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The abstract

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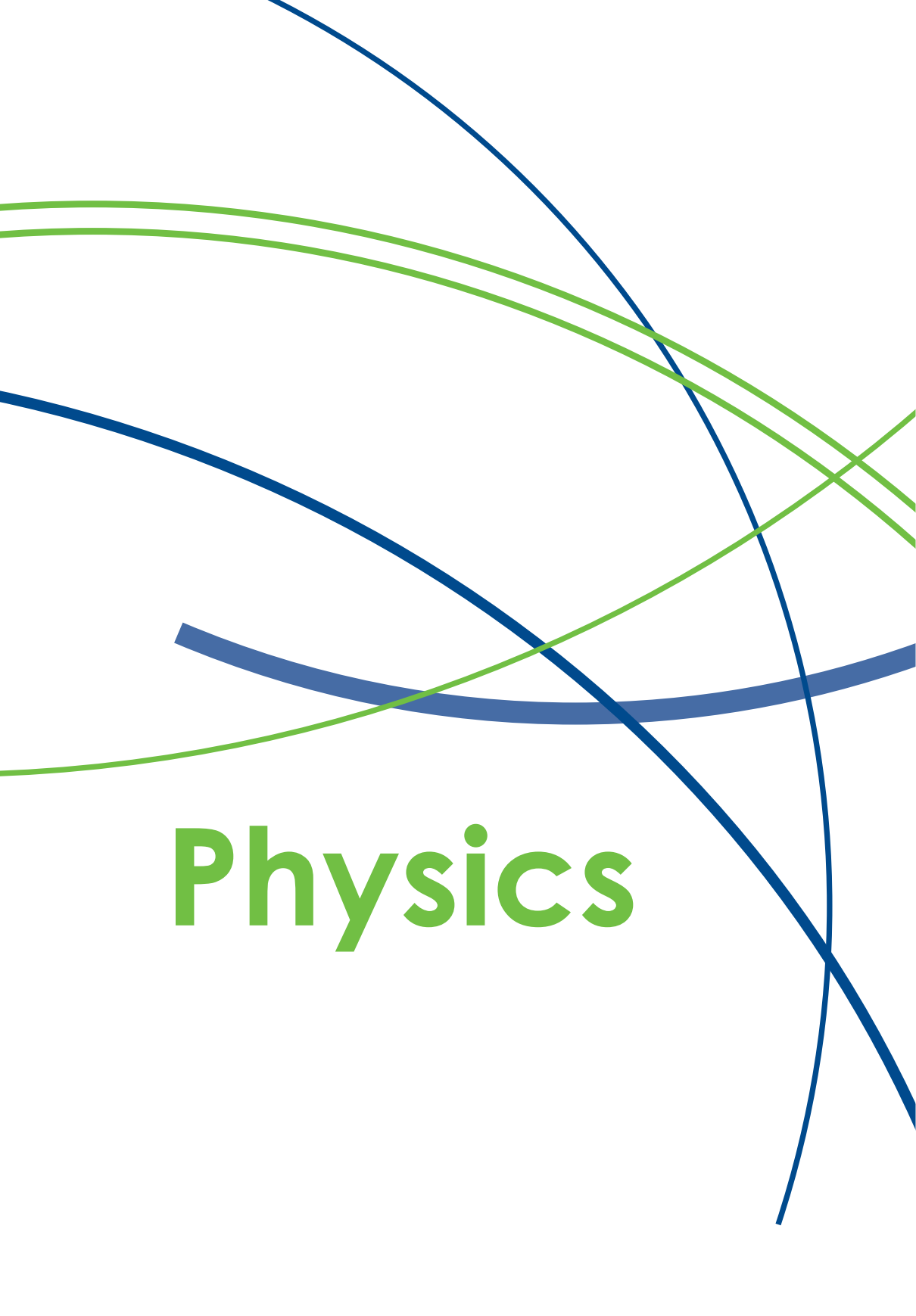
Physics

ORAL PRESENTATIONS

P 1.1
MODELING ASYMTOTIC GIANT BRANCH STARS

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It is known that half of the heavy elements beyond copper are synthesized in a peculiar class of stars called “Asymptotic Giant Branch stars (or shortly AGB stars)”.
Such evolved stars have complex structures, and since they have high power (or luminosities), they can be observed even in external galaxies.
We present some basic discussion about the modeling of these stars to get better insight on their interesting complex structures and how these structure are linked to the heavy-element production.

P 1.2
HEAVY ELEMENT SYNTHESIS IN MASSIVE STARS

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Massive stars of masses in excess of 10 solar masses are major contributor to the heavy element production in the universe. Massive stars evolve through complex thermonuclear fusion phases where heavy elements are synthesized.
We present a typical evolutionary calculation of a massive star and emphasize how the heavy elements are produced during its evolution. We focus on the so called slow neutron-capture process, or s-process occurring

P 1.3
ROTATIONAL EFFECTS IN STELLAR EVOLUTION

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The effect of rotation on the evolution of stars is a complex and not yet fully explored. In this contribution, we present a basic discussion of various rotationally induced instabilities which appear to be influencing the star's evolution.

P 1.4
A SEARCH FOR A CORRELATION BETWEEN THE MASSES OF SUPERMASSIVE BLACKHOLES AND THE HOST GALAXY HALOS

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Data has been accumulating over the last several years on an increasing number of galaxies in terms of measurements of the bulge velocity dispersion, mass of the central supermassive blackhole (SMBH), Mbh, and the circular velocity, Vc. It is becoming possible to start asking, and attempting to answer, big questions about the processes that govern the formation of galaxies and their central SMBHs. One way to approach these issues is to phrase these question by comparing observed correlations Vc and Mbh with theoretical correlations obtained from models of galaxy/ SMBH formation. We found a correlation between Mbh and Vc based on analysis of 16 galaxies (Sabra, Abi Akl, & Chahine 2008): Mbh proportional to Vc taken to power 6.7, contrary to theoretical models that predict a power of approximately 4. We present in this contribution an analysis based on

a larger sample. We build a heterogeneous sample of 340 galaxies: 33 of which have Mbh and Vc. We wish to stress here that our approach relies on directly measured Mbh·s (dynamical), as opposed to studies that use Mbh derived indirectly. Vc is a measure of the dark matter halo. Hence, our approach probes directly the relation between the supermassive blackhole and the dark matter halo. Based on our increased sample, we find that the previously observed correlation vanishes. We discuss the new result and also its implications on models galaxy formation.

P 1.5
SEARCHING FOR THE SITE OF A LEBANESE NATIONAL OBSERVATORY

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Based on 1:20000 maps and Google Earth surveys, we have identified a list of seven sites on the two Lebanese mountain ranges offering interesting prospects for the development of a National Observatory. Some have been visited for 2 to 3 nights each to observe their local conditions and produce a preliminary survey of seeing measurements. These are measured with a DIMM set-up. Results for the measurements of four of these sites are presented showing some subarcsecond nights.

P 1.6
INFRARED PROPERTIES OF B[E] STARS FROM THE 2MASS CATALOG

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We have selected a sample of 157 B[e] stars for which we were able to obtain all data required to correct their 2MASS measured fluxes for interstellar extinction. We have plotted the sample in a (J-H)-(H-K) diagram and compared the loci of stars with the main sequence. We note that, for a sample, there is no segregation of the different subclasses of B[e] stars in the color-color diagram. The loci of stars seem to be very well fitted by a linear fit. We also discuss the different methods used to correct for interstellar extinction and their implications to our results.

P 2.1
APPLICATIONS OF HYBRID NANOPARTICLE IMAGING IN NEAR FIELD OPTICAL MICROSCOPY

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Hybrid nanoparticles have been proven to be essential actors in fields such as biomedical imaging, and therapeutic treatment[1,2]. In this presentation, we shed light on two different applications that add much importance to their use: We present the optical properties of such nano-objects, in order to prove possible the feasibility of a biosensor which is capable to detect the binding of biomolecules, through the use of near field optical microscopy (SNOM). In this case, Localised Surface Plasmon Resonance plays a majors role for fluorescence emission. We also propose a new SNOM excitation method, where we demonstrate that optical waveguides can serve as an illumination source for the imaging of nano-objects in near field optical microscopy. Nanoparticles deposited on the surface of glass waveguides, thus lying in their evanescent waves are imaged at high resolution.

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P 2.2
L’INFLUENCE DES NANOMATÉRIAUX SUR LES CELLULES SOLAIRES

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Les cellules photovoltaïques standards montrent une limitation intrinsèque en termes de rendement de conversion énergétique : on sait que quelque soit le degré d›optimisation des dispositifs, une jonction simple ne dépassera jamais 31% de rendement.
Pour dépasser cette limite, une rupture technologique est nécessaire, soit par une architecture de dispositif différente (exemple multi-jonction en série) soit par une transformation du spectre lumineux incident (matériaux optiques à up et down-conversion). La plus grande complexité de telles architectures reste acceptable dans la mesure où une réduction de coût est réalisable.
De nombreuses publications attestent aujourd›hui que l›introduction des nanomatériaux dans la filière photovoltaïque pourrait créer le potentiel de dépasser un certain nombre de ces limites. Les nanomatériaux présentent des propriétés physiques particulières, ils sont connus pour leurs propriétés optiques et électriques, affectant principalement la structure de la bande interdite des matériaux semi-conducteurs.
Dans le domaine photovoltaïque, ces différentes propriétés peuvent être exploitées de différentes façons. De nombreux groupes de chercheurs dans le monde étudient différentes applications de ces propriétés, dans une perspective de gain en rendement de conversion.

Dans ce travail on va simuler deux cellules solaires réalisée par le logiciel de Simulation SILVACO 2007 Licence Unité de Recherche Matériaux et Energies Renouvelable, Notre Etude est consacré sur l'amélioration du transport de charge ainsi que l'influence de quelque paramètre optique sur nos cellules solaires à bases des fils nanomatériaux introduites et des cellules solaires simples à base du SiGe/Si.

Mots clés :
Photovoltaïque, Nanomatériaux, Semi-conducteur, SILVACO

P 2.3
NANOPHOTO POLYMERIZATION TRIGGERED BY THE ENHANCED OPTICAL NEAR FIELD OF METALLIC NANOPARTICLES

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A novel technique of nanoscale photo polymerization induced by the local electromagnetic field of metallic nanostructures is developed. Silver colloidal nanoparticles (CNP) are used as a nanoantenna to trigger the photo polymerization. The glass slide was functionalized to create an amine-terminated selfassembled monolayer on which silver nanoparticles were strongly bounded to the glass surface. In parallel, a photosensitive formulation is firstly developed and is subsequently characterized by an Argon laser source coupled to an inverted optical microscope, in order to determine its threshold dose of photo polymerization. Finally, an irradiation

of the CNP is done using a dose smaller than the threshold dose already characterized, in such a way that the photo polymerization around the MNP is achieved by their enhanced optical near field. The AFM images of MNP after irradiation show two lobes of polymer in the direction of the incident field's polarization. These results are displayed in figure 1. This approach has overcome all the difficulties faced by scanning probe methodologies to reproduce the form of the near field of the localized surface plasmons and provides a new way to quantify its magnitude. Furthermore, this approach leads to the production of polymer/metal hybrid nano-systems of new optical properties.

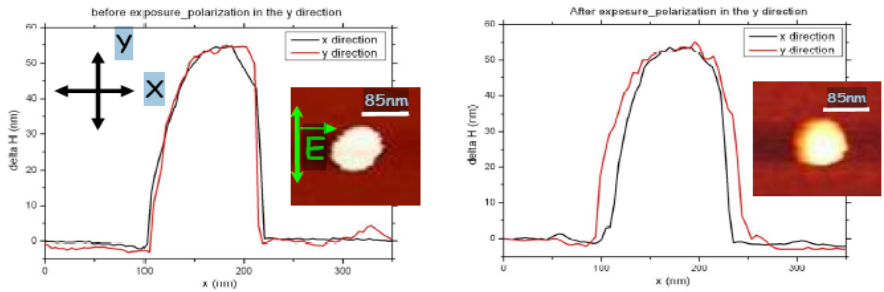

Fig.1. AFM image for the same CNP before and after exposure with a dose slightly smaller than the threshold dose. The elongation of the particle (of 30nm) in the direction of the incident field is quite obvious.

P 2.4
STABILITY STRUCTURE OF THE MULTILAYERED NANOSTRUCTURE OF SELF-ASSEMBLING SYMMETRIC DIBLOCK COPOLYMERS DOPED WITH MAGHEMITE NANOPARTICLES

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We demonstrated successful stability structure of a multilayered nanostructure of Self-Assembling symmetric Diblock copolymers doped with maghemite Nanoparticles, both in nanometer thickness, by utilization

of thin films of symmetric polystyrene-block-polybutylmethacrylate (PS-d-PBMA) and nanoparticles of maghemite (γ-Fe2O3) of average size 35Å covered by a PS layer of short chains (M w =13 K). On one hand, the strong interaction between the Polystyrene block (PS) and the substrate; while on the other hand, the lower surface energy of the PS block and the Air, have generated a multilayer of lamellae parallel to the substrate with a symmetric wetting configuration. The lamellar order is maintained up to volume fractions of the order 20% of nanoparticles according to atomic force microscopy and to Transmission electronic microscopy. A unidimensionnal magnetic liquid is thus realized, with a periodic distribution of the nanoparticles in the polymeric matrix.

Keywords: Smectics, Copolymers, Nanoparticles, Magnetic fluids, Atomic force microscopy, Transmission electronic microscopy.

P 2.5
INTRODUCTION TO THE FIELD OF FUSION ENERGY AND THE ROLE OF TURBULENCE AND DISRUPTIONS

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Controlled thermonuclear fusion is one of the most promising ways to produce energy beyond 2050 [1]. A large body of technical and scientific challenges remains mainly concerning radial turbulent transport in these devices which strongly degrades the confinement [2]. We are in the process of building a fusion simulator at AUB consisting of a linear plasma device with the goal to initiate a group working on turbulence and doing fusion research. In parallel, we aim at building in-house numerical knowledge by developing code(s) to simulate two- dimensional (2D) turbulence [3,4]. The strong magnetic field (B) in magnetic fusion devices leads to almost

no uctuations in its direction, whereas in the direction perpendicular to B complex motion and turbulence develops often caused by the pressure gradient. The results of the numerical simulations will be compared to the experiment with the purpose to have strong interaction between the two fields. In particular, we want to understand the non-stationary behavior of the instability observed in linear devices [5] and the theory should allow us to have a better understanding of the phenomena involved.

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P 2.6
HIGH ENERGY PIXE AT ARRONAX

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ARRONAX, acronym for «Accelerator for Research in Radiochemistry and Oncology at Nantes Atlantique», is a high energy and high intensity cyclotron. It is mainly devoted to the production of radionuclides for medicine. Its main characteristics are: acceleration of both proton and alpha particles at high energy (70 MeV). It will turn into operation in October 2009 in Nantes (France). One of the beam line is devoted to research in physics. Several experimental set up are being build among which a high energy PIXE. The benefits of Highenergy PIXE is the significant increase of the Klines Xray production crosssections with respect to those of lower energy protons. This makes possible the identification of medium and heavy elements not only by their Llines but also by their Klines. As the K Xray spectrum for an element is less complex than the corresponding L Xray spectrum, the data analysis is simplified. Moreover, due to the the decrease of the stopping power at larger proton energies, a strong reduction of the target irradiation damage is expected. The range of higher energies proton and the low attenuation of the hard Xray represents an asset for the

analysis of thick targets. In this talk, I will present the ARRONAX facility and describe the characteristics of highenergy PIXE and the possible applications.

P 3.1
MICROSCOPY OF ELECTRONIC WAVE-FUNCTION IMAGING, SIMULATION & MODELISATION

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In the velocity-map imaging, charged particles (ions / electrons) with a kinetic energy of order eV are projected to a position sensitive detector. The resulting image is the projection of a traditional sphere of Newton. Through an inversion method, it is possible to reconstruct the 3D distribution of the initial speed of the particles. So surprising, when this technique is improved to allow the study of slow electrons (meV), the result of screening is drastically changed. The most striking is the presence of modulation in the radial distribution of the image. These fringes are interpreted in terms of quantum interference between different paths that lead the electron into the detector. Part of the ejected electronic wave package re-circulates by the ionic core. This indirect trajectory is observed in the images. Simulations based on the propagation of wave packets allow the separation of the different effects of the ionic and electronic core. We showed that when the ionization of a hydrogenoid atom occurs at Stark resonance of the continuum, the observed image represents a direct macroscopic projection of component related to the electronic wave function. But when the atom is considered as non-hydrogenoid, the effect of the electronic core changes the wave function, leading to a continuous evolution of the interferogram independent of the Stark structure of the continuum. An analytic model characterizing the experiment and identifying the observed images is going

to be presented. Experimental results for Li atoms and simulated results for H and Li atoms will be also displayed.

P 3.2
HIGH-PRESSURE HIGH-TEMPERATURE LOCAL STRUCTURAL STUDY OF PBZR0.52TI0.48O3

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Ferroelectric materials with the perovskite structure have drawn considerable attention for many years. Among them, PbZr1−xTixO3 (PZT) materials are particularly interesting due to their high piezoelectric response in the so-called “morphotropic phase boundary” (MPB) region. Recently, synchrotron X-ray powder diffraction experiments done by Noheda et al. showed the existence of a monoclinic (M) phase (near x ~ 0.5) between the tetragonal and rhombohedral phases1,2. The effect of high pressure on the physical properties of PZT has been studied recently3. Experiments based on electron diffraction4 and neutron diffraction studies5, Raman scattering results6, as well as theoretical calculations7 have indicated the existence of an intrinsic short range dynamical disorder over nearly the entire PZT solid solution. Rouquette et al. observed the presence of diffuse X-ray/neutron scattering in PbZr0.52Ti0.48O3 diffraction patterns which is an evidence of local lattice deformations with respect to the average structure. Additional high pressure high-temperature investigations showed the disappearance of the polar phonons A1(TO) (which is the origin of the ferroelectric instability) upon compression around 5 GPa in agreement with neutron diffraction data. High-pressure high-temperature EXAFS experiments were carried out on BM29 at the ESRF to follow the corresponding changes in short-range order around Zr at the ferro-to-paraelectric phase transition.

The EXAFS results at 300 K isotherm show a change in the fine structure that starts at 5.3 GPa and this is in consistent with the value of the curie pressure Pc obtained by neutron diffraction3 and Resonance Raman Spectroscopy3 experiments. By fitting the first coordination shell (Zr,Ti) O6 octahedra using a cubic model, the values of the Debye-Waller (DW) factor at different pressure points were obtained. A noticeable drop in the DW factor above 6 GPa was observed, and these values agree with the value of the DW for BaZrO38 that has a centrosymmetric structure with no shift in the position of the Zr atom. This drop at an isotherm can be considered as a representative of the polar displacement and therefore of the ferro-to-paraelectric phase transition. Below 6 GPa, the obtained values of DW are in good agreement with what was obtained for PZT9.

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P 3.3
DEVELOPMENT AND CHARACTERIZATION OF A LOW-PRESSURE PLASMA SYSTEM FOR MATERIAL SURFACE STUDIES

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Low pressure plasmas (below 1 Torr) are extensively investigated because of their broad range of applications in high-impact technological fields. For example, such plasmas are used for improving adhesion between surfaces by enhancing bondability on substrates such as glass or polymers through the control of surface energies. Oxygen plasmas are also utilized in the growth of oxide materials that play a central role in the semiconductor and opto-electronic industry. Remote plasma processing allows for the possibility of oxidizing a material by exposing it to an oxygen reactive species generated by the plasma. It is formed when plasma diffuses and expands at low pressure thereby making the process scalable and applicable to large surfaces. One of the most important type of species present in the remote plasmas are the free radicals that have a high chemical reactivity and promote compound formation at temperatures much lower than those required by purely thermal reactions. In addition, remote plasmas have a low thermal budget since they induce little heating of the treated material; this factor is very important because it allows independent control of plasma conditions and substrate temperature. The aim of this work is to characterize the oxygen plasma generated by a microwave source that is being used for thin film growth and oxidation. The study consists in evaluating the oxygen atomic den- sity by optical emission spectroscopy and determining the electron density and electron temperature in the remote plasma using Langmuir probes. Tests of oxidation of pure metallic films through thermal treatment in the oxygen remote plasma have also been performed. A parametric study as a function of operating conditions, namely microwave power, flow rate, chamber pressure, plasma source-substrate distance, and substrate temperature, has been achieved in order to optimize the oxidation process and correlate it to plasma operating conditions.

P 3.4
ACTIVITY CONCENTRATIONS OF POLONIUM-210 AND LEAD-210 IN LEBANESE FISH

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As part of marine environmental monitoring program, the activity concentrations of Po-210 and Pb-210 were determined in 5 different species of benthic and pelagic marine fish, collected from the fresh catch sold in the local markets in 4 different stations along the Lebanese coast.
A total number of 11 samples were collected such that they represent the mostly consumed species by the majority of the Lebanese population. Po-210 was measured by alpha spectroscopy, after chemical separation consisted of drying, digestion, tracer addition and then spontaneous deposition on a silver disk. Pb-210 was analyzed directly using gamma spectrometer with extended range low-level High Purity Germanium detector of relative efficiency 50 %. The activity concentrations varied between 0.8 and 156 Bq/kg dry for Po-210, and between 11.35 and 35.4 Bq/kg dry for Pb-210. These variations are due to the differences in metabolism and feeding patterns. The highest concentrations were found in the pelagic species. Many factors may be the reasons of these concentrations such that, particulate stream run-off, particulate scavenging process, and precipitation process.

P 3.5
COLD TARGET RECOIL ION MOMENTUM SPECTROSCOPY (COLTRIMS) ENDSTATION FOR ATOMIC, MOLECULAR AND CLUSTER SCIENCE RESEARCH USING THE PROPOSED VUV AND SOFT X-RAY BEAMLINE AT SESAME SYNCHROTRON

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A COLTRIMS endstation for atomic, molecular and cluster science research is planned to be built and operated at the proposed VUV and Soft X-Ray beamline at SESAME Synchrotron. The COLTRIMS endstation will be interchangeable with other endstations belonging to the research community at large. The proposed beamline is ideally suited to our needs, and the development of the endstation will place our group in a favorable position to perform cutting edge research at SESAME. The COLTRIMS technique is a revolutionary technique that has been developed in the early 1990's and is frequently referred to as a reaction microscope. It is an imaging technique to measure the complete fragmentation of few-body systems. It utilizes supersonic cooling of targets, position imaging, time-of-flight coincidence, and multi-hit detection of charged fragments from reactions to obtain the fragments' three dimensional momentum vectors. The wealth of information obtained enables unprecedented level of scrutiny of atomic, molecular and cluster interactions. Currently, there are a number of operational COLTRIMS setups at many of the third generation synchrotron radiation facilities around the world. This talk includes a description of the design features of the COLTRIMS endstation. In addition the main components of the COLTRIMS technique will be also introduced in more detail. Some of the distinguished experimental studies performed using the COLTRIMS imaging technique will be also discussed to demonstrate the powerful of this imaging technique. Moreover, the efforts done by the COLRTIMS research group to support building up this endstation as well as letters of the international supporters will be presented. Finally, the rich future potential of this endstation will be envisaged.

P 3.6
PROPRIETES DU TRANSPORT ELECTRONIQUE DES SEMICONDUCTEURS ZNSE ET ZNTE

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Le but de cet article est l'étude des propriétés du transport électronique des semiconducteurs binaires ZnSe et ZnTe par la méthode de Monte Carlo. Nous nous intéressons particulièrement à l'étude de l'énergie en fonction du temps des électrons ainsi que leur vitesse de dérive en fonction du champ électrique appliqué et ceci pour les différentes vallées (Γ, L, X) de la bande de conduction Une étude comparative est ensuite faite. Les résultats montrent que plus le champ appliqué est fort plus les propriétés de transport sont meilleurs jusqu'à une valeur critique du champ appliqué.

Mots-clé : matériaux semiconducteurs, méthode Monté-Carlo, vitesse de dérive, énergie électronique, vallées (Γ, L, X).

P 3.7
COMPUTATIONAL TREATMENT FOR THERMAL SHOCK PROBLEM FOR GENERALIZED THERMOELASTIC LAYERD COMPOSITE MATERIAL

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The dynamic treatment of one-dimensional generalized thermoelastic problem of heat conduction is made for a layered thin plate, which is exposed, to a uniform thermal shock. The basic equations are transformed by Laplace transform and solved by a direct method. The solution was applied for a plate of sandwich structure. The inverses of Laplace transforms are obtained numerically. The temperature, the stress and the displacement distributions are represented in graphs, which show the coupled and the generalized cases.

Keywords: Thermoelasticity- Laplace Transforms - Layered Composite.

P 4.1
THE MEDICAL PHYSICIST AND ADVANCED TECHNOLOGY IN THE FIELD OF SCIENCE AND MEDICINE

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Medical physics is the branch of physics concerned with the application of physics to medicine, particularly in the diagnosis and treatment of human diseases. The main areas of interest at present are in the treatment of cancer by ionizing radiation (Radiation Oncology), in diagnostic imaging with x-rays, ultrasound and nuclear magnetic resonance (Diagnostic Radiology), in diagnostic imaging and treatment with radioisotopes (Nuclear Medicine) and in the study of radiation hazards and radiation protection (Health Physics). Medical physicists are scientists. It is through science that they are able to identify problems and unveil deficiencies. It is also through science that they solve the problems and correct the deficiencies. From the time when Wilhelm Roentgen and other physicists made the discoveries which led to the development of Diagnostic Radiology, Radiotherapy, Brachytheraphy and Nuclear Medicine, medical physicists have played a pivotal role in the development of new technologies that have revolutionized the way medicine is practiced. In today›s health care scene, the medical physicist is essential to the safe and cost effective operation of any creditable medical institution. There will be exciting and difficult challenges in the field of health care during this century. Count on the science of Medical Physics to help you meet the challenge.

P 4.2
NUMERICAL SIMULATION BY MOLECULAR DYNAMICS OF THE GLASS $B_2O_3SIO_2$

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Computational chemistry is a topic whose progress is closely related to the current technology of computers. Molecular simulations are important in designing new materials, pharmaceuticals, in Biological chemistry and physics. Molecular dynamics involves the integration of classical trajectories in phase space random selection for their initial conditions. Molecular simulations have become a powerful tool in investigating the microscopic behaviour of matter as well as in calculating macroscopic observable quantities. Glasses are routinely studies using molecular dynamics, correlations functions has been particularly successful for studies of condensed matter systems. In this work, we use those functions to study the structure of $B_2O_3SiO_2$, using Dl_Poly code.

Keywords: numerical simulation, molecular dynamics, structure, glass, Dl_Poly.

P 4.3
EFFECTS OF SOME PARAMETERS (N_0, S AND $\frac{\beta}{\gamma}$) ON TL GLOW-CURVES

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In this paper, we are interesting to the effect of some trap parameters on the thermostimulated luminescence bands. We study in particular, the the retrapping-recombination ratio $\frac{\beta}{\gamma}$ on TL glow-curves using an appropriate numerical program. We are limited in this work to the first and second order of kinetics. The numerous trap parameters used in the equations describing the thermostimulated luminescence intensity show the difficulties to give an adequate interpretation to the band emission. We have analysed deeply the retrapping-recombination ratio effect on the glow curve which is shown to have retarding effect on the band emission.

Keywords: traps, luminescence, simulation, defects.

P 4.4
HAMILTONIAN FORMULATIONS IN TERMS OF RIESZ FRACTIONAL DERIVATIVES

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The traditional calculus of variations is extended to be applicable for systems containing fractional derivatives. This paper presents fractional Lagrangian and fractional Hamiltonian for systems containing Riesz fractional derivatives (RFDs). The Hamilton·s Equations of motion are defined in terms of (RFDs).

P 4.5
PGNAA IN LARGE SAMPLE USING ^{241}AM-BE NEUTRON SOURCE: SIMULATION WITH MONTE CARLO CODE MCNP

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A simulation method based on MCNP 4C code (Monte Carlo N- Particle) was used to determine cadmium concentration in large sample of water. The simulation consists on PGNAA (Prompt Gamma Neutron Activation Analysis) setup composed principally by an ^{241}Am-Be neutron source, large sample of pure water and a shielding material for gamma-ray GeHP detector. Using the calculated neutron thermal flux and detector efficiency

curve by MCNP, the concentration of cadmium in water was found similar to the known amount of cadmium dissolved and irradiated by the ^{241}Am-Be.

Keywords: Large sample, PGNAA, MCNP, ^{241}Am-Be neutron source.

P 4.6
PULSED LASER DEPOSITION OF TUNGSTEN THIN FILMS ON GRAPHITE FOR MAGNETIC FUSION APPLICATIONS

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Tungsten is one of the candidate materials to be used as a first wall material in fusion reactors and is presently investigated on the ASDEX-Upgrade tokamak. Coatings of Tungsten on CFC tiles were done by several techniques and their efficiency evaluated at the Max- Planck-Institut fr Plasmaphysik (Germany). Improvement in the production of these wall materials is an ongoing process. The pulsed laser deposition (PLD) technique has never been used to this purpose and it is our challenge to perform the coating and to test its properties. We present results of thin coatings of Tungsten on Graphite by ablating a 99.99% Tungsten target using a 20 ns KrF excimer laser (λ= 248 nm). Two types of substrates were used: The main body of work so far was done on substrates fabricated by pre-depositing Graphite on Si(100) substrates. The other substrate used is a Graphite (CFC) pucks provided by the Max-Planck Institute matching specifically those already used in fusion reactors and compatible with ITER. The two substrates have different properties in terms of crystalline structure, roughness, thickness, as well as other physical properties. The effect of back- ground gas pressure, substrate temperature, laser fluency, and substrate properties is studied using several techniques including X-ray diffraction, AFM, surface profileometry, and Rutherford Back Scattering

(RBS). The key goal is to assess the quality of the Tungsten thin films in terms of adherence, coverage, and overall quality.

P 4.7
STOPPING POWERS OF MYLAR AND POLYPROPYLENE FOR ^{16}O FROM 1.6 TO 5.5 MEV/U

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Stopping powers of mylar and polypropylene for $_{16}O$ from 1.6 to 5.5 MeV/u have been measured by transmission technique. No previous data have been published with these ions in the energy range of 1.6 to 5.5 MeV/u in such film. The obtained data are compared with the values predicted by the codes of calculations, SRIM-2006, MSTAR and PASS. The effective charge values of these ions have also been deduced from the experimental set of data.

Keywords: Stopping powers, effective charge, SRIM-2006, MSTAR, PASS, Mylar, Polypropylene, $_{16}O$.

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P 4.8
A QUANTUM MECHANICAL APPROACH TO BULK WATER NMR

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The present work provides a quantum treatment of bulk water NMR in order to use such a simple system with magnetic field gradients as a quantum computing device alternatively to the use of NMR of specific molecules. The hydrogen nuclei are treated in a first part as independent particles which undergo sequential pulses and the total magnetization is determined by means of their individual wave functions. In a second part it is shown that an interaction between the proton spins of water molecules is necessary to explain multiple echoes after only one pulse. The theoretical treatment is confronted with experiments on macroscopic samples at room temperature and reproduces satisfactorily the evolution of the nuclear magnetization even in some inhomogeneous magnetic fields. The experiments show multiple spin echoes for different pulse angles which can be reproduced by a simple parameterization of the phenomenon.

P 5.1
UTILIZING X-RAY FLUORESCENCE ANALYSIS FOR THE STUDY OF ARCHEOLOGICAL ARTIFACTS

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One of the most prominent problems in archeology is the identification of the origin of artifacts found at historical sites. Moreover, pottery artifacts constitutes a special challenge, since they are usually found in abundance in the form of small to medium size fragments, that are eventually glued together to reconstruct the original object. Reconstruction processes depend on matching the fragments like a jigsaw puzzle, depending on visual characteristics such as shape, size, color, and texture. Most of the time, such reconstruction techniques succeed in reproducing the original object, other times however such a task becomes very difficult due to either the presence of too many fragments with similar visual characteristics, or the lack of enough fragments for the reconstruction of a complete artifact. In the latter case the missing pieces are usually replaced by fragments made from a material similar in general characteristics but definitely not similar in chemical composition.

Short of performing chemical analysis on every pottery fragment found at the site, there are no other credible way of identifying which fragments belong to which object, and what material to use to replace missing fragments. X-ray fluorescence analysis offers a solution to such a problem. Being a non-destructive technique, XRF could be utilized to perform chemical analysis on different types of materials to detect elements in the range of Na to U.

In this project pottery fragments from the same object are analyzed using a hand held micro XRF analysis system. The objective here was to determine the possibility of accurately matching a number of pottery fragments depending on their chemical composition. Analysis was first performed on different points of the same fragment and then four different fragments from the same clay pot to determine chemical compatibility within acceptable statistical limits.

Results show that analysis of different points of the same fragment shows a rather homogeneous spatial distribution of the majority of the elements, with slight differences in concentration for minor elements. No statistically viable differences were seen between the four different fragments.
We conclude that XRF could be utilized to discern similarities in chemical composition of historical pottery artifacts. Similar experiments should be conducted to compare chemical composition of pottery originating from different geographical locations.

P 5.2
TOPICS RELATED TO HOPPING CONDUCTION IN DOPED SEMICONDUCTORS

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The activation energy E_3 in the nearest neighbor hopping conduction regime for doped semiconductors is calculated taking into account the partial overlap of the adjacent wave functions of impurity sites. Initial increase in the activation energy E_3 is observed as the donor concentration is increased. This is followed by a gradual decrease at higher concentrations. The critical concentration at which metal-insulator transition occurs can be predicted.

P 5.3
SMALL-SIGNAL MODELING OF PHEMTS AND ANALYSIS OF THEIR MICROWAVE PERFORMANCES

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Accurate extraction of the small-signal equivalent circuit of GaAs microwave field effect transistors (GaAs FET) is crucial for efficient design of microwave analog circuits such as low noise amplifiers (LNAs). This paper proposed an improved direct analytical extraction procedure. Its efficiency was demonstrated through the characterisation of two 1μm gate-length pseudomorphic heterojonction transistors.

Keywords: pHEMT, extraction, small signal modeling.

P 5.4
DEPENDENCE OF BACKGATING ON THE TYPE OF DEEP CENTERS IN THE SUBSTRATE OF GAAS FETS

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The reduction of the conductance of GaAs FETs by a negative voltage applied to the substrate, termed backgating or sidegating, is numerically modelled to clarify which type of traps is responsible. Modelling is carried out for several sets of deep levels in the substrate. It is observed that deep acceptors are mainly responsible for backgating independently of the shallow level type in the substrate. In this case there is no threshold. When deep donors are present in the substrate, it is observed that backgating is reduced and there is a threshold. The presence of a buffer layer between the channel and the semi-insulating substrate also helps in reducing backgating.

P 5.5
POTENTIAL ENERGY CURVES, PERMANENT AND TRANSITION DIPOLE MOMENTS FOR NUMEROUS ELECTRONIC EXCITED STATES OF CAAR

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The adiabatic potential energy curves and the permanent and transition dipole moments of the low-lying electronic states of the CaAr molecule dissociating into Ca(4s,3d,4p,5s,4d,5p,4f,6s) + Ar have been investigated. The electronic structure of the Ca-Ar molecule is investigated using [Ca2+] and [Ar] core pseudopotentials complemented by core polarization operators on both atoms and full configuration interaction calculations through the CIPSI quantum chemistry methods the molecule is considered to be a two-electron system. The potential energy curves and the spectroscopic constants of all CaAr states dissociating into atomic configurations ranging between the ground state 4s and excited states 6s are determined. The derived spectroscopic constants of the ground state and lower excited states are in good agreement with available experimental and theoretical works.

Keywords: pseudopotential, Configuration interaction, Spectroscopic constants, permanent and transition dipole moments.

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P 5.6
PILOT STUDY OF PATIENT DOSES FROM CONVENTIONAL DIAGNOSTIC RADIOLOGY IN LEBANON

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The widespread use of x-ray examination and the increased utilization of recent development of remarkable x-ray equipment have improved the lives of patients in Lebanon; however, this evolution of imaging has also resulted in a significant increase in the population's cumulative exposure to ionizing radiation. The objective of this study is to assess the patient doses for most frequent x-ray examinations in Lebanon by measuring the entrance skin dose for patients within the weight range of 65 to 70 kg taken in some of the Lebanese hospitals. This study gives preliminary results of a pilot project on "improvement in x-ray image quality and reduction in patient dose in radiology" launched by the IAEA and Lebanon –LAEC as a first step towards the standardization of medical imaging procedures in Lebanon. Quality control checks on the x-ray machines used for the study should be performed prior to the experimental investigations. The results will be compared between involved hospitals and compared to the international reference levels of patient dose; this study will help to provide a more unified diagnostic radiology practice and help to reduce patient exposure levels to those comparable to IAEA standards. We hope through this effort to establish in the near future a national reference dose levels in Lebanon.

P 5.7
SIMULATING BI-DIMENSIONAL TURBULENCE IN FUSION PLASMAS USING THE HASEGAWA-MIMA EQUATION

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Controlled thermonuclear fusion is one of the most promising ways to produce energy beyond 2050. Its strategic importance is reected in the recent international agreement to build the world biggest toroidal fusion device (tokamak called ITER) [1]. A large body of technical and scientific challenges remains mainly concerning radial turbulent transport in these devices which strongly degrades the confinement [2]. We are in the process of building a linear plasma device at AUB and in parallel, we aim at building in-house numerical knowledge by developing code(s) to simulate two-dimensional (2D) turbulence. The strong magnetic field (B) in magnetic fusion devices leads to almost no uctuations in its direction, whereas in the direction perpendicular to B complex motion and turbulence develops often caused by the pressure gradient. Combining the parallel and perpendicular dynamics lead to the so-called Hasegawa-Mima [3] and Hasegawa-Wakatani [4] equations. Our goal is to study first the mathematical foundations of the solutions of these equations and then to perform numerical simulations in cylindrical coordinates. We present the physics basics of the Hasegawa-Mima equation and discuss the numerical tools to simulate plasma turbulence in cylindrical coordinates. Preliminary results are also discussed with the ultimate goal to compare them with the experiment.

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P 5.8
AB-INITIO STUDY OF THE GROUND AND EXCITED STATES OF CAH^+ MOLECULE

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All adiabatic curves of CaH^+ dissociating into Ca^+ (4s, 3d, 4p, 5s, 4d, 5p, 4f, and 6s) + H (1s, 2s, 2p) and Ca^{2+} H^- are determined by an ab-initio approach involving a non-empirical pseudo-potential for the Ca core, imperatorial core-valence correlation, and full valence configuration-interaction approaches through the CIPCI quantum chemistry methods the molecule is considered to be a two-electron system. The potential energy curves and the spectroscopic constants of all these states are presented. A very good agreement is obtained for some lowest states of the CaH^+ molecule for spectroscopic constants with the available theoretical works. Also we have calculated permanent and transition dipole moments for several states.

Keywords: Ab initio, Born–Oppenheimer approximation, Pseudopotential, Spectroscopic constants, Dipole moments.

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POSTERS PRESENTATIONS

YIG THIN FILMS DEPOSITED IN THE PRESENCE OF OXYGEN AT HIGH SUBSTRAT TEMPERATURE

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A thin films of YIG deposited using a magnetron sutter techniques on quartz substrat in the presence of oxygen. The oxygen fraction of sputter gas varied from 0 to 20%. At a fraction equal to 20%, the magnetic values of the film are higher then the massive material. In particular, the saturation magnetization, stoichiometry and refractive index varies with the fraction of oxygen. For the films prepared at low value of oxygen fraction, the saturation magnetization is lower than that of the massive material, the stoichiometry and refractive index decreases with the oxygen fraction. The variation of the chemical stoichiometry as well as the other caracteristic values are related to the structural and physical features of the YIG film. At a value of 10%, leads to increase the saturation magnetization at its maximum value, which is required in microwave applications, but compared to the X-ray diffraction diagram that do not have the correct phase of YIG.

FABRICATION RAPIDE ET PEU COUTEUSE DE CIRCUITS MICROFLUIDIQUES ET LEURS APPLICATIONS POUR LES ANALYSES CHIMIQUES ET BIOLOGIQUES

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A nos jours, la miniaturisation de systèmes d'analyses chimiques et biologiques devient une nécessité pour améliorer la sensibilité et économiser le temps et le coût des analyses. Le verrou principal face à la microfluidique réside dans la complexité de fabrication de ses microsystèmes exigeant le passage en salle blanche. Pour remédier à ce problème, nous avons développé un procédé utilisant une résine sèche photosensible pour la microfabrication de réseaux microfluidiques. Les avantages de ce procédé par rapport aux méthodes conventionnelles sont (i) la simplicité (ii) la rapidité (iii) le faible coût de fabrication. Des structures de 35 µm de largeur sont obtenues en trois minutes. Les microcanaux fabriqués peuvent atteindre un rapport de forme de 3,5 et ont montrés leur fiabilité en tant que moules pour faire des réplications par 'soft lithographie' dans le poly(diméthylesiloxane). Cette méthode nous a permis de fabriquer un diluteur microfluidique, et d'intégrer des microélectrodes dans les canaux de sortie pour quantifier, par voie électrochimique, des molécules électroactives. Les biologistes ont utilisé le diluteur pour étudier la réponse des cellules face à un gradient de molécules chimioattractantes.

LOW AND WIDE GAP ORGANIC SOLAR CELLS PARAMETERS EXTRACTION FROM ILLUMINATION CURRENT-VOLTAGE

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An improved method based on Matlab code for the simultaneous determination of the different solar cells parameters from illumination current-voltage characteristics has been developed. These parameters are the ideality factors, saturation current, photocurrent, the series and shunt resistance. The validity of this method has been checked by comparing the results obtained here from two pin organic solar cells based on low and wide gap structures which can strongly improve the performance of organic solar cell. The method is very convenient to use and the reasonable agreement between experiment study and calculation results confirms the model.

Keywords: solar cells, extraction, low-gap, wide-gap, physical parameters, I-V.

OPTIC VIBRATIONAL MODES OF $PBMG_{1/3}NB_{2/3}O_3$

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Hyper-Raman scattering is a non-linear-optic spectroscopy where two incident photons scatter one photon after interaction with an excitation in the media [1]. One major interest of this technique is its high sensitivity to all polar vibrations, including soft polar modes [2], and to excitations that are inactive in both infrared absorption and Raman scattering. These specificities provide hyper-Raman with a very powerful tool for the investigation of local and average structure of ferroelectric-type materials such as relaxors or multiferroic systems.

We will focus on hyper-Raman results obtained on three single crystals of the relaxor $PbMg_{1/3}Nb_{2/3}O_3$ (PMN)[3,4]. The relative scattering intensities of the band near 250 cm^{-1} in various polarization geometries are fully compatible with the hyper-Raman tensor of the F_{2u} 'silent' mode of the parent O_h cubic structure. The temperature dependence of the three F_{1u}-symmetry polar modes was investigated between 20 K and 800 K. Some of the transverse (TO) and longitudinal (LO) components are splitted up to the highest temperatures, confirming the existence of local lattice distortions from the cubic symmetry well above the Burns temperature $T_d \approx 620$ K. The splitting of the LO2-mode strongly increases below T_d, a behaviour which likely relates to the growth of the nano-domains. The soft TO-mode is also clearly observed, with a frequency decreasing to zero near T_d. Same behaviours have been observed in another relaxor-type compound, $PbMg_{1/3}Ta_{2/3}O_3$. Finally, a weak but clear transition-like anomaly in the temperature dependence of the lowest frequency LO-mode (LO1) is observed near the Curie temperature $T_c = 210$ K. These experimental observations will be compared to Raman and neutron scattering literature data, and confronted to the proposed scenarios for the evolution of the local structure of PMN with temperature.

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TANDEM AND SINGLE ORGANIC SOLAR CELLS PARAMETERS EVALUATION

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Here, we describe, apply and analyse a new method to extract the physical parameters of pin organic solar cell based on single or Tandem structures which can strongly improve the performance of organic solar cell from illuminated current-voltage data. These parameters are the ideality factors, saturation current, photocurrent, the series and shunt resistance which are parasitic parameters, affect solar cell performance. The method is very convenient to use and the reasonable agreement between experiment study and calculation results confirms the model by employed a curve fitting to provide a graphical representation of the result using MATLAB code.

Keywords: organic, Tandem, single, parameters extraction, illumination I-V plot.

The Influence of Substrate Temperature on Density of States and Optical Properties of GeTe Thin Films

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A systematic investigation on the effect of substrate temperature on the structure, optical absorption and density of states of vacuum evaporated GeTe thin films is reported. The X-ray diffraction analysis shows an occurrence of amorphous to polycrystalline transformation in the films deposited at higher-temperature substrates (473K). The thickness of the film (3500 nm) is measured by an optical interference fringes method. Optical characteristics of the GeTe sample have been analyzed using reflection and transmission spectrum result. The absorption mechanism has been recognized as the allowed direct transition for amorphous and polycrystalline films. We investigated the absorption coefficient (α) and the effect of T_s on it, also we calculated the tail width for each prepared films. By depended on D.C conductivity measurements calculated the density of state (DOS), the density of extended state $N(E_{ext})$ increases with increasing the T_s, while the density of localized state $N(E_{loc})$ is decreased. Low field conduction have enabled us to determine the density of states near Fermi level N (E_F) in amorphous and poly-GeTe films, that need to measurements the D.C conductivity under low temperature (by use liquid Nitrogen). The experimental results are interpreted in terms of variations in the density of localized states due to progressive decrease of the unsaturated bonds during deposition.

FOUR-QUADRANTS FOUR TRANSISTORS SYNAPSE CURRENT-MODE ANALOG MULTIPLIER

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Neural networks are particularly attractive for CMOS VLSI implementation as each parallel elements (neuron or synapse) is relatively simple, allowing the complete integration of large networks on a single chip. Moreover, Neural Networks are most efficiently implemented by asynchronous analog circuits because they are generally faster and require less hardware (lower transistor count) than digital VLSI implementations.
In this research, a new implementation of CMOS four-quadrant analog synapse multiplier circuit for multi layer perceptron neural networks will be proposed. The proposed multiplier is composed of only four transistors and it will multiply two input currents and produces an output current. The multiplier circuit consists of ten transistors; but only four of them will be implemented inside the synapse, while the others will be implemented inside the input and the neuron. The main characteristics of the proposed circuit are the small silicon area and the low power consumption. A comparison among some other multipliers will be presented.

Key Words:

Analog multipliers, Analog signal processing, Neural Networks, Synapses, CMOS VLSI implementation.

IMPROVING LAND USE/COVER CLASSIFICATION USING ADVANCED REMOTE SENSING METHODS

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The accuracy of land cover/use classification has a great economic impact and the correctness of any decision taken by policy makers depends on this accuracy. Many land cover/use maps are created to estimate, to identify, and to manage natural resources. In addition, these maps are used in urban planning. So, any mistake in estimating the correct type or position and area of these resources or urban settlements can lead to economic and human disasters. In this research paper a selected known area in Lebanon is classified using well known traditional remote sensing method which can be found in any commercial software. Later a new remote sensing method is built using Self-Organizing Maps (SOMs) which is an unsupervised Artificial Neural Network (ANN) method. SOMs is used to classify the same area. The accuracies of the classification methods are evaluated using field verification based on the Global Positioning System and confusion matrix. In addition, the errors in the classification methods are economically evaluated.

Keywords- Segmentation, Remote sensing, Self-Organizing Maps, Satellite image.

SIMULATION OF GAS JET PENETRATION INTO MAGNETICALLY CON_NED PLASMAS

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Massive gas jet pu_ng in ITER-like devices is to be used as part of disruptions mitigation. Frequently used for cooling down the tokamak vessels, gas pu_ng and its corresponding reactions release the excess of heat responsible of melting down the plasma _rst wall and generating a large amount of impurities that strongly a_ect the plasma con_nement. Gas jet expansion as well as its propagation into vacuum is investigated in this presentation. After that a simulation of the gas jet penetration into plasma is presented based on simulating the particle and power balance equations with the appropriate radial and poloidal transport coe_cients. Additional reactions are taken into account involving ionization, recombination and charge exchange and their appropriate terms in both particle and energy balance equation for both electrons and singly ionized ions. We will present a numerical model for the variation of the plasma density pro_le according to the following equation:

$$\partial_t n_0 + \nabla.(n_0 \vec{v}_0) + \nabla.(\langle n\vec{v} \rangle) = S_{in} + S_{ext} \qquad (1)$$

where n0 and ~n are the plasma density and its corresponding uctuation, ~v0 and ~v being the particles velocity and uctuation respectively. Sin represents the inherent source of particles that come from the walls and the gas pu_ng without the additional massive gas jet. Sext is the external source term of plasma that comes from the ionization, recombination and charge exchange of the neutrals jet. The ultimate goal is to understand and quantify the penetration of massive gas jets with ITER-like plasma properties.

ROVIBRATIONAL STUDY AND DIPOLE MOMENT CALCULATION OF THE MOLECULE YBR NEGLECTING AND INCLUDING SPIN–ORBIT INTERACTION

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Amongst the Group III elements, there has been considerable interest in the spectroscopic properties of yttrium monohalides in the past years. Recently we investigated the lowest molecular states of YBr via CASSCF and MRCI (single and double excitations with Davidson correction) calculations. Potential energy curves for the lowest 20 bound electronic states in the representation $^{2S+1}\Lambda^{(+/-)}$ (neglecting spin–orbit effects) and 41 electronic states in the representation $\Omega^{(+/-)}$ (including spin–orbit effects) have been determined along with the corresponding spectroscopic constants. By using these results, we investigate in the present work the electric dipole moment and the electronic transition dipole moments for the different bound states including the spin–orbit coupling. Using the canonical functions approach, the vibration-rotation Schrödinger Equation has been solved. The electronic wave functions derived in the ab initio process is used as the potential in the vibration-rotation Schrödinger Equation. The integration of Schrödinger Equation has been done by using a cubic spline interpolation between the different points of the potential curve. From the canonical functions approach, the eigenvalues E_v, the rotational constants B_v and the centrifugal distortion constants D_v of the different bound states, including and neglecting the spin–orbit coupling, have been calculated up to $v = 30$ with the abscissas of the corresponding turning points R_{min} and R_{max}. To the best of our knowledge, experimental results are not available yet to compare with ours. When applying the same approach on different other molecules, the comparison of the results obtained with the available experimental shows a very good agreement.

STUDY THE STATIONARITY OF TURBULENCE IN LINEAR PLASMA DEVICES

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In fusion plasmas magnetically confined, radial spread of the plasma particles is observed caused by collisions and turbulence. These turbulent structures lead to particle and energy transport in the radial direction outside the plasma, therefore they are the most important source for confinement degradation in plasma devices. Their understanding remains up-to-date a very important issue. It was shown that in linear plasma devices turbulence may not be stationary in the sense that different modes exist at different times and the change occurs at relatively long periods of time. Data sets have been col- lected from different plasma devices (linear plasma device, CASTOR small tokamak, Blaaman toroidal device, MAST spherical tokamak and ASDEX-Upgrade tokamak). A time-dependant signal analysis from data obtained using high speed imaging on the linear device will be studied. Adequate statistical tools will then be developed in order to identify the shift in modes occurring in these turbulent structures and to study the properties of these phenomena in various devices. We will rely on Fourier analysis, Gabor analysis and then a wavelet analysis, to study when and how the phase shift occur in our signal.

Investigating 2D Coherent Structures of an Electrolyte Solution Subject to Electromagnetic Forces

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The dynamics of fuids are dierent in three-dimensions (3D The dynamics of uids are di_erent in three-dimensions (3D), where vorticity has non-vanishing values in three dimensions, with respect to two dimensions (2D) where the vorticity has only one non-vanishing component. The experiment proposed hereafter is moti-vated by two areas of fundamental research where the issue of 2D and 3D plays a particularly important point: Magnetic fusion and geophysical systems where the systems can be approximated to be 2D but in reality the role of the third dimension is poorly known. Achiev-ing 2D and controlling the transition from 2 to 3D is a difficult task. This proposal is an attempt to achieve this goal. The experimental setup consists of a square container where permanent Neodymium bar magnets installed at the bottom leading to an axial magnetic field. At the four edges of the container we install stainless steel electrodes biased in order to draw a current among them. The Lorentz force is thus a forcing term that should be added to the Navier-Stokes equa-tion acting on the uid and causing motion. The setup is designed so as both the magnetic field and the currents can be modified so we have a greater number of degrees of freedom. The main fluid used in this experiment is a potassium hydroxide (KOH) solution dissolved in distilled water. The transition from 2D to quasi-2D structures that we hope to achieve is made possible by increasing the depth of the uid allowing kink type of instabilities to occur and thus leading to a 3D dynamics. We diagnose the dynamics using a passive tracer dye which is left to evolve as a function of time while being imaged by a fast imaging camera.

The Motion of Liquid Gallium Subjected to Two-dimensional Electromagnetic Forces

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The dynamics of uids are different in three-dimensions 3D with respect to two dimensions 2D where the vorticity has only one non- vanishing component. We present a uid experiment to study the dynamics of liquid gallium in a cylindrical container of radius 10 cm. A 2 cm layer of gallium is subject to an axial magnetic field which reaches 0.1 T at the center. At the edge of the container 36 electrodes are installed to draw currents among them. Thus, the Lorentz force driving term should be added to the Navier-Stokes equations forcing the system in two dimensions. We present experimental results show- ing that the liquid gallium is characterized by a high conductivity, low magnetic Reynolds number Rm, and a relatively high Hartmann number Ha, where these parameters are important in characterizing the magnetohydrodynamics (MHD) properties of the ow. Since gallium is opaque, one of the main issues that we shall be presenting is how to determine the velocity and vorticity. We present initial studies to build a fast x-ray imaging system that should be used with the flow seeded with small beads of tungsten. Electrical probes are also built and initial results of point-wise velocity measurements are presented. The first movies were obtained and the motion of the liquid gallium is recorded showing the onset of small and large vortices between the electrodes. The dynamics of these vortices will be studied as a function of the height of the fluid once the diagnostic issues are resolved.

GEOMETRICAL EFFICIENCY OF EQUAL VOLUME GAMMA-RAY DETECTORS

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The calibration of gamma-rays detectors is crucial to determine the activity of radioactive gamma ray sources. To find out the activity, the source – detector system efficiency is required. The geometrical efficiency of parallelepiped, spherical and cylindrical detectors for an arbitrarily positioned isotropic radiating axial point source is obtained by the use of compact analytical expressions. Furthermore, the attenuation of photons by the source it self (self-absorption) is determined by calculating the photon path length through the source material. The theoretical and the experimental efficiency values are in good agreement.

Keywords: Parallelepiped, spherical and cylindrical detectors; arbitrarily positioned axial point source; geometrical efficiency.

ENVIRONMENTAL RADIATION MONITORING SURVEY IN LEBANON

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This work is a part of a national environmental monitoring program. The objective is to have an Environmental Indicator by monitor the long-term behavior of radionuclides and to provide a baseline in the event of radiological incident. The techniques cover the monitoring of radioactivity in land and costal areas, as well as, the collection and preparation of terrestrial samples such as soil, food, vegetables… and daily measurement of dose rate in air in different locations. The paper provides an overview of the current situation in respect of regulatory actions and technical development of radiation protection in relation to NORM in Lebanon. Dose rate in air were carried out using portable beta and gamma detectors while for the other samples gamma spectroscopy method were used. Concentrations of Uranium, Thorium series and Potassium were quantified and the results represented consist of a one year monitoring.

Keywords: Environment, NORM, Lebanon, Monitoring, Radioactivity.

Ab initio calculation of low lying sextet electronic states of CrCl molecule

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The potential energy curves for the lowest-lying electronic states of CrCl molecule in the $^{2s+1}\Lambda^{(\pm)}$ representation have been investigated via CASSCF method. Multireference CI calculations (single and double excitations with Davidson corrections) were performed. Chromium atom is treated in all electron schemes where the 24 electrons of the chromium are considered using a contracted Gaussian basis set given by Bauschlisher-ANO for s, p, d, and f functions in order to obtain the contracted basis set [7s 6p 4d 3f]. The clorid atom with the 17 electrons are considered using the contracted Gaussian basis set aug-cc-PVQZ/ [6s 5p 3d 2f]. Among the 41 electrons explicitly considered for CrCl molecule (24 electrons for Cr and 17 for Cl) 36 inner electrons were frozen in subsequence calculations so that 5 valance electrons were explicitly treated. In the range of internuclear distance r around the equilibrium distance of its ground state, the CrCl molecule is assumed to be mainly ionic $Cr^{+}Cl^{-}$. The harmonic frequency ω_e, the internuclear distance r_e, the rotational constant B_e, $_{the}$ electronic energy with respect to the ground state T_e, been calculated. The comparison of these values to the theoretical and experimental results available in the literature shows a good agreement

DFT calculations of ^{1}H chemical shifts and simulated and experimental NMR spectra for sarcosine

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Very recently [1], sarcosine was identified as a differential metabolite that was highly increased during prostate cancer progression to metastasis. It can be detected non-invasively in urine and may be considered as a marker to distinguish between slow-growing and aggressive prostate cancers. We are currently involved in calculations of NMR spin Hamiltonian parameters for prostate metabolites, in order to produce reliable values of these parameters from which NMR spectra could be simulated and used further in quantitation procedures. In this study, we have 1) calculated ^{1}H chemical shifts d for sarcosine in water solution using DFT methods, 2) simulated the corresponding NMR spectrum that we compared to the experimental one we obtained in D_2O at 300 MHz.

DFT calculations are performed with four functionals: B3LYP, PBE, OPBE and PBE0 and two basis sets: 6311++G** (181 basis functions) and pcJ2 (474 basis functions). Chemical shifts d are calculated using the GIAO method to ensure gauge independence and the tetra-methyl silane (TMS) is chosen as reference. Solvent effects are taken into account through the Polarisable Continuum Model (PCM). Contributions to d values from the eight isomers of sarcosine which were calculated to lie in a relative energy range of 3.5 kcal/mol are taken into account assuming Boltzmann distribution.

Vibrational effects on calculated d values have been estimated in two ways. First, for the lowest-energy structure, perturbation calculations were performed at the Hartree-Fock level using a 6-31G** basis set. In a second way, for sarcosine in the gas phase, unconstrained ADMP molecular dynamics simulations were performed starting from equilibrium geometry with a given initial kinetic energy of 1000 µHartree (~ 315 °K). The fictitious electron mass has been fixed to 0.1 amu and a time step of 0.2 fs has been used for a global simulation time of 2 ps. Snapshots were taken along the trajectory each 1.6 fs Both approaches show that vibrational effects are quite small, and smaller than the isomer effects. Nevertheless these corrections slightly improve the results.

All calculations have been carried out using the Gaussian03 [2] and cfour [3] packages and the graphical interface Gabedit [4]. From d values, the NMR spectrum of the solvated sarcosine has been simulated. It is found to be in good agreement with the experimental one.

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[4] A. R. Allouche, Gabedit is freely available from http://gabedit.sf.net

ATOMIC SCALE SIMULATION OF Si-Ge/Si ISLANDS

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Many recent works have been devoted to the study of the growth of Ge and Si-Ge alloys on (001)Si substrates. Two main reasons are the origin of this interest. The first is a technological interest and concerns the potentiality of this structure in microelectronic and optoelectronic devices. In particular the formation of regular Ge-Si islands embedded in Si matrices is a promising technique for the fabrication of quantum dots for optoelectronic applications. The second reason is the nature of this structure, which involves two elementary semiconductor materials with perfect covalent bonding, both having cubic diamond crystal structures. In this paper, we explore the effect of lattice mismatch (4%) on the static and vibrationnal properties of big size Ge islands having (113) facets on Si substrate. The simulation is done by minimizing elastic energy using valence force field (VFF) to describe strain and stress and taking into account the intermixing between the two materials. Then we study vibrationnal properties of these systems as function of the interdiffusion.

A SCALE-ENTROPY DIFFUSION EQUATION TO DESCRIBE WALL TURBULENCE INTERMITTENCY

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We applied on a database of PIV fields obtained at "Laboratoire de Mécanique de Lille" corresponding to a turbulent boundary layer the statistical and geometrical tools defined in the context of entropic-skins theory. We are interested by the spatial organization of velocity fluctuations. We define the absolute value of velocity fluctuation δV defined relatively to the mean velocity. For given value δVs (the threshold), the set $\Omega(\delta Vs)$ is defined by taking the points on the field where δV - δVs. We thus define a hierarchy of sets for the threshold δVs ranging from the Kolmogorov velocity (the corresponding set is noted Ω_K) to the turbulent intensity U' (the corresponding set is noted $\Omega_{U'}$). We then characterize the multi-scale features of the sets Ω(δVs). It is shown that, between Taylor and integral scale, the set $\Omega(\delta Vs)$ can be considered as self-similar which fractal dimension is noted Ds. We found that fractal dimension varies linearly with logarithm of ratio $\delta Vs/U_0$. The relation is $Ds = 2+\beta ln(\delta Vs/U_0)$ with $\beta \approx 0.12 - 0.26$: this result is obtained for all the values y+ we worked with. We then defined an equivalent dispersion scale le such as $N(\delta Vs)-N_K = l_e^2$. It is shown that $\delta Vs/U_0 \approx l_e^{1.52}$. We thus can write $Ds = 2+\beta_0 ln(l_e/l_0)$ with $\beta_0 \approx 0.18-0.39$. These results are interpreted in the context of a scale-entropy diffusion equation introduced to characterize multi-scale geometrical features of turbulence.

Abstract

The potential energy curves have been investigated for 4 quadraply excited electronic states in the $^{2s+1}\Lambda^{\pm}$ representation of the molecule LaS via CASSCF. Multi-reference CI calculations MRCI (single and double excitation with Davison correction) were performed by using Gaussian basis sets for the two considered atoms. The harmonic frequency ω_e, the internuclear distance R_e and the electronic energy with respect to the ground state T_e have been calculated for the lowest obtained quadraply excited states. To the best of our knowledge these results are the first ones of the quadraply excited states of the molecule LaS.

Chemistry

ORAL PRESENTATIONS

C 1.1
STUDY OF SOLID STATE EMISSION OF A NEW CU(I) BR COMPLEX : AN AB INITIO APPROACH

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The coordination chemistry of Cu(I) is interesting and important due to its extensive structural and stoichiometric variation. Moreover, Cu(I) complexes has catalytic applications and is involved in certain biochemical reactions. The presence of copper in copper-containing proteins establishes the need for modeling of its coordination sites. Copper(I) complexes with phosphine based ligands have received considerable attention in the past few years since these complexes can be used as sensitizers for conducting materials, which is an important goal in material sciences [1,2]. Photophysical and photochemical properties of copper(I) have attracted the attention of researchers [3]. Specially designed copper(I) complexes have long lifetimes for the excited MLCT state [4]. In addition, photoluminescent copper(I) complexes are viewed as a favorable alternative to many Ru(II) compounds [5]. Some copper halide compounds are used as imaging systems for electronic applications [6].

Vogler and Kunkely [7] considered the MLCT complex to be an isomer of the ground state which contains an oxidized metal and reduced ligand. Thus various reactions like electrophillic attack and radical reactions on the reduced ligand, oxidative addition at the metal center due to the reduced ligand, and outer sphere charge transfer reactions can be attributed to states arising from MLCT transitions. MLCT states' reactivity often depends on the oxidation of the metal. Subsequent processes include associative ligand substitution, exciplex formation and cleavage of metal-metal bonds.

In this paper, a newly reported mixed ligands copper bromide complex was prepared. This complex is CuBr($C_{12}H_8N_2$)($C_{20}H_{20}NP$){bromo-(1,10-phenanthroline-N,N›)-(4-(N,N-dimethylamino)phenyldiphenylphosphine)-copper(I)}.

Ab Initio calculations (Density Functional Theory) were employed to

identify the major atomic contributions to HOMO, LUMO and LUMO+n orbitals. Contrary to common excitation mechanism in pure Cu(I) complexes exhibiting MLCT excitation mechanism, this bromide-based copper(I) complex exhibits excitation mechanism of the type LMCT. The introduction of bromide into the system reverses the usual excitation mechanism. An explanation is given.

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C 1.2
METALS AND SPECIATION OF METALS IN DOMESTIC WATER: PIPES IMPACT

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The World Health Organization (WHO), in its Guidelines for Drinking Water Quality defines domestic water as being “water used for all usual domestic purposes including consumption, bathing and food preparation. The importance of adequate water quantity for human health has been recognized for many years. However there has been an extensive debate about the relative importance of water quantity versus water quality in health promotion and protection. Though the main risks to human health associated with consumption of polluted water is microbiological in nature, yet the importance of chemical contamination should not be underestimated. In urban cities, the environmental services are the responsibility of the public sector where piped water supply is the norm for urban households. Numerous factors influence the quality of water within a building’s

distribution pipes system and may result in chemical contamination of drinking water. The objective of this study is an assessment of domestic water quality in terms total metal content, metal species and metal scales formed within water distribution system. Domestic water samples were collected from different houses of different water type (well and municipality) and different piping systems as well as different plumbing and different material. The following parameters were measured in water pH, temperature, alkalinity, sulfate, chloride, calcium, magnesium, iron, and the toxic metals copper, zinc and lead. The chemical metal specie forms, metal scales and corrosion were predicated using the geochemical models "FREEQCE" and the collected data were analyzed using the "SigmaStat statistical Package software. The results from this study revealed high levels of toxic metals in some domestic water samples. The free metal ion, the metal scales and internal corrosion depended on water pH, hardness, and alkalinity, forms of metal species, pipes and fittings types.

Keywords: Domestic water, pipes, metals, metal species, metal scales, corrosion.

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C 1.3
EFFICIENT WASTEWATER TREATMENT AND REUSE AT THE UNIVERSITY OF BALAMAND

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The purpose of this work is to study the efficiency of the Wastewater Treatment Plant at UOB in producing an effluent suitable for reuse in

irrigation. This is done by conducting an experimental work based on measuring several water quality parameters classified into physical, chemical, and microbiological parameters. The results obtained were compared with the standards adopted by the Lebanese Ministry of Environment (MoE), and confirmed a good functioning of the UOB Treatment Plant along the studied period. Almost all the measured parameters were below the MoE Standards which proves that the effluent can be reused in irrigation of crops not human consumption.
In conclusion, this study revealed the importance of wastewater treatment and its reuse in protecting the environment, the public health, and the water resources against shortage. It initiates as well further studies and experiments regarding the effect of the treated effluent and the sludge on crop growth.

C 1.4
SYNTHESIS OF 14C LABELED ALIGNED MULTI-WALLED CARBON NANOTUBES BY AEROSOL-ASSISTED CCVD PROCESS

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Clean and well aligned multi-walled carbon nanotubes (MWNTs) are synthesized by aerosol-assisted CCVD process from toluene/ferrocene solution [1]. The final objective of our work is to study the biodistribution of such nanotubes previously labeled with carbon 14 isotope. Two different ways are involved: either nanotubes are labeled by a chemical treatment performed on as-grown MWNTs [2], or they are directly labeled during the aerosol-assisted CCVD process. In this paper, we will present the adjustment of the aerosol-assisted CCVD process in order to fit with the conditions of

use of radio-labeled carbonaceous precursors. The main parameters to take into account are the small amount of ^{14}C labeled carbonaceous precursor (toluene). Therefore, we will demonstrate that the versatility of the aerosol-assisted CCVD process allows the synthesis of clean; long and aligned MWNTs from small amounts of precursors. The device was first modified in order to make smaller all the injection system. Various parameters, such as precursor injection rate, duration, … were investigated in order to optimize MWNT production in terms of chemical yield, purity and length. Therefore, clean and long aligned MWNTs were obtained with a high chemical yield. In addition, we will illustrate the transposition of this adjusted process to the use of labeled precursors, and we will demonstrate that ^{14}C labeled MWNTs exhibiting a high labeling degree can be obtained, which opens up new experiments of biodistributions.

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C 1.5
OXIDATION OF CARBON BLACK AND PROPENE OVER RU/CEO_2-ZRO_2 CATALYSTS

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Reducing particulate matter (PM) and volatile organic compounds (VOCs) emissions has been a major challenge for car manufacturers and researchers. One of the principal solutions to reduce these emissions is the catalytic oxidation. Different percentages of ruthenium were impregnated on ceria (CeO_2), zirconia (ZrO_2) and ceria-zirconia mixed supports. The

results showed that reactive ruthenium oxide species are formed following calcination at 600ºC. In fact, adding 1.5wt.% ruthenium over calcined ceria yields a very efficient catalyst in oxidation reactions. The activated 1.5Ru/CeO_2 catalyst is very reactive in the catalytic oxidation of carbon black (CB) ($T_{50\%}$~335°C) and propene ($T_{50\%}$=187°C). In propene oxidation, it was observed that two different catalytic sites are involved in the reaction. The two sites correspond to ruthenium oxide species that are well dispersed and in tight interaction with the surface of cerium oxide. One of the sites is sensitive to water and remains un-reactive if no pre-treatment is envisaged. The second site is reactive at room temperature but requires regeneration at higher temperatures under an oxidative atmosphere.

C 1.6
SPECTROPHOTOMETRIC AND SPECTROFLUORIMETRIC DETERMINATION OF GEMIFLOXACIN (GFX)

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Two sensitive, selective and rapid spectrophotometric and spectrofluorimetric methods have been developed for the determination of gemifloxacin active ingredient in its bulk state or pharmaceutical formulation. The proposed methods were based on a coupling reaction of the primary amine in gemifloxacin with 7-chloro-4-nitrobenzofurazan (NBD-Cl). The colored product showed an absorption maximum at 470 nm and a fluorescence emission peak at 529 nm in methanol. The first and second derivatives of the absorption spectra of the product were recorded and their peak amplitude was measured. Also, the first derivative of the fluorescence spectra was measured.
The reaction obeys Beer's law over the ranges of 525- and 0.050.25-µg.ml- for the spectrophotometric and spectrofluorimetric measurements,

respectively. Intra-day and inter-day relative standard deviation and the relative mean error values at three different concentrations were determined. The low relative standard deviation values explain the accuracy of these methods.
The result obtained agrees with the labeled concentration and thus, these methods can be successfully applied to the quantification of the gemifloxacin in either its bulk form or pharmaceutical formulation as well as for the routine quality control testing and drug stability monitoring.

Keywords: Gemifloxacin; 7-chloro-4-nitorbenzofurazan (NBD-Cl); spectrophotometry; spectrofluorimetry.

C 2.1
ANALYTICAL METHOD FOR THE DETERMINATION OF SUGARS AS SOURCE INDICATORS OF BIOGENIC ORGANIC CARBON IN ATMOSPHERIC PARTICULATE MATTER

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This study reports a method for the analysis of sugars in atmospheric samples. Fifteen individual sugar standards, including sugar alcohols, anhydrosugars, mono-, di- and tri- saccharides were analysed by gas chromatography- mass spectrometry (GC- MS) after derivatization with BSTFA (N,O-bis-(trimethylsilyl)trifluoroacetamide). Air sampling was carried out using a Hi- Vol sampler at a flow rate of 30 $m^3.h^{-1}$. The particle phase was collected according to four 6 h periods by day over three days. Detection limits varied between 5 µg.L-1 and 10 µg.L-1 for all sugars and corresponding to quantification limits between 28 $pg.m^{-3}$ and 56 $pg.m^{-3}$ for 540 m^3 of air sampled. The results on two sampling campaigns (summer and autumn) in Strasbourg (East of France) are presented and discussed.

C 2.2
NANOMOLAL SCALE AQUEOUS SOLUBILITY MEASUREMENT OF A 5 ARENES POLYCONDENSED HYDROCARBON USING MODIFIED DYNAMIC SATURATION METHOD

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Work Supported by CEDRE

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Polycyclic aromatic hydrocarbons, known as PAH, are generated principally during the incomplete combustion of fossil fuel. These anthropogenic compounds are found in the environment at different levels and concentration leading to an enhancement of the human contamination. Their physical chemical characterization is then a necessity in order to estimate their fate and transport in the ecological system. The aqueous solubility is a key property in the knowledge of the mass transfer PAH between different compartments (water, air, soil). The determination of such data are difficult due to the low solubility of the PAH (high molecular weight compounds). Thus a dynamic saturation apparatus was realized based on the saturation of a heated fluid passing through a saturation cell. The transported solute is subsequently trapped in a specific extraction column. Back flashing method is then applied to dissolve the compound. The analysis that follows, allow the determination of solubility at the consign temperature. The validation of our apparatus was achieved by measuring the aqueous solubility of the ethyl benzene and Carbaryl at 313.15 K. A standard deviation about 0.2 % was obtained, knowing that the literature value was done by means of a static method. Thereafter solubilities in pure and mineral water of 3 PAH were determined. They ranged from $1.42.10^{-10}$ to $9.21.10^{-12}$ in molar fraction. The data were fitted to a 3 parameters Heidman's equation in order to calculate the thermodynamic properties of dissolution.

C 2.3
SELECTIVE UPTAKE OF SILVER(I) AND MERCURY(II) CATIONS BY MACROCYLES BASED CALIXPYRROLE AND CALIXRESORCARENE

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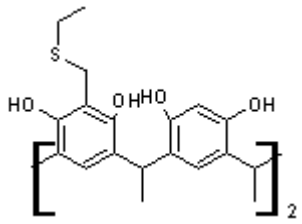

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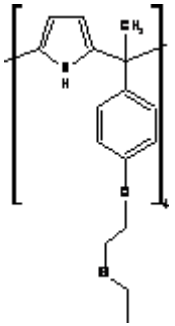

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In recent years Supramolecular Chemistry has established itself as one of the most active fields of science. Resorcarene and calixpyrroles are some of the macrocycles which are commonly encountered in Supramolecular Chemistry. They have received particular interest because of their ionic and molecular binding properties. Resorcarene and Calixpyrrole derivatives with functional groups containing nitrogen or softer atoms such as sulphur show superior selectivity toward soft ions such as Ag^{+} and Hg^{2+} over alkali and alkaline earth metal ions. In this context, two macrocyclic derivatives (I and II) have been synthesized and characterized[1],[2]. Their interaction with metal cations and anions were investigated in different solvents at 298 K. The hosts (I and II) show high selectivity toward Ag(I) and Hg(II) cations. Based on the obtained results, the capacity of these macrocycles to extract metal cations from aqueous media was explored. These two extracting

agents show good capacity for the removal of Ag(I) and Hg(II) cations from aqueous media. Although, many materials and techniques have been used to purify polluted water systems from heavy metals[3], the advantage of using hosts (I and II) is their high selectivity to uptake polluting cations from aqueous media and thus leaving biologically active metals in water.

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C 2.4
A STUDY OF BREAD WHEAT FLOURS QUALITY THROUGH INFRARED AND PHYSIOCHEMICAL METHODS

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Bread quality varies according to the physicochemical and rheological quality of the flour from which it is resulting. This work aims at comparing four qualities of flours obtained from four varieties of wheat: Kazakh Sibirisky (V1), Russian E.N (V2), Kazakh E.N (V3) and Allemande (V4). These varieties are imported from abroad on the Lebanese market to be used in the Lebanese and European bread manufacturing, in order to deduce which is the most suitable in terms of technological quality. The four varieties of wheat as well as the corresponding flours were analyzed by traditional physicochemical methods used for the quality control of these products. The mid-infrared spectroscopy (MIR) was also used to study the composition of the flours. The physicochemical results and the spectral data were treated by chemometrics.

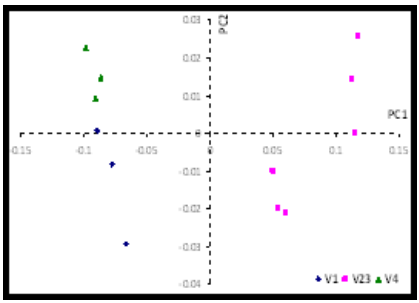

Figure 1. Principal components study of physicochemical tests results.

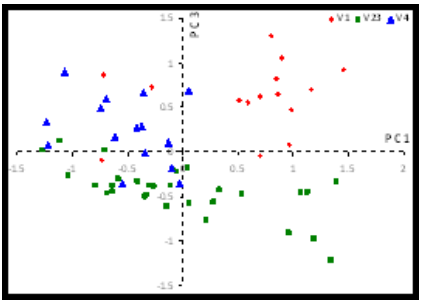

Figure 2. Principal components analysis on the MIR spectra of wheat flour.

The Principal Components Analysis showed that the two varieties «Kazakh Sibirisky» and «Allemande» have a higher technological than that of the two varieties «Russian E.N» and «Kazakh E.N» that seems to have a similar one (Figures 1 and 2). «Kazakh Sibirisky» and «Allemande»have a larger dough quality and higher contents of gluten and proteins other than the gluten.
This study is a first step of a larger one which includes bread making tests and the development of an optimal model consisting of three elements: raw material, bread processing and the final product resulting.

C 2.5
DEVELOPPEMENT D'UN ANALYSEUR DE FORMALDEHYDE ET D'ALDEHYDES TOTAUX: APPLICATIONS A LA CHIMIE ATMOSPHERIQUE

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Afin de comprendre la réactivité atmosphérique des aldéhydes, de surveiller leurs émissions et d'évaluer leurs impacts sanitaires, ce travail s'est focalisé sur la mise en place d'une nouvelle stratégie d'analyse du formaldéhyde et des aldéhydes totaux de l'air. La procédure consiste à dissoudre les aldéhydes gazeux en milieu aqueux par le biais d'un tube à écoulement en verre puis à les dérivatiser chimiquement au fur et à mesure de leur dissolution avec le 3-méthyl-2-benzothiazolone hydrazone (MBTH) en milieu acide à pH = -0,5. Ainsi, les aldéhydes incolores sont transformés en complexes bleus analysés par spectroscopie UV visible à 630 nm. L'aspect novateur de la détection repose sur l'usage de guides d'onde sous forme de capillaires (Téflon AF 2400) comme cellule optique. Ces derniers contribuent à une limite de détection du formaldéhyde de 3,8 pptv avec un pas de temps de 15 minutes. Les travaux entrepris dans le cadre de ce projet ont permis d'estimer une réponse des aldéhydes totaux supérieure à 97%. Ceci a été vérifié par l'intercomparaison de nos mesures avec différentes techniques classiques d'analyse.

C 2.6
ESSENTIAL OIL COMPOSITION OF ROSA DAMASCENA MILL FROM DIFFERENT LOCALITIES IN LEBANON

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Damask roses (Rosa damascena Mill.) are used for essential oil production in many regions in the world. In Lebanon, according to a survey, R. damascena is used in its multiple varieties to produce rose water. In this study xx cultivars of R. damascena growing in different ecosystems were collected from several localities in Lebanon. The study aimed to determine their essential oil quality, quantify the most important components and detect the presence of toxic compounds. The investigated characters were: climate, cultural practices, taxonomical and ecological characters.

The oil has been extracted by steam distillation and analyzed by gas chromatography and gas chromatography coupled to mass spectrometry. The study has shown quantitative and qualitative differences between all species. These differences were discussed and analyzed. This work is the first report on the chemical composition of R. damascena growing in Lebanon.

Keywords: Rosa damascena, essential oil, Lebanon, GC-MS.

C 2.7
TRACE ELEMENTS CARRIERS AROUND A PHOSPHATE FERTILIZER INDUSTRY IN SELAATA: MINERALOGICAL AND QUANTITATIVE INVESTIGATION

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Phosphate fertilizer industry is considered one of the possible sources of trace elements contamination in the environment. Soil contamination with trace elements around the industrial complex of chemical fertilizers in Selaata-Batroun, located at 46 km north of Beirut, was investigated. Sampling sites were chosen around the industry for mineralogical and physicochemical determination of the principal mineral phases and carriers of trace elements. Two granular fractions were separated, higher and lower than 50µm. X-Ray Diffraction, Transmission and Scanning Electron Microscope coupled with Energy Dispersive X-Ray Spectroscopy have been used, for fine fraction (< 50µm), to determine respectively the principal mineral phases and the trace elements occurrences in individual particles collected from different region around the plant. Major and trace elements in samples < 50 µm were determined respectively by ICP-AES and ICP-MS. Sequential extraction procedure was applied on collected sediments and soils to evaluate the mobility of Zn, Cu and Pb between geochemical

fractions and the sources of these pollutants in soil. Atomic Absorption Spectroscopy was used to determine Zn, Pb and Cu contents. XRD results showed that the principal mineral phases were calcite, quartz, kaolinite and hematite with signals of fluoroapatite and gypsum. TEM and MET images illustrated particles of pyrite originating from gypsum reduction and trace elements (Pb and Zn) associated to carbonates and phosphates. Correlation between major and trace elements indicated that phosphates were the principal carrier of uranium, cadmium and strontium. As for Zn and Cu two carriers were identified, iron oxihydroxides and silicates whereas for Pb, silicates and carbonates were found as principal carriers. Results of speciation revealed geochemical mobility of Zn, Cu and Pb from carbonate and accumulation inside the alumino-silicates fraction. Contaminants are accumulated considerably in north and north-east of the industry due to wind direction.

C 3.1
PROCEDURE DYNAMIQUE ABSOLUE A SATURATION D'UN GAZ INERTE POUR LA DETERMINATION DES TENSIONS DE VAPEUR DES MOLECULES ORGANIQUES

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Depuis plusieurs années, nous assistons à une prise de conscience croissante des effets à long terme des polluants chimiques à la fois peu solubles dans l'eau et peu ou très peu volatils. De tels polluants, présents en faible quantité dans l'environnement sont cependant dangereux pour l'homme suite à des expositions répétées et persistantes. Afin de comprendre et de modéliser les phénomènes de transport et le devenir de ces composés chimiques disséminés dans l'environnement, des données de pression de vapeur sont indispensables. Ces données combinées aux solubilités aqueuses permettent

la détermination des constantes de Henry qui donnent un accès direct à des paramètres environnementaux essentiels tels que les coefficients de partage air/eau.
L'objectif majeur de notre travail est l›étude de tensions de vapeur des hydrocarbures aromatiques polycycliques dans un intervalle de température couvrant le domaine ambiant. Pour se faire, nous avons mis au point puis validé le dispositif expérimental dit Absolu Dynamique à saturation d'un gaz inerte*. Ce dispositif se base sur la technique de transpiration de produit (saturation suivie de piégeage). Nous avons validé notre dispositif au moyen d'un hydrocarbure phénanthrène de tension de vapeur variant entre 105- Pa et 100 Pa dans une gamme de température allant de 295 K à 500 K. Cette validation nous permettra d'optimiser différents paramètres qui contrôlent la saturation du gaz inerte tels que le choix de la section des canalisations, les débits de gaz, le mode de piégeage le plus adapté, etc. Une fois optimisée, l'étude se poursuivra sur des molécules organiques de haut poids molaire moléculaire (composés aromatiques polycycliques, pesticides, etc,). La tension de vapeur générée servira comme base de données pour les évaluations thermodynamiques prédictives par l'intermédiaire des équations cubiques et plus spécifiquement l'équation de Peng-Robinson. Ces données expérimentales combinées aux mesures de solubilité permettraient la détermination du coefficient de partage Air/Eau. Il serait ainsi possible de modéliser leur comportement dans le milieu environnemental*.

*Ce présent projet fait l'objet d'une candidature au CNRSL 2009.

C 3.2
MONITORING AIR QUALITY IN BEIRUT: THE AIR RESEARCH UNIT (ARU) PROGRAM SPONSORED BY CNRS

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Scientists from AUB and USJ have joined efforts to create an infrastructure in Lebanon for monitoring ambient gaseous and particulate phase pollutant levels. With the support of the Lebanese National Council for Scientific Research (CNRS), the first Air Quality Research Unit (AQRU) in the nation was established. AQRU measures, analyzes, benchmarks against international standards, and reports on air quality for sulfur oxide (SO_x), carbon monoxide (CO), nitrogen oxide (NO_x), ozone (O_3) and two sizes of particulate matter (PM10 and PM2.5). State-of-the-art gaseous and PM samplers are calibrated and deployed for the collection of ambient gaseous pollutants and PMs at sites selected to reflect the influence of major emission sources and the influence of meteorological conditions. Chemical composition and concentrations of resulting samples are analyzed and coupled with source apportionment studies. As a first step, we show, in this poster presentation, the results of gaseous NO2 concentrations in 23 different sites in Beirut and the levels of PM10 and PM2.5 collected over a period of six months in 3 different sites. Furthermore, the PM chemical inorganic composition and seasonal and temporal variations of NO2 and PMs are presented. The compilation of the results is an ongoing process that will extend over a period of one year. Once annual averages of PM and different gaseous levels are computed, the results will be disseminated by the team in collaboration with CNRS to assist decision makers by establishing criteria and quality assurance programs, public transportation designs, urban planning and development decisions.

C 3.3
ESTIMATION OF HEAVY METALS CONTAMINATION LEVEL IN TWO SETTLED FISH SPEICES ON THE LEBANESE COAST USING AAS AND CHEMOMETRIC TOOLS

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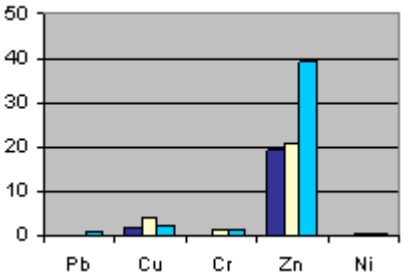
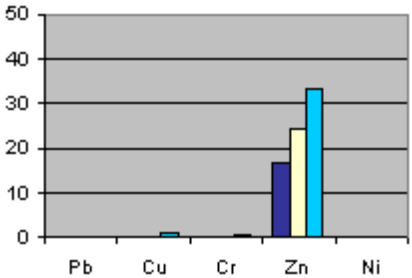
Industrial effluents, sewages, and household wastes were dumped, some years ago, straight into the sea. The water, becoming contaminated, transfers a lot of pollutants such as heavy metals in the food chain which causes the bioaccumulation of this inorganic pollutants in the aquatic organisms especially fishes making them unsuitable for consumption and allowing these trace elements to become toxic.
In this project, contamination by heavy metals is studied in two species of sedentary and regional fishes: Diplodus sargus and Siganus rivulatus. This study is been undertaken on three sites of the Lebanese coast: Tabarja, Dora and Ouzaï, selected in function of the type of pollution detected in each site.



mg (heavy metal) / Kg (Siganus rivulatus)



mg (heavy metal) / Kg (Diplodus sargus)

The analytical results by Atomic Absorbance Spectrometry showed a high degree of heavy metal contamination in the site of Ouzaï and an important level of copper contamination in the site of Dora; whereas Tabarja was found as the less contaminated site. The anthropogenic and industrial activities in these sites could be given as an explication for theses observed results.

C 3.4
ONLINE CONTROL OF TERPOLYMER PROPERTIES IN STYRENE/ METHYL METHACRYLATE/ METHYLACRYLATE TERPOLYMERISATION REACTOR

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An advanced model based control strategy was developed to ensure real time optimal operation of the emulsion terpolymerisation reactor. Linear multivariable constrained model predictive control was developed and implemented for enhanced operation and product characteristics such as the particle radius, average molecular weight and terpolymer composition and the process conversion. To achieve this implementation, novel generic multilayer control architecture for real-time implementation of optimal control policies for particulate processes was developed. A mechanistic dynamic model for emulsion terpolymerisation, developed in our previous work, is used as a real-time soft-sensor. The methodology was developed within a gPROMS-API-DCS environment allowed real-time implementation of model-based control of the process. The optimal control problem was implemented via an interface to a dynamic optimization code. Case studies involving manipulation of flow rates of monomers (styrene, MMA, MA), surfactant and initiator, and the reactor temperature were performed for process control investigation. Although some offsets were observed with a degree of model mismatch, the experimental results agreed well with predictions.

Keywords: Emulsion terpolymerisation; Dynamic model; Model predictive control; Soft sensor; Terpolymer composition; Average molecular weight; Particle radius.

C 3.5
AUTHENTICITY AND CHARACTERIZATION OF LEBANESE HONEYS ACCORDING TO THEIR HARVEST AND ORIGIN

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In order to characterize and study the authenticity of the Lebanese honey, a survey has been done among beekeepers in the whole Lebanese territory. This survey has allowed localizing the hives, knowing their numbers as well as the crop season for each beekeeper in order to well appoint sampling. Honeys were collected during summer 2007 and 2008, from the counterpart agricultural zones reported by the Lebanese Ministry of Agricultural (Figure 1).

Figure 1. Sampling based on agricultural zones reported by the Lebanese Ministry of Agricultural.

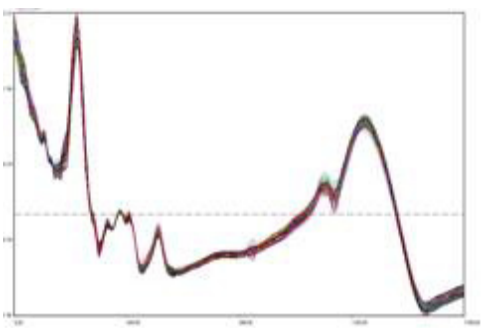

Figure 2. MIR spectra of honey samples.

These samples were analyzed by classical physico-chemical methods used in quality control routine and by mid infrared spectroscopy (MIR) (Figure 2) to study their composition according to their harvest origin. The survey results as well as physico-chemical and spectral data were then analyzed using chemometrics. Principal Component Analysis (PCA) and Factorial Discriminate Analysis (FDA) have been applied to inspect differences between honey groups by criteria and explain these differences.
The results obtained from statistical processing of the survey showed a difference between beekeepers based on the harvest method (number of hives, number of harvesting per year and the practice of transhumance) and on the profile of the beekeeper (if he is a member of a cooperative, if he is an amateur or not...).
Spectral data treatment showed that, the parameter that best separate the honey groups is the sucrose. The "Clear" honey originated from the "Thyme/Flower" contains more sucrose than "Dark" honey originated from "Oak/Thorn".

C 3.6
ASSESSMENT OF AIR POLLUTION AROUND SELAATA REGION

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The aim of the work was to assess the atmospheric pollution around the fertilizer industry of Selaata. The work was divided to two parts:
• sampling or collection of particles from the atmosphere
• analysis of these particles
Concerning data collection, the sampling was done during the period of April to June 2008 in similar weather conditions (similar Temperature and

Wind direction). Samples were taken from 7 locations that form a semi circle of a radius around 4 km surrounding the company (each location was visited twice).Concerning data analysis, it was carried out in the Laboratory of Catalysis and Environment LCE at the University of Littoral Cote D'opale (ULCO) in France . Organic compounds were detected using Gas Chromatography- Mass Spectroscopy while ions were detected using Ion Chromatography (anions are done, cations not yet). Concerning organic compounds, cyclic sulfur compounds S6, S7, and S8 were detected in the regions located after the plant (subjected to the wind) but not in the regions located before the plant (not subjected to the wind). Concerning anions, higher levels of nitrates were detected in the regions located after the plant as compared to the regions located before the plant.

C 3.7
A STUDY OF BREAD WHEAT FLOURS QUALITY THROUGH INFRARED AND PHYSIOCHEMICAL METHODS

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Bread quality varies according to the physicochemical and rheological quality of the flour from which it is resulting. This work aims at comparing four qualities of flours obtained from four varieties of wheat: Kazakh Sibirisky (V1), Russian E.N (V2), Kazakh E.N (V3) and Allemande (V4). These varieties are imported from abroad on the Lebanese market to be used in the Lebanese and European bread manufacturing, in order to deduce which is the most suitable in terms of technological quality.
The four varieties of wheat as well as the corresponding flours were analyzed by traditional physicochemical methods used for the quality

control of these products. The mid-infrared spectroscopy (MIR) was also used to study the composition of the flours. The physicochemical results and the spectral data were treated by chemometrics.

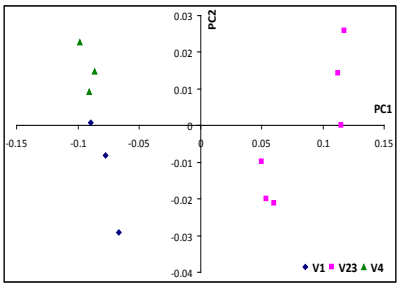

Figure 1. Principal components study of physicochemical tests results.

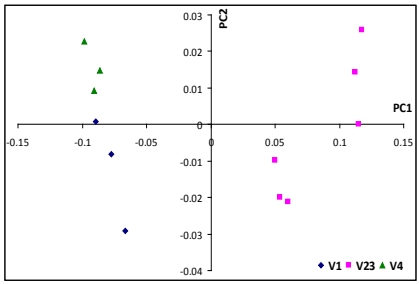

Figure 2. Principal components analysis on the MIR spectra of wheat flour.

The Principal Components Analysis showed that the two varieties «Kazakh Sibirisky» and «Allemande» have a higher technological than that of the two varieties «Russian E.N» and «Kazakh E.N» that seems to have a similar one (Figures 1 and 2). «Kazakh Sibirisky» and «Allemande»have a larger dough quality and higher contents of gluten and proteins other than the gluten.
This study is a first step of a larger one which includes bread making tests and the development of an optimal model consisting of three elements: raw material, bread processing and the final product resulting.

POSTER PRESENTATIONS

Solvent Effects on Nucleophilic Substitution Reactions of Anilines With 2- Chloro-3-Nitro Pyridine

Abstract:Substitution reactions of some para-substituted anilines with 2-chloro-3-nitro pyridine were caried out spectrophotometrically in dimethyl sulfoxide and dimethyl formamide at different concentrations of aniline and different temperatures in the range of 45-60^{0}C.The various thermodynamics parameters for the reactions have been reported and discussed along with the validity of the kinetic relationship.The correlation of second-order rate constant with Hammett's substituents constants yields a fairly linear straight line with negative slope. The correlation of delta H$^{\#}$versus delta S$^{\#}$gives linear straight line with negative slope.

ETUDE DU DEVENIR DES COLIFORMES FECAUX DANS LES EAUX DE SURFACE EN REGIME MEDITERRANEEN : BIOFILMS EPILITHIQUES, RESEVOIR POTENTIEL DES MICROORGANISMES PATHOGENES

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Cette étude portée sur la rivière Nahr Ibrahim au Liban a pour but d'établir une base de données sur la qualité de ses eaux. Une analyse spatio-temporelle de chaque paramètre considéré séparément ainsi que sa comparaison avec les grilles de qualité SEQ-Eaux français montre un manque de pertinence dans la détermination de l'état trophique de chaque eau. Une analyse multidimensionnelle à l'aide d'un outil statistique qui est l'Analyse en Composantes Principales (ACP) s'est avérée plus intéressante pour l'évaluation de la qualité des eaux de surface. L'ACP a l'avantage de prendre en considération les réactions du milieu face à l'introduction de polluants de l'extérieur. Par conséquent, cet outil a permis de définir un état trophique pour chaque station. L'ACP a montré aussi que les bactéries sont influencées indirectement par les paramètres du milieu. Ainsi, les corrélations qui existent entre les bactéries dans la colonne d'eau et dans les sédiments montrent que probablement, une partie des bactéries dans l'eau arrivent à coloniser les sédiments et former par la suite les biofilms. En plus, l'ACP a pu discriminer deux rivières différentes. Ceci témoigne de l'intérêt d'utiliser l'ACP comme outil d'évaluation de la qualité des eaux de surface. Enfin, la colonisation des billes de verre utilisées dans cette étude témoigne de la persistance des bactéries fécales dans le milieu, ce qui pose sûrement un problème dans les équilibres hydriques des écosystèmes aquatiques.

DYNAMIC MECHANICAL THERMAL ANALYSIS IN INVESTIGATING THERMAL TRANSITIONS AND MODULUS/TEMPERATURE BEHAVIOR OF UNPAINTED AND PAINTED THERMOFORMABLE CARRIER FILMS

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The glass transition temperatures (Tg) and the temperatures at which crystallization occurred during heating (Tc) of four thermoformable carrier films were measured using a dynamic mechanical thermal analyzer (DMTA). These films were candidates for the automotive process, which uses painted carrier films as moldable automotive coatings (MAC). A complete moldable coating (i.e., painted laminate) was evaluated as well. The modulus/temperature behavior of the films and laminate was also observed over a wide temperature range, which included thermoforming temperatures. Previously, modulus/temperature behavior at and above thermoforming temperatures, which are above film T_g's, could not be obtained experimentally. While the glass transition, crystallization, and melt temperatures of GM-MAC carrier films may be determined by standard differential scanning calorimetry (DSC), the modulus/temperature behavior, especially above Tg, of these films and laminates cannot be obtained using standard mechanical tests [1]. Neither rheovibron nor rheometric techniques can obtain data at temperatures above Tg. Instron techniques are also unable to provide data above Tg. It has been found, however, that the sample mounting and clamping arrangement of the particular dynamic mechanical thermal analyzer (DMTA) used in this work allows measurement of modulus/temperature profiles of polymer films throughout a wide range of temperatures, as well as Tg, Tc, and Tm of these materials.

References:

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INTRAMOLECULAR CYCLIZATION OF A NEW PHENYLDIAZENE LIQUID CRYSTAL. LIQUID AND GASCHROMATOGRAPHIC STUDY

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A new phenyldiazene liquid crystal with a methylene group in the ortho position to the diazo linkage was cyclized by temperature increasing. Differential scanning calorimetry (DSC) was used to precise :

- The liquid crystal nature of the initial and the final compounds

- The exothermic enthalpy of the cyclization.

^{1}H and ^{13}C nuclear magnetic resonance allowed to confirm the cyclization around the diazo linkage. Complete kinetic of cyclization (kinetic order, reaction constants and activation energy) was determined by high performance liquid chromatography (HPLC). Separations were carried out on a 30 x 0,4 cm - Porasil column with the mobile phase : n-hexane /tetrahydrofuran/ acetonitrile ; 80/18/2 in volume.

Key words:

Liquid crystal, Cyclization, Kinetic, DSC, ^{1}HNMR, ^{13}CNMR, Liquid chromatography

FORMULATION OF MODIFIED MICROSPHERES BASED ON CYCLODEXTRIN-LACTIC ACID POLYMERS

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Polymers, based on Poly L-lactic acid (L-PLA) and coupled with Cyclodextrin (β -CD), have been used for the preparation of microspheres for drug encapsulation. The strategy was based on the modification of the terminal carboxylic group of L-PLA by coupling it with a β -CD in the presence of the peptide coupling agents: DCC/HOBT. Characterizations of the new product were carried out using 1H NMR, gel permeation chromatography, and acid base titration. The size of the functionalized microspheres was determined by Dynamic Light Scattering (DLS). Amphotericin B (AmB), a polyenic antifungal molecule, has been incorporated in L-PLA coupled with β -CD microspheres. The maximal quantity of AmB encapsulated has been studied. This technique of encapsulation in microspheres demonstrates the capacity of enhancing the % of encapsulation.

Kinetic and Thermodynamic studies of the solvolysis of trans-$[Co(3,4\text{-dmpy})_4Cl_2]ClO_4$ complex in binary Aqueous medium

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The kinetics of solvolysis of trans-$[Co(3,4\text{-dmpy})_4Cl_2]ClO_4$ has been measured over a wide range of solvent compositions (0-60% v/v) and temperatures (40-55°C) in H_2O, H_2O-ethanol and H_2O-propan-1-ol. Plots of log(rate constant) versus the reciprocal of the relative permittivity of the co-solvent are non-linear for both co-solvents. This non-linearity is derived from a large differential effect of solvent structure between the initial and transition states. However, extrema in the variation of enthalpy $\Delta H^{\#}$ and entropy $\Delta S^{\#}$ of activation correlate well with the extrema in physical properties of the mixtures which are related to changes in solvent structures. Linear plots of $\Delta H^{\#}$ versus $\Delta S^{\#}$ were obtained and isokinetic temperature indicates that the reaction is entropy controlled. The Gibbs energy cycle relating the Gibbs energy of activation in water and in the mixtures to Gibbs energies of transfer of individual ionic species between water and the mixtures $\Delta G_t^o(Cl^-)$ can be applied.

Treatment of Phenols using Calixarene-Silicate Materials

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The thermodynamic and kinetic of complexation of calixarene with phenols are studied in acetonitrile. A 1:1 complex was obtained and a second order reaction rate was found. The Talc and Kaolin silicates have been treated with silicon tetrachloride to produce the chloro-silica Kaolin and Talc. t-butylcalix[4]arene was then anchored in basic medium giving the corresponding modified silicates.
The new modified Talc and Kaolin were studied by thermal analysis, TG-DSC. The percentages of t-butylcalix[4]arene bounded to are Kaolin (18%) and Talc (21%).
The results of batch and column experiments are presented for the removal of pollutants (4- nitrophenolate) from water using t-butylcalix[4]arene anchored onto kaolin.

KINETIC STUDIES OF SOLUTE-SOLVENT INTERACTIONS FOR THE SOLVOLYSIS OF TRANS-[Co(4-t-butyl pyridine)$_4$Cl$_2$]ClO$_4$ COMPLEX IN ORGANIC AQUEOUS MIXTURES

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The kinetics of solvolysis of Trans-[Co(4-t-butyl pyridine)$_4$Cl$_2$]ClO$_4$ complex was followed spectrophotometrically in water, water-dimethylsulfoxide and water-dioxane media from (0- 60% v/v) within the temperature range (40-55^{0}C). Non-linear plots for the first order reaction; logk against the reciprocal of the relative permittivity (ε_r) and the Grunwald-Winstein Y function were found. This behavior can be attributed to the differential solvation of the initial and transition states of the complex. Although the free energy of activation indicates a small variation with solvent composition, the enthalpy and entropy of activation show compensating extrema with the mole fraction of solvent. From the application of a free-energy cycle, it was found that [ΔG^o_t (cation in the transition state) − ΔG^o_t (cation in the initial state)] is negative indicating that the cation in the transition state is more solvated than that in the initial state.

SOLVENT EFFECTS ON THE KINETICS OF SOLVOLYSIS OF TRANS-[Co(3,5-dimethylpyridine)$_4$Cl$_2$]ClO$_4$ COMPLEX IN BINARY AQUEOUS SOLVENTS

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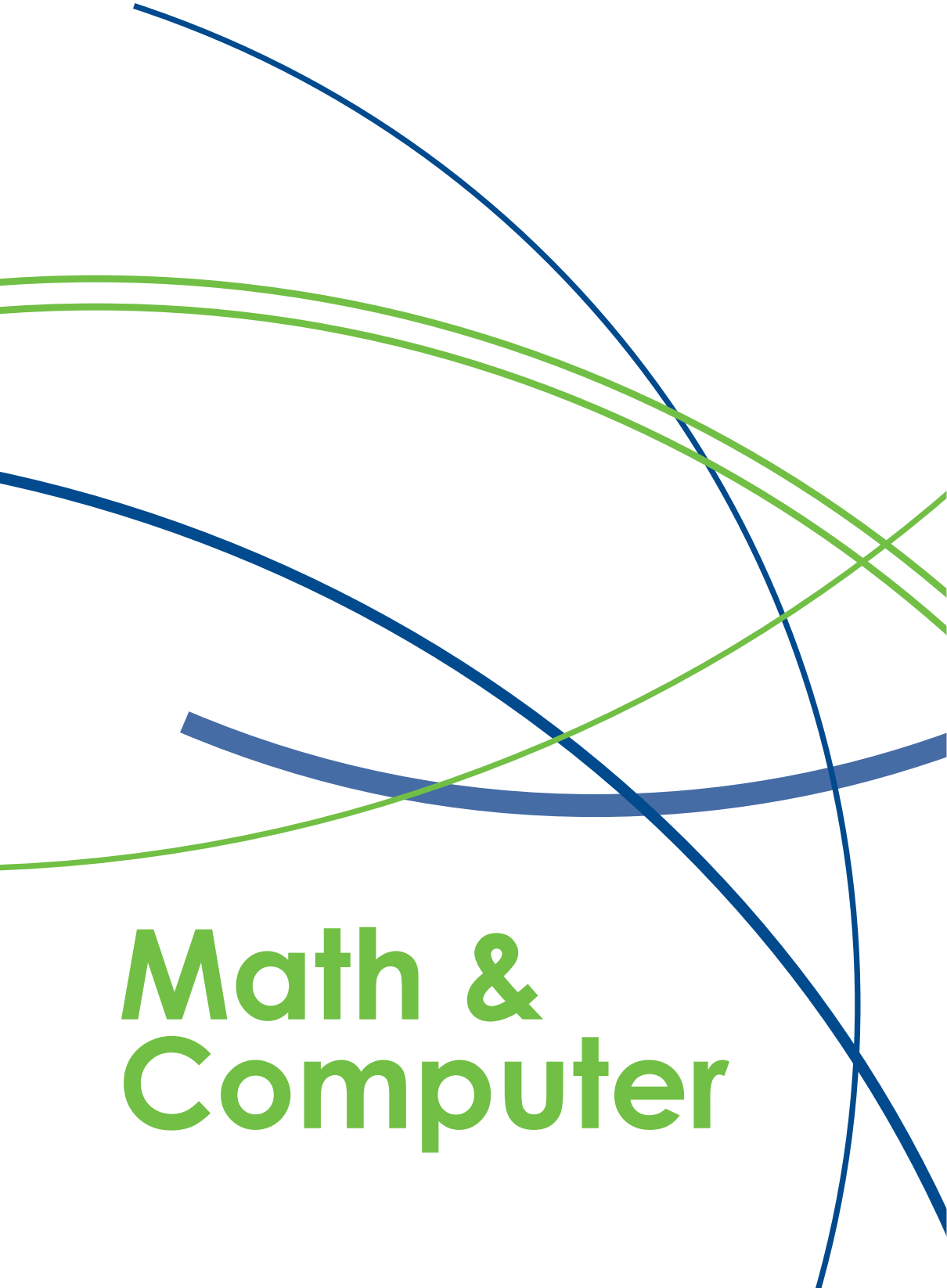
Rate constants and thermodynamic activation parameters are studied for the solvolysis of trans-[Co(3,5-dimethylpyridine)$_4$Cl$_2$]ClO$_4$ complex in methanol, propan-2-ol and tert-butyl alcohol as cosolvents added to water (0- 60%(v/v)). This study was done at temperature ranging from 40^{0}C to 55^{0}C. The obtained results showed non-linear plots for log(rate constant) against the reciprocal of the relative permittivity of the medium. The same behavior was found for Grunwald-Winstein Y value. The enthalpy and entropy of activation exhibited extrema in the same composition region where the physical properties indicate sharp changes in the structure of the solvent, confirming that the solvent structure is an important factor in determining the solvolytic reactivity. Moreover, the initial and transition states contributions of the complex were discussed using a free energy cycle.



Math & Computer

ORAL PRESENTATIONS

MC 1.1

SLOWLY OSCILLATING SOLUTIONS OF A STATE DEPENDENT DELAY DIFFERENTIAL EQUATION

Mustapha YEBDRI

Abstract. We deal with the following problem:

$$(P_\epsilon) \qquad \begin{cases} \frac{d}{dt}x(t) = -f(x(t-\tau(t))) \\ \epsilon\frac{d}{dt}\tau(t) = g(x(t)) - \tau(t) \end{cases}$$

for all $\epsilon \in [0,1]$. For $\epsilon = 0$ the equation (P_ϵ) is reduced to a state dependent delay differential equation. Under some assumptions (P_0) posses slowly oscillating solutions. The same result remains valid for (P_1) i.e.the case $\epsilon = 1$. Such result is not known for $0 < \epsilon < 1$. This work deals with this situation.

MC 1.2

A GENERALIZATION OF SELF DUALITY ON HOPF ALGEBRAS

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In this work, we introduce the concept of a left bicrossproduct Hopf algebra associated to a factorization of a finite group X into a subgroup G and a subsemigroup M. Moreover, we show that for a left Hopf algebra H = kM BJ k(G) associated to a factorization X = GM of a group X into a subgroup G and a subsemigroup M with identity and left inverse property, there is a left Hopf algebra isomorphism H→H* which sends basis elements to basis elements can be constructed from a factor-reversing isomorphism of X = GM and vise versa.

MC 1.3

COMBINED STRATEGIES IN WIRELESS SENSORS DEPLOYMENT FOR OPTIMIZED FOREST FIRE SURVEILLANCE

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The objective of this paper is to demonstrate the usage of Geographic Information Systems (GIS) in optimally distributing a set of permanent stationary sensors to ensure the reliable functioning of a wireless sensors network (WSN) in the case of forest fires. Once a fire occurs, an additional set of sensors are air-dropped over the area. Both stationary and air-dropped sensors will form a network that will transmit back to the base critical real-time information. Collected information, such as temperature, wind direction, humidity, pressure and pollution level, will enable the fire fighters to accurately assess the situation before heading on-site. A GIS based, as well as a terrain and obstacle aware procedure is presented in this paper which enables the optimal distribution of the stationary nodes and permits the calculation of several performance parameters such as the network connectivity in 2D and 3D, the total number of generated sub-networks, and the number of unused nodes. The proposed procedure is based on 3 different input parameters that are related to the hardware used and to terrain nature of the area under study.

MC 1.4

EXPLORATION OF DIFFERENT LEVELS OF PARALLELISM IN THE VIDEO CODEC APPLICATIONS ON MULTI-PROCESSOR SYSTEM ON-CHIP (MPSoC)

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Multiprocessor-system-on-a-chi p(MPSoC) will be the dominate architecture in embedded systems because it provides more concurrency, and thus improves the performance of the system rather than increasing the clock speed (which affects the power consumption of the system). Providing concurrencies is not enough to improve the system performance because one has to explore the different levels of parallelism in the target applications. The new emerging H.264/AVC [1] coding standard which is designed to cover a wide range of applications (Real-time conversational services such as videoconferencing, videophone, etc.) includes many new features that require complex computation compared to previous video coding standards. This new H.264/AVC coding standard will be a challenging workload for future MPSoC embedded systems. In this paper we explore the natural existent parallelism in the H.264 decoder software [2] itself, rather than forcing parallelization techniques. Our novel idea is based on the fact that the H.264 decoder decodes the luminance and chrominance signals completely separated. In our approach, we explore the Data Level parallelism (decoding of the luminance and chrominance signal in parallel) as well as functional level parallelism (pipelining the different decoding stages), by doing so we were able to reduce decoder execution time to the third.

Keywords: H.264/AVC decoder, MPSoC, Embedded systems, data partitioning, functional partitioning, parallel processing.

References:
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MC 1.5

PARALLEL SCATTER SEARCH ALGORITHM FOR EXAM TIMETABLING

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University exam timetabling refers to scheduling exams into predefined days, time periods and rooms, given a set of constraints. Exam timetabling is an intractable optimization problem, which requires heuristic techniques for producing adequate solutions within reasonable execution time. For large numbers of exams and students, sequential algorithms are likely to be time consuming. The purpose of this work is to present a parallel scatter search meta-heuristic algorithm for producing good sub-optimal exam timetables in a reasonable time. Scatter search is a population-based approach that generates solutions over a number of iterations and aims to combine diversification and search intensification. We propose a parallel scatter search algorithm that is based on distributing the population of candidate solutions over a number of processors in a PC cluster environment. The main components of scatter search are computed in parallel and an efficient communication technique is employed. Empirical results show that our proposed parallel scatter search algorithm yields good speed-up. Also, they show that the parallel scatter search algorithm improves solution quality since it explores larger parts of the search space within reasonable time, in contrast with the sequential algorithm.

MC 1.6

AN E-LEARNING MODEL BASED ON DYNAMIC QUALITATIVE CONSTRAINT NETWORKS

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This contribution presents a new approach to model the core part of an e-learning process. The formal modeling we use relies on Allen's Interval Algebra to build the qualitative constraints networks. With the corresponding intervals, we could represent the conditional sequence of activities the learner is expected to conduct in order to complete a particular course. We propose temporal representation of learning activities and we build the constraints satisfaction problem network according to the activation constraints of learning activities and the activation conditions. The algorithm demonstrates the consistency of the corresponding network and provides the learners with learning scenarios they may take during a particular material learning process. With the current focus on new learning technologies, nowadays, learning management system platforms became essential to the learning process. The development of such platforms is progressing along with the increasing demand for new learning-related concepts. The success of the innovation in higher education learning methodologies, motivates designers to build new specifications for material content delivery by adding new features to the E-learning management system. Researchers are actively working to find the most appropriate learning design for course delivery. Moreover, studies have demonstrated that new trends seem to be very convenient to a big percentage of learners. Among other aspects, the type and the diversity of the recently adapted learning activities made the learning process more flexible and allowed the academics to diversify assessment types in order to obtain the most accurate evaluation of the learners. Managing these activities is not a simple task; especially because they depend on each other. The activation of a particular activity may depend on student results in a previous one. Also, some activities can be conducted concurrently; some others require to be achieved simultaneously. The system can suggest different learning scenarios. The learner will have the choice between different learning paths. Nevertheless, the learner has to fulfill the requirements before moving to the next activities in his learning path. Things are much more complicated from a design point of view if the designer intends to automate the activities management process. For this reason, we propose a qualitative reasoning formal method based on Allen calculus to model the learning scenario of a particular learning material. Temporal and spatial reasoning is a particular sub-field in Artificial Intelligence. Besides being a theoretical concept, it has been applied in several domains such as natural language processing, geographic information systems and document interpretation. The reasoning objective is to find, given a set of relationships concerning temporal events, or spatial regions, whether there exists a model fulfilling all of the

relationships or not. The instances of the reasoning task may be modeled using the constraint satisfaction problem, which is a computational problem where the input consists of a set of constraints on variables and the question is whether or not there is an assignment to the variables satisfying all of the constraints. A well known example from temporal reasoning is Allen's Interval Algebra, where the variables denote temporal intervals, and the constraints talk about relationships between intervals such as containment, overlap, and the like.

Keywords: Allen's Interval Algebra, E-learning, qualitative CSP, formal model.

MC 1.7

STOCHASTIC ANALYSIS OF DYNAMIC SYSTEM USING FLEXIBILITY METHOD

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Description of real-life engineering structural systems is associated with some amount of uncertainty in specifying material properties, geometric parameters, boundary conditions and applied loads. In the context of structural dynamics it is necessary to consider random eigenvalue problems in order to account for these uncertainties. A new approach based on the combination of the probabilistic Transformation methods for a random variable and the Flexibility method in order to evaluate the probability density function of the eigenvalue of stochastic system.
The probabilistic transformation methods evaluate the Probability Density Function (PDF) of the system output by multiplying the input PDF by the Jacobean of the inverse function.

MC 1.8

A PROPOSED METHODOLOGY FOR RELIABILITY BASED DESIGN OPTIMIZATION

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The reliability-based design optimization (RBDO) aims to design structures which should be reliable and economical. A new method for reliability based design optimization is developed. In the proposed method, the sensitivities of the Most Probable Point (MPP) of failure with respect to the decision variables are introduced to update the MPPs during the deterministic optimization phase of the proposed RBDO approach. For the test problem considered, the method not only finds the optimal solution but it also locates the exact MPP of failure, which is important to ensure that the target reliability index is met. The MPP update is based on the first order Taylor series expansion around the design point from the last cycle. The MPP update is found to be extremely accurate, especially around the vicinity of the point from the previous cycle.

Keywords: Reliability methods; RBDO; Optimization

MC 1.9

NEW GENERATING TECHNIQUE FOR IMAGE STEGANOGRAPHY

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Steganography is one of the newest technologies in sending secure data between sender and receiver without leaking a third party. It is the process of hiding one medium of communication within another. The most popular methods are those who use a cover image in order to hide a text or a secret message behind it.
While most traditional methods depend on an already existing cover image, our new technique generates the cover image from the hidden text itself. One advantage of using generating image techniques is that you cannot compare the stego file with any pre-existing copy of the cover file to discover differences between the two. The result is an original file that is invulnerable to comparison tests.
Our generating technique main idea is to take every 8 bit character of the secret message apply a specific formula to xor it with a secret key to give new 8 bits that can represent a color or an 8 bit pixel. This will produce at the end a cover image constructed by different colors out of 256 colors of bit combination. At the receiver part steganalysis will be done easily if the receiver knows the secret key used. So the text will be extracted form the image again.
When steganography is combined with cryptography they can offer a secure and secret mean of communication. So our technique of steganography will be combined with cryptography method to produce a strong undefeated cover massage.

MC 2.1

BIDIMENSIONAL TAU-ELEMENTS FORMULATION FOR THE NONLINEAR CUBIC SCHRÖDINGER EQUATION

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We discuss a spectral numerical method based on domain decomposition for the numerical simulation of the nonlinear cubic Schr¨odinger equation. The method is based on a bidimensional Tau-Elements formulation which extends that of [ ] and provides an essential tool for the domain decomposition by implementing new procedures for the domain decomposition and the matching conditions of the solution on the elements' interfaces. The original domain is decomposed into smaller appropriate local elements. Consequently, the global solution is reduced to a sequence of local interlinked subsolutions defined on these newly formed elements. The local solutions are found as finite expansions in terms of a double orthogonal polynomial basis. Two types of orthogonal expansions have been used. In both cases good and rapid convergence has been achieved, by considering a few elements and low order of approximations. The results obtained using the mentioned techniques have proved to be very accurate and well competitive with other published results obtained by the use of various standard numerical methods.

Keywords: Domain Decomposition, Bidimensional Tau-Elements Method, Nonlinear Schrödinger Equation, Double Orthogonal Expansions, Tensor Product.

MC 2.2

ELECTROSTATIC POTENTIALS AND REGULAR POLYGONS

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Let be an electrostatic potential associated with a finite distribution of charged particles at rest in space. We consider the question that attracted the interest of several mathematicians since the days of Maxwell. What are

the number and the indices of the components of the critical points of ? In their treatment to this question, M. Morse and S. S. Cairns stated that an electrostatic potential can have degenerate critical points, and provided an example for such cases. They considered four equally charged particles located at the vertices of a square. They claimed that the center of the square is the only critical point, and added that this critical point is degenerate. However, it turns out that the potential has at least five critical points, and the center is nondegenerate. In this paper we provide a correction to Morse and Cairns' error, and show a general result about electrostatics and regular polygons.

MC 2.3

ON THE COMPOSITION OF KRAMMER'S REPRESENTATION AND THE NATURAL MAP $B_5 \to B_6$

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The braid group, B_n, has a lot of linear representations. One of them is obtained by using the standard Artin representation of the braid group by automorphisms of a free group with n generators. The well known representation is called the Burau representation of degree n. Another representation is Krammer's representation, which is of degree $n(n-1)/2$ and is defined in terms of two indeterminates. Krammer's representation is proved to be a faithful representation in the general linear group $GL(n(n-1)/2, Z[q^{\pm 1}, t^{\pm 1}])$. If we specialize $t=1$, Krammer's representation will be given by the symmetric square of the Burau representation. We introduce Cohen's map $B_n \to B_{nk}$, where each string in the geometric braid is replaced by "k" strings. In a previous work, it has been proved that the composition of Cohen's map $B_n \to B_{nk}$ and the Burau representation $B_{nk} \to Gl_{nk}(Z[t^{\pm 1}])$ gives a linear representation whose composition factors are one copy of the Burau representation and k-1 copies of the standard representation, a representation studied by I-Sysoeva. In our present work, we consider Krammer's representation instead of the Burau representation. Our main theorem is that the representation obtained by composing Cohen's map $B_3 \to B_6$ with

Krammer's representation $B_6 \to GL_{15}$ $(Z[t^{\pm 1}, q^{\pm 1}])$ is irreducible, which has no proper non trivial invariant subspaces.

References:

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MC 2.4

LOW ENERGY FILE SHARING SCHEME FOR MOBILE DEVICES

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Mobile devices have penetrated all aspects of human activities due to their convenience, cheap price, lightweight, and compact size. Consequently, mobiles devices seem to have a profile that supports the need for effective data sharing and pervasive connectivity. Wireless networks are ubiquitous. Subsequently, a mobile device incorporated with a wireless card can fulfil the need of sharing data and connecting continuously. However, studies have shown that sending one bit over the wireless card is 1000 times more energy consuming than a single 32 bit CPU computation. As a matter of fact, mobile devices suffer from the inherent constraint of limited battery lifetime. To this end, it is important to develop schemes that achieve efficient data sharing and pervasive connectivity while reducing energy consumption. Since wireless cards are typically characterized by high energy consumption, sending less number of bits shall lead to energy saving. Accordingly, data compression seems to be a suitable scheme to reduce the number of bits to be sent and, thus, lead to reducing the energy consumption and prolonging the battery lifetime. Nevertheless, applying compression blindly can backfire. The computational requirements of compression algorithms might result in higher energy consumption than sending data uncompressed. As a result, the compression option is investigated through conducting experimental work in different scenarios to record the energy consumption of data transfer from one mobile device to another. Energy measurement results show that compression does not lead to energy gains at all times and in all scenarios. Whenever the received signal strength at the mobile device is high, no compression is needed. However, compression is profitable whenever the signal strength gets weak. Accordingly, we propose an adaptive on-the-fly energy aware compression scheme that monitors the

signal strength during transmission and applies compression only when energy gain is promising. Energy measurement results demonstrate that the adaptive scheme results in notable energy gain irrespective of the data type.

Acknowledgements: This work was supported by The National Council for Scientific Research – Lebanon (CNRS Grant).

MC 2.5

CLASSIFICATION OF UTERINE EMG ACCORDING TO THE PLACENTA POSITION

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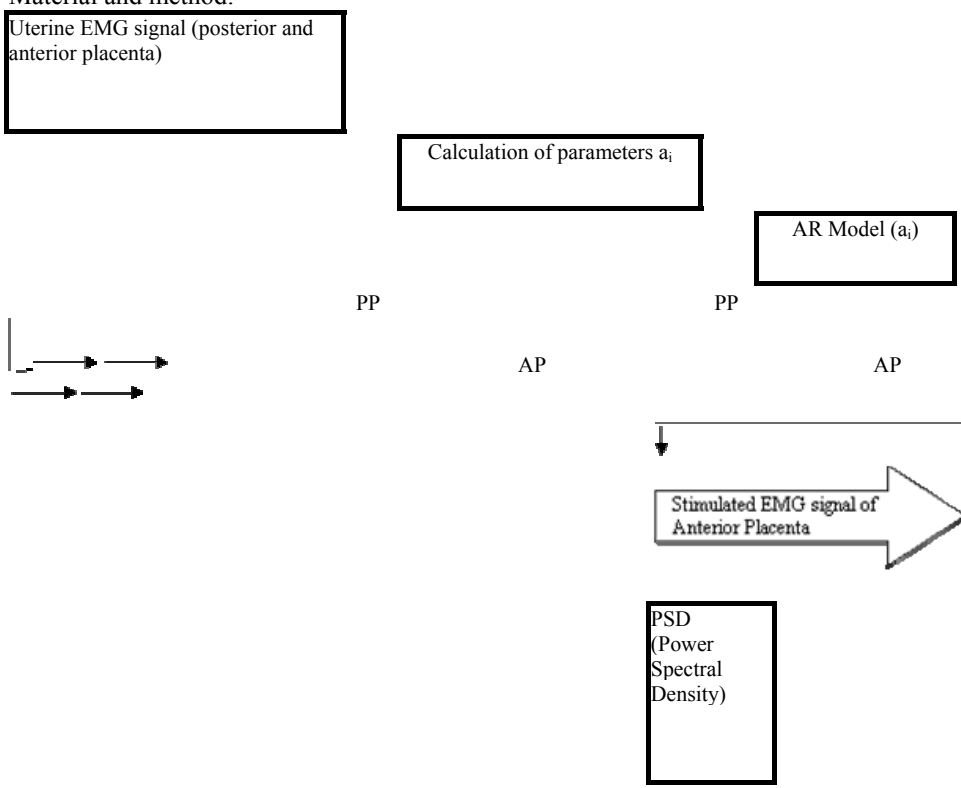
Introduction:

The uterine EMG signal appears to be a potential vector of indication of the risk of premature birth. Several researchers have tried to see if the position of the placenta affects delivery but until this time no results are observed.

Material and method:



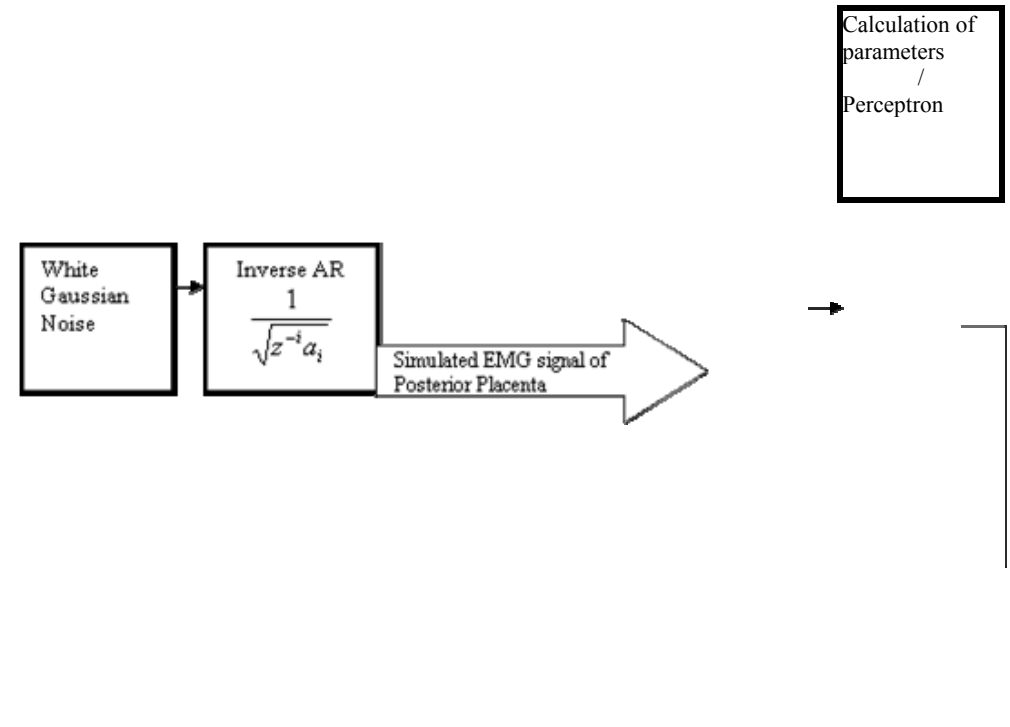


Figure 1: Block diagram for the classification of new data

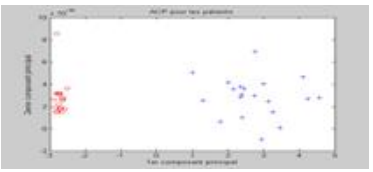


Figure 2: Principal component analysis projection for classification

- First we apply the AR model on the uterine EMG signal for the calculation of the a_i parameters (Figure 1).
- After obtaining the AR parameters of the two groups, we generate the signals simulate of the two types of uterine contractions using the input white Gaussian noise.
- The power spectral density is used to extract the parameters of each stimulated contraction (Figure 1).
- A supervised classification method (perceptron) is used to classify these signals (Figure1)
- A principal component analysis projection is then used to evidence the groups resulting from this classification (Figure 2).

- Results show that the uterine contractions of the posterior placenta and anterior placenta can be classified into two independent groups by taking on the same date registration.

Conclusion:

We have presented an approach of classification using the perceptron neural network method.

We find that most women who have placenta anterior make a confinement terrm and most that has the posterior placenta make a premature birth.

Our work has been performed on a small database. To validate our results, we need a large database of both anterior and posterior placenta provided at the same time.

MC 2.6

AN ELEMENTARY PROOF OF AN ITERATIVE METHOD TO COMPUTE THE INVERSE OF AN INVERTIBLE MATRIX.

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Most students and perhaps instructors are only familiar with two methods of computing the inverse of an invertible matrix A; Form the augmented matrix $(A \mid I)$ where I is the identity matrix of same size as A then reduce it by applying elementary row operations to the matrix $(I \mid A^{-1})$. The other method is to use the following known formula $A^{-1} = \frac{1}{\det(A)} adj(A)$. These methods are called exact methods since we're seeking the exact inverse. Little is known about iteration methods where the objective is to get an approximate inverse. We will provide a simple proof of the following theorem

Theorem: Suppose that A is an invertible matrix. The following iteration method $X_{k+1} = X_k + X_k(I - AX_k)$, $k = 0,1,\ldots$ converges to A^{-1}, for an arbitrary initial guess X_0 under the following two assumptions:

$i)$ $\lim_{n\to\infty}(I - AX_0)^n = 0$

$ii)$ X_0^{-1} exists.

The iteration converges under more general conditions. But then the proof is more difficult. Without using any deep techniques from functional analysis, we will provide an elementary proof which requires only basic knowledge of linear algebra. We will illustrate with a numerical example. Finally, we will conclude with some remarks and future work.

MC 2.7

FUZZY OPTIMIZED METRIC FOR ADAPTIVE NETWORK ROUTING

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Network routing algorithms used today calculate least cost (shortest) paths between nodes. The cost of a path is the sum of the cost of all links on that path. The use of a single metric for adaptive routing is insufficient to reflect the actual state of the link. In general, there is a limitation on the accuracy of the link state information obtained by the routing protocol. Hence it becomes useful if two or more metrics can be associated to produce a single metric that can describe the state of the link more accurately. In this paper, a fuzzy inference rule base is implemented to generate the fuzzy cost of each candidate path to be used in routing the incoming calls. This fuzzy cost is based on the crisp values of the different metrics, a fuzzy membership function is defined. The parameters of these membership functions reflect dynamically the requirement of the incoming traffic service as well as the current state of the links in the path. And this paper investigates how three metrics, the mean link bandwidth, queue utilization and the mean link delay, can be related using a simple fuzzy logic algorithm to produce a optimized cost of the link for a certain interval that is more 'precise' than either of the single metric, to solve routing problem .

Keywords: Network routing, link cost, short path routing, fuzzy logic control.

MC 2.8

MATHEMATICAL MODELLING OF ATHEROMA PLAQUE DEFORMATION

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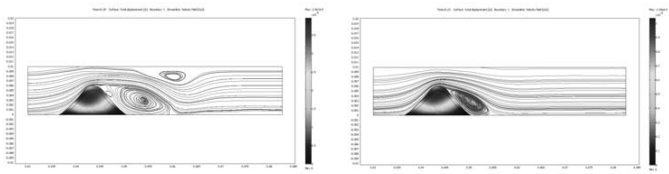
Abstract: The development of atherosclerosis leads to the formation of an atheroma plaque which takes place in the artery. This plaque is composed of two parts: a lipid deposit and a fibrous cap. This fibrous cap covers the lipid deposit and isolates it from the blood flow. The blood flow which circulates in the artery modifies the geometry of the atheroma plaque and can cause dangerous effects as the rupture of the plaque and liberating solid parts which can block the blood circulation. The problem is modeled as a fluid-structure interaction between the blood and the plaque.

Mathematical model The model's geometry is composed of a rectangular domain representing the artery which contains the plaque. We consider two cases for the blood model: a Newtonian fluid with constant viscosity or a non-Newtonian fluid. The blood flow enters the artery by the left side with a Poiseuille profile and exits by the right side. Both parts of the plaque are modeled with the hyper-elastic Mooney-Rivlin model. The fluid viscosity is modeled by the Carreau law. In the Carreau law, the parameter n describes the properties of the fluid: n=1/3 takes into account the non-Newtonian aspect and n=1 corresponds to the Newtonian fluid.

Equations The fluid is governed by the Navier-Stokes equations: $\rho_F\left(\frac{\partial u}{\partial t}+u.\Delta u\right)+\Delta p=\nabla.\sigma_F+f_F$, $\nabla.u=0$. Carreau's model of viscosity: $\eta=\eta_\infty+(\eta_0-\eta_\infty)(1+(\lambda\dot{\gamma})^2)^{(n-1)/2}$ where $\dot{\gamma}$ is the shear rate. The two parts of the plaque are governed by the Mooney-Rivlin model for hyper-elastic materials where the displacement energy w is given as: $w=C_{10}(I_1-3)+C_{01}(I_2-3)+\frac{1}{2}\kappa(J-1)^2$, where I_1 and I_2 are the first invariants of the Cauchy tensor, κ is the bulk modulus and J is the jacobian of the Cauchy tensor. Two formulations for the initial condition on the left boundary are used, the first one is a constant function with a Poiseuille profile and the second one is a function of time t: $U_{in}=4U_{max}t^2/\sqrt{(0.04-t^2)^2+(0.1t)^2}$ with $U_{max}=0.1$ to 0.4 $m.s^{-1}$. We note that the geometry of the domain changes in time. Therefore the numerical mesh should be adapted to it. Comsol Multiphysics controls the moving geometries and moves the mesh distribution with respect to the geometry change by using the **ALE** application (Arbitrary Lagrangian Eulerian).



Results We simulate the model using Comsol Multiphysics. After a short time, we can see that equilibrium takes place. Note that each simulation was performed for four seconds. The blood flow creates some vortices at the beginning of the simulations. The number of these vortices depends on the initial velocity. The presence of the vortices can influence the blood coagulation. Fluid-structure interaction can also result in the plaque rupture which is the most dangerous from the clinical point of view.

POSTER PRESENTATIONS

THE USE OF GENETIC-FUZZY INFERENCE IN DECISION MAKING

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Abstract

Evolutionary learning and tuning mechanism to fuzzy systems is the main concern to researchers in the filed. The optimized final performance on the fuzzy system is dependent on the ability of the system to find the best optimized rule-set(s) as well as the optimized fuzzy variable selection (fuzzy set shape). This paper proposes a mechanism of selection and optimization of fuzzy variables termed as "Fuzzimetric Arcs" and then discusses how this mechanism can become a standard of selection and optimization of fuzzy set shapes. The same principle would aid in rule-set selection and optimization as well where any system will be composed of known number of rule-set(s) that can be concluded from a fixed number of fuzzy variables defined using fuzzimetric arcs. Genetic algorithm is the technique that can be utilized to alter/modify the initial shape of fuzzy sets using two main operators (Crossover and Mutation). Optimization of rule-set(s) is mainly dependent on the measurement of fitness factor and the level of deviation from fitness factor.

Keywords: Fuzzy systems, GFS, Genetic algorithm, Fuzzimetric Arcs, learning and tuning.

Biology & Medical Science

ORAL PRESENTATIONS

B1.1

HISTOPATHOLOGICAL AND ULTRASTRUCTUAL STUDIES ON THE PROTECTIVE EFFECT OF SILYMARIN ON CISPLATIN-INDUCED TISSUE TOXICITY IN RATS

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Objective: Although cisplatin (CDDP) is widely used as effective chemotherapeutic drug, yet at high doses it can produce undesirable side effects such as toxicity to normal tissues specifically hepatotoxicity and nephrotoxicity. Recently, the administration of antioxidants has been suggested to protect against cisplatin-induced tissue toxicity. Silymarin, (a plant extract obtained from *Silybum. Marianum)* has been used as an antioxidant to treat liver disorders and renal injures. The aim of this study was to evaluate the protective role of silymarin on cisplatin-induced hepatotoxicity and nephrotoxicity in rats. ***Materials and methods:*** Male Sprague Dawley rats weighing 150 g average body weight were allocated among 5 study groups, each group consisting of 18 rats. Animals in vehicle group were intraperitoneal injected (i.p.) with propylene glycol in saline 75/25 (v/v). Rats in Cisplatin group were i.p. injected with single dose equal 5 mg kg^{-1} body weight the rats of third group i.p. administrated with silymarin at a dose level 50 mg kg^{-1} body weight; 2 h after cisplatin injection. Rats in the last group i.p. administrated silymarin at a dose level 50 mg kg^{-1} body weight; 2 h before cisplatin injection. Rats were killed after 6 and 12 days of experiment. Cisplatin produced changes in histological and ultrastructural picture of liver and kidney. Histopathological changes of the liver included; blurred trabecular hepatocytes arrangement, dilated sinusoids, and mononuclear cellular infiltration. Diminutive hepatocytes, with irregular shaped nuclei, pseudonuclear inclusion, loss of RER encircling mitochondria, minimal glycogen rosettes, increased cytoplasmic vacuolization. Severe changes involved both glomeruli and renal tubules in rat kidneys included shrunken glomeruli, dilated urinary space, and increased mesangial matrix. Altered podocytes, ballooning, hypertrophy and fusion of secondary foot process and thickening of renal filtration barrier membrane were recorded. Also, the proximal convoluted tubular cells were severely afflicted. They have pleomorphic irregular nuclei, swollen mitochondria with irregular distribution, lost of basal infoldings, and large and irregular microvilli that were lost in some cells. Changes in the distal convoluted tubular cells are less pronounced and included reduced microvilli, pleomorphic nuclei, disorganized organlles. Simultaneous administration of silymarin 2 hrs after cisplatin failed in the complete protection against the pathological alteration caused by cisplatin. Pretreatment of animals with silymarin 2 hrs before cisplatin significantly decreased the histological and ultrastructural changes induced by cisplatin and was highly protective.
Conclusion: These results suggested that the active components of silymarin possess protective effects against hepatotoxic and nephrotoxic actions of cisplatin used in animal models. Since no significant toxicity of silymarin is reported in human studies, this plant extract can be used as a dietary supplement for patients suffering from liver and kidney failures and might serve as a novel combination agent with cisplatin since it plays a significant role in reducing the toxicity induced by cisplatin.

Keywords: cisplatin, silymarin, liver, kidney, histopathology, ultrastructure

B 1.2

Profiling of the different cell wall polysaccharides in Orange (*Citrus reticulata*) and Bomali (*Citrus grandis*) Fruit

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The composition of pectin varies with the source from which it is isolated; it is known to be abundant in citrus fruits. Cell wall materials from Orange (Citrus *reticulata*) and Bomali (*Citrus grandis*) were analyzed for sugar composition by gas chromatography of alditol acetates to determine the variation of pectin content and its chemical composition in the two different citrus species. The extraction of pectic polysaccharides from various parts of the fruits (peel and pulp) was carried out using a sequence of aqueous solvents comprising water, buffers, calcium-ion chelators, and bases at different conditions (pH, temperature and time). The results showed that of the two different citrus species, Bomali was richer in pectic polysaccharides than Orange indicated by the higher levels of neutral sugar (especially arabinose, glucose and galactose) and galacturonic acid content in both peel and pulp. This study demonstrates that there may be significant variation in the levels and compositions of pectic polysaccharides between different citrus species.

B 1.3
A PRELIMINARY STUDY OF THE BIOLOGY OF *ALCEA SETOSA* (MALVACEAE) IN BEIRUT

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Known to the local Lebanese by the common Arabic name *khatmiyyah*, the bristly hollyhock (*Alcea setosa* (Boiss.) Alef.) is one of the most showy medicinal flowering plants of Lebanon. While its flowers are admired for their beauty, and for the highly valued infusions they are used to prepare, its floral biology is poorly understood. This study attempts to fill the gap in our understanding of the floral and seed biology of *Alcea setosa* by exploring the phenology, insect visitors, and fruit and seed characteristics of this plant along the coast of Beirut. Several buds, enclosed by the epicalyx, were monitored on a daily basis during March – April 2009. Typical of the Malvaceae, the buds went through a male phase, followed by a separate female phase, and developed into immature fruits in a period of around 20 days. At least ten different species of insect visitors were collected, some of which used the plant for oviposition, others used the plant as a rendezvous site; even others displayed typical behavior of pollinators. The plants were attacked by snails, particularly after the rain. The infructescences of 15 haphazardly selected plants were collected. As predicted, the study revealed that fruits situated towards the bottom of the plant matured earlier. The average number of fruits per plant, the average number of seeds per fruit and the size of each fruit were determined. Seed size variance, as well as the effect of relative fruit position, fruit size and the number of seeds per fruit on seed size was also studied.

Key words: *Alcea setosa*, Malvaceae, seeds, fruits, pollinators, medicinal plants, Lebanon

B 1.4

Bioremediation of Some Food Industrial Wastewaters

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Some waste waters namely: whey effluent (WhE); orange effluent (OE); carrot effluent (CE) and chocolate effluent (ChE) were bioremediated using some allochtonous microorganisms (*Lactobacillus delbrueckii* subsp. *bulgaricus*, *Saccharomyces carevisiae* y-1347 and *Dekkera bruxellensis*).

The highest biodegradable efficiency of COD, BOD and TKN of the effluents under investigations was noticed when using the allochthonous microorganisms together with the autochthonous one.

Saccharomyces carevisiae proved to be the best utilizer of WhE organic and nitrogenous compounds with the reduction of BOD, COD and TKN by 87.6, 75.6 and 74.7%, respectively. *Dekkera bruxellensis* proved to be the organism of choice on using orange effluent (OE) where BOD, COD and TKN were reduced by 89.85, 82.35 and 80.1%, respectively. *Lactobacillus delbrueckii* proved to be the best utilizer of the carrot effluent constituents by reducing BOD, COD and TKN by 50.48, 66.74 and 68.8%, respectively. *Dekkera bruxellensis* proved to be the best utilizer of the chocolate effluent constituents by improving its quality and reducing the COD and TKN by 77.4 and 71.51%, respectively.

A successful trial was made to use the treated liquid effluents in the irrigation of *Trigonella foenum graecum* and *Viccia faba* seeds for germination.

B 1.5
CD437, A PROMISING SYNTHETIC RETINOID, IN THE TREATMENT OF ADULT T-CELL LEUKEMIA/LYMPHOMA

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Background and Objectives
Adult T-cell leukemia (ATL)/lymphoma is an aggressive neoplasm caused by human T-cell lenkemia virus type I (HTLV-I); the oncogenic protein Tax plays an important role in disease development. ATL carries a poor prognosis due to chemotherapy resistance. Retinoids are used in cancer treatment; however, their use is limited by side effects and acquired resistance. Therefore, synthetic retinoids with reduced toxicity and increased specificity have been developed, namely 6-[3-(1-adamantyl)-4-hydroxyphenyl] -2-naphthalene carboxylic acid (CD437). The general aim of our studies, using ATL/lymphoma as a model, is to investigate the potential use of CD437 in ATL treatment.

Materials and Methods
Cell growth was assessed in HTLV-I positive (HuT-102, C8166, MT2) and HTLV-I negative (CEM, Jurkat, Molt-4) malignant T-cell lines, primary ATL cells from two patients, and normal resting and activated circulating T-lymphocytes. Cell cycle distribution and mechanisms of cell death were determined using propidium iodide staining of DNA content, mitochondrial membrane potential dissipation by Rhodamine staining, cytochrome c release, PARP cleavage, and caspase and ceramide involvement.

Results
CD437 induced growth arrest and cell death in all tested HTLV-I positive and negative cell lines, and primary ATL cells, while no effect was observed in resting and activated normal lymphocytes. HTLV-I negative T cells were more sensitive to CD437 compared to HTLV-I positive cells. All tested malignant T cell lines are resistant to pharmacological levels of all-trans retinoic acid. CD437 caused a G_0/G_1 arrest and apoptosis in all tested cell lines. CD437 induced mitochondrial membrane potential dissipation, cytochrome c release, caspase 3 activation, and PARP cleavage which were less pronounced in HTLV-I positive *versus* HTLV-I negative cells. Ceramide accumulation was only observed in HTLV-I negative cells. Interestingly, CD437 resulted in early proteasomal-mediated Tax degradation.

Conclusion
This research may support a potential therapeutic role for CD437 in ATL and T-cell lymphomas, especially in those leukemic cells that are resistant to chemotherapeutic agents.

B 1.6

Malva sylvestris water extract: A potential anti-Inflammatory and anti-ulcerogenic remedy

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Malva sylvestris, family *Malvaceae*, has been grown as a medicinal plant and pot herb since Roman times. It is found in subtropical and temperate latitude of both hemispheres. The present study investigates the role of the aqueous extract of *its* aerial part upon lipemia, glycemia, inflammation and gastric ulcer using rats as a model. After one month of extract intake via drinking water (100, 400 and 800 mg/kg body weight) the 400 and 800 mg/kg body weight doses resulted in significant increase in serum triglyceride, while other lipid and glycemic parameters and liver enzyme activities (AST, ALT, LDH, ALP) were unaffected. About 10% increase in stool water content was observed at highest dose used. Doses of 50, 100, 250 and 500 mg/kg body weight were used in acute and chronic inflammation models induced by carrageenan and formalin respectively [1]. Significant anti-inflammatory activity was observed at most doses used with an optimum inhibition at 100 mg/kg body weight (60% inhibition) in both models. Protection against ethanol-induced gastric ulcer was investigated [2]. Results showed maximum protection (37%) at 500 mg/kg body weight, a value higher than that observed with cimetidine (30%), a reference drug. The assessment of antibacterial activity against 11 bacterial hospital isolates and the antifungal effect against *Candida albicans* using disk diffusion technique showed no potentials in this respect. In conclusion, *Malva sylvestris* water extract showed no liver toxicity, and exhibited a positive effect on ulcer and inflammation with relatively a neutral effect on lipemia and glycemia.

B 2.1

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Protocadherin LKC (PLKC) is a member of the heterogeneous subgroup of protocadherins, which was identified and described as a potential tumor-suppressor gene involved in contact inhibition (Okazaki et al. *Carcinogenesis 2002*). Several aspects of the structure, posttranslational processing, targeting and function of this new protocadherin are still not known. Here, we demonstrate that the expression of PLKC at the apical pole and its concentration at regions of cell-cell contacts occur concomitantly with significant elevation of PLKC-mRNA levels. Furthermore, it can be found within the adherens junctions, but it does not colocalize with tight junctions proteins ZO-1 and occluding, respectively. Additionally, unlike E-cadherin, PLKC is not redistributed upon Ca^{2+} removal. Biosynthetic labeling revealed N- and O-glycosylation as posttranslational modifications as well as a fast transport to the cell surface and a low turnover rate. During differentiation, PLKC associates with detergent resistant membranes, which is accompanied by an alteration of its glycosylation pattern. This suggests a model in which the subcellular localization of PLKC follows a lectin-mediated raft association and is dependent on the cellular differentiation status. Moreover, we show that PLKC, as a potential differentiation and growth

regulator, is directly involved in the establishment of a proper epithelial cell polarity, but is presumably not implicated in control of cell proliferation rate. Finally, overexpression of PLKC results in increased transepithelial electrical resistance in polarized MDCK-II cells but not in CHO cells, indicating that it is not sufficient per se for establishment of impermeable tight cell-cell contacts

B 2.2
AN ANTI-INFLAMMATORY COMPONENT IN THE POPULAR FOLK MEDICINAL PLANT ANTHEMIS SCARIOSA (CHAMOMILE) EXHIBITS PARTHENOLIDE ANALOGOUS ANTI-PROLIFERATIVE ACTIVITIES

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Anthemis scariosa DC, a Lebanese endemic plant commonly known as "Chamomile", has been a popular folk medicinal remedy for centuries, having various claimed therapeutic effects. Using bioactive guided fractionation and spectroscopic techniques, an anti-inflammatory agent in the water extract of the plant, that is capable of suppressing IL-6 production by endotoxin treated SCp2 mammary epithelial cells, was identified by our lab to be the germacranolide 1β,10α-epoxy-6α-hydroxy-1,10H-inunolide. The potent activity of the identified molecule "K100" is most probably attributed to three functional groups: the exocyclic α-methylene-γ-lactone, an OH group adjacent to the α-methylene, and an epoxide. Moreover, the structure of K100 appeared to be analogous to that of parthenolide (PT), the major sesquiterpene lactone extracted from the plant *Tanacetum parthenium* (feverfew), which has been extensively studied and reported to be capable of inhibiting the proliferation of several cancerous cell lines. Interestingly, recent literature reports have shown that di-methyl-amino-parthenolide (DMAPT), a more soluble PT analogue, has similar effects to those of PT *in vitro* as well as *in vivo* and is currently under clinical trials. Molecular docking *in silico* of K100, DMAPT and Salograviolide A (a sesquiterpene lactone isolated by our lab from the plant *Centaurea ainetensis*) against 10 known target proteins of PT, predicted that K100 can bind to all tested targets at similar positions as PT, and that its affinity of binding is either higher than that of PT or second best to it. Although K100 showed less cytotoxicity than PT, it inhibited the growth of two tested cancerous cell lines (MDA-MB-231 and MCF-7) in a dose dependent manner, with MCF-7 being more sensitive to K100 treatment.

B 2.3

HIV-1 REV IS HIGHLY MUTABLE WITH PARTNER RNAS AND R35G ALLOWS SUBSTITUTION OF N40 WITHOUT LOSS OF RRE BINDING

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The arginine-rich domain of the HIV-1 Rev protein binds to a short stem in the Rev Response Element (RRE) RNA and mediates the export of incompletely-spliced viral transcripts. Rev-RRE recognition regulates gene expression and is essential for viral replication. Many biochemical, genetic, and structural studies of Rev-RRE have been published, yet the roles of several amino acids in binding are still unclear. RNA aptamer I (RAI) is an artificially-selected Rev binder for which an NMR structure and incomplete biochemical data are available. Randomized libraries of the arginine-rich domain of Rev were constructed and screened for their ability to bind the RRE high-affinity site or RAI using a bacterial reporter system based on bacteriophage lambda N antitermination. The results reveal Rev34-48 is highly mutable, support specific biochemical roles for some residues, and provide biochemical support to the existing NMR-based structural models. Rev-RRE and Rev-RAI are similar RNA-protein complexes with distinct binding modes. The panel of mutants found to be active against RRE using the antitermination reporter are strikingly similar to the sequence variability found in clinical isolates, suggesting that the wild HIV population is exploring all possible evolutionary paths. The high proportion of active mutants supports the neutral theory of molecular evolution. By chance, the selection of asparagine 40 mutants revealed that R35G allows mutation of N40 when bound to RRE, but not RAI. That a distinct binding strategy occurs with only two mutations highlights the ability of arginine-rich peptides to evolve new recognition strategies

B 2.4
Structural Bases of Ligand Efficacy and Functional Selectivity at the Arginine-Vasopressin Type 2 Receptor

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The Vasopressin receptor V2 (V2R) belongs to the G-protein coupled receptor (GPCR) superfamily of plasma membrane receptors. GPCR signalling is often induced in a ligand-specific manner and is mediated by coupling to different G-protein subtypes or through G-protein- independent pathways. We hypothesize that the efficacies of specific ligands and/or their functional selectivity in activating different signalling pathways is determined through the stabilization of different conformational states in GPCR. To study the structural flexibility and the mechanisms of activation of V2R, we expressed V2R in SF9 insect cells using recombinant baculovirus. Fos-choline based detergents proved highly efficient in extracting the receptors, and Fos-choline C12 (N-tetradecylphosphocoline) was selected for optimal solubilization and subsequent purification. A two step purification method of Flag purification and ligand affinity chromatography was optimized which enabled V2R to be obtained at >90% purity. To examine the structural changes induced by ligand and leading to the activation of V2R, we first monitored changes in the intrinsic fluorescence of V2R following ligand binding by fluorescence spectroscopy. We observed various alterations in fluorescence intensity in the presence of agonist, inverse agonist, and antagonist which suggested that specific conformational change are induced by each of these ligands. To examine in more detail these specific conformational states, we designed a site-specific fluorescent labelling strategy allowig to examine the ligand-induced structural changes of C-terminus and the third intracellular loop (i3) by intra molecular fluorescence resonance energy transfer (FRET). The acceptor fluorophore FlAsH (Fluorescein Arsenical Helix binder) was attached to a CCGPCC motif at the extreme C-terminus. A panel of single residue mutations to Cysteine in i3 was designed for the attachment of a donor Fluorophore (Terbium cryptate). Functional characterization of these Cysteine mutants confirmed that most of them exhibited similar properties to those of the wild type V2R. Using this strategy, we are currently examining the ligand-specific changes in FRET. Our results provide the first evidence of ligand-specific conformational changes in the V2R that may be relevant to the ligand efficacy and functional selectivity of GPCRs in general.

B 2.5
CHANGE IN CLAUDIN EXPRESSION DURING CACO-2 CELL DIFFERENTIATION

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Epithelia create barriers and regulate solute and water transport through transcellular and paracellular pathways. The paracellular pathways of different tissues vary remarkably in size selectivity, ionic charge selectivity and electrical resistance. The claudin family of tight junction proteins includes twenty four members which are responsible for providing these variable properties. Claudin proteins interact with each others and with other proteins, and based on these interactions epithelial monolayers can range from leaky to tight. In order to better understand the contribution of claudins to the regulation of paracellular permeability, claudin expression in epithelial monolayers should be understood. We are studying the claudin expression profile in caco-2 cells. These cells were grown on permeable and plastic supports for twenty days, which stimulated them to differentiate into enterocyte-like cells. Under these conditions, caco-2 cells formed an epithelial monolayer where the cells gradually exhibited tight junctions. The permeability of the monolayer was monitored by measuring transepithelial electrical resistance (TER), which reflected the tightness of the claudin-based junctions. Measurements revealed a sharp increase in TER during the first five days followed by a slower increase till day seventeen where a plateau value was reached. Throughout the differentiation process, the relative expression of all twenty two human claudins (claudins 1-12, 14-20, 22-24) was monitored by quantitative real-time PCR. Our results demonstrate that the expression of claudins (1, 2, 14, 15, 16 and 18) change during the differentiation of caco-2 cells, while the expression of all other human claudins did not show a significant change. These results suggest that caco-2 cells modulate the properties of their tight junctions as they differentiate. Interestingly, these changes in claudin expression are not always consistent between cells grown on plastic and cells grown on filters supports highlighting the importance of the extracellular matrix in tight junction formation.

B 2.6

THE bHLH TAL-1 AND LYL CONTROL ANG-2 EXPRESSION IN ENDOTHELIAL CELLS

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Angiogenesis consists of several steps of migration, proliferation and morphogenesis. This series of events is controlled by several transcription factors among them TAL-1 and LYL which are two related factors belonging to the bHLH (basic Helix Loop Helix) family. Whereas TAL-1 is associated with active angiogenesis, the expression of *LYL* on the contrary is upregulated in quiescent tissues. To understand their respective functions, we performed transcriptome analysis downstream these two factors in human primary endothelial cells HUVECs. This approach revealed several genes that are modulated by both factors and known to have important functions in angiogenesis among them: VE-cadherin, Angiopoietin2 (ANG2), Metalloproteinase-10 (MMP10) and Inhibitor of differentiation-1 (ID-1). We demonstrated that the gene encoding VE-cadherin, the major component of endothelial adherens junction, is the first target of TAL-1 in endothelial cells: we show that TAL-1 binds directly and activates the VE-cadherin promoter in association with its cofactors E47, LMO2, GATA2 and LDB1. The second selected gene, ANG2, plays a major role in the endothelial lineage. I confirmed *ANG2* downregulation after the extinction of either TAL-1, LYL or LMO2. ChIP experiments show that TAL-1 and its cofactors are recruited in vivo to the *ANG-2* promoter.Similar studies will be done on the *MMP10* promoter to determine whether it is directly regulated by the TAL-1 complex. ID-1 is an HLH protein lacking a DNA binding domain, which heterodimerizes with E bHLH factors (E2A) and thereby inhibits their transcriptional activity. ID-1 has been shown to play a pivotal role in vascular and tumoral development. Interestingly, I found that the cytoplasmic localisation of ID-1 correlates with ANG-2 expression; conversely, its localisation within the nucleus is associated with the lack of ANG2 expression. These results suggest a model where ID-1 may indirectly modulates the activity of TAL-1 complex in endothelial cells. Current studies are performed to validate this hypothesis.

B 3.1
HISTOLOGICAL CHARACTERISTICS AND LIPID COMPOSITION OF PLASMA MEMBRANE OF HEPATOCYTES OF STUFFED GEESE. A RELATIONSHIP WITH THE MELTING LIPID OF FATTY LIVERS?

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The histological characteristics and lipid composition of plasma membrane of hepatocytes were studied in the liver of stuffed geese. One hundred and thirty two female landes geese were raised and stuffed in experimental station. Force-feeding started at 13 weeks of age for a duration of 18 days to obtain 850 g fatty liver mass. Biochemical analysis showed that, for the 72 samples used, the correlation between the weight of the fatty liver and the technological yield was significantly negative (r= -0.53; *P<0.05*). On the other hand, using a sub-sample (N= 22; ~ 30% of N= 72), the relationship between these 2 parameters was rather week (*P= 0.06)*. The live weight of birds, at the onset of force-feeding period, was not correlated with the technological yield of fatty liver. The quantity of lipids exceeded 40% (40 to 60%) of the fatty liver weight. There was a significant correlation between the state of fattening (lipid % / weight of liver) and the lipid melting of the liver (R^2= 0.446). This result implied that the most steatoses livers are those that have the higher melting and should be penalized. Moreover, this study did not show a significant correlation between the membrane lipid composition elements and the liver lipid melting, determined as the technological yield. The histological coloration and cell imaging results showed that laminin is one of the constituents of the basement membrane of the cell. Comparing 2 coloration methods (by Osmium Tetroxyde & Nile Red), this experiment showed that the Nile Red is the most suitable coloration for the hepatic tissue. The Nile Red coloration may be used as a determination method of the technological yield of fatty livers [R2= 0.97 between the technological yield (calculated by the ratio of the liver weight after cooking to the weight of the liver before cooking) & the surface of detected lipid after cooking to the surface of detected lipid before cooking for the Nile Red coloration Vs R^2= 0.70 for the Osmium Tetroxyde coloration].

Keywords : ***Geese, Fatty liver, Hepatocyte, Melting liver, Technological yield, Nile Red, Osmium Tetroxyde***

B 3.2

Association between the Angiotensin Converting Enzyme Genetic Polymorphism and Hypertension in the Lebanese Population

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Background: Hypertension is one of the most prevalent diseases in the adult population. Angiotensin converting enzyme (ACE) is involved in the conversion of Angiotensin I into Angiotensin II which is a vasoconstrictive molecule that affects systemic blood pressure. *ACE* gene is highly polymorphic, and a common variant is the nsertion/Deletion (I/*D)* polymorphism that results from the presence or absence of a 287 base pair fragment of a repeated Alu sequence on intron 16. Several studies have looked at the potential link between *ACE* genotype and the risk of hypertension, and although data is sometimes inconsistent and inconclusive, it seems that the *DD* polymorphism may be associated with a higher prevalence of hypertension. This could be explained by the fact that subjects with the *D* allele have higher plasma ACE levels.

Aim: To determine the frequency of the *ACE I/D* polymorphism in the Lebanese population, and assess for possible association between *ACE* variants and hypertension.

Methods: 192 Lebanese subjects (107 males and 85 females, mean age ± SD= 67 ±14) were recruited. DNA was isolated from peripheral leukocytes and amplified by Polymerase Chain Reaction. The products were then identified by gel electrophoresis according to their size.

Results: 115 (59.9%) patients were hypertensive and 77(40.1%) were non hypertensive with the following genotype frequencies: 43.41%*D/D*, 45.24% *I/D*, and 11.35%*I/I* compared to 35.16% *D/D*, 51.87% *I/D*, 12.97% *I/I* respectively.

Age was found to be the most significant risk factor for hypertension. We have shown that this was even more prominent when accounting for the *ACE* genotype. For instance, the *DD* genotype with age had a significantly higher odds ratio (OR=2.472; *P*=0.001) than *ID* genotype with age (OR=1.526; *P*=0.006), *II* genotype with age (OR=0.625; *P*=0.519), and age alone (OR=1.182; *P*=0.006). Similar results were found with other factors known to be associated with hypertension such as diabetes mellitus, dyslipidemia, atrial fibrillation, and coronary artery disease.

Conclusion: Our results show that the *ACE* insertion/deletion polymorphism is common in Lebanon, and that the combination of *ACE D* allele and age is associated with an increased risk of hypertension.

B 3.3

MONITORING AIR QUALITY IN BEIRUT:

THE AIR RESEARCH UNIT (ARU) PROGRAM SPONSORED BY CNRS

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Scientists from AUB and USJ have joined efforts to create an infrastructure in Lebanon for monitoring ambient gaseous and particulate phase pollutant levels. With the support of the Lebanese National Council for Scientific Research (CNRS), the first Air Quality Research Unit (AQRU) in the nation was established. AQRU measures, analyzes, benchmarks against international standards, and reports on air quality for sulfur oxide (SO_x), carbon monoxide (CO), nitrogen oxide (NO_x), ozone (O_3) and two sizes of particulate matter (PM10 and PM2.5). State-of-the-art gaseous and PM samplers are calibrated and deployed for the collection of ambient gaseous pollutants and PMs at sites selected to reflect the influence of major emission sources and the influence of meteorological conditions. Chemical composition and concentrations of resulting samples are analyzed and coupled with source apportionment studies. As a first step, we show, in this poster presentation, the results of gaseous NO_2 concentrations in 23 different sites in Beirut and the levels of PM10 and PM2.5 collected over a period of six months in 3 different sites. Furthermore, the PM chemical inorganic composition and seasonal and temporal variations of NO_2 and PMs are presented. The compilation of the results is an ongoing process that will extend over a period of one year. Once annual averages of PM and different gaseous levels are computed, the results will be disseminated by the team in collaboration with CNRS to assist decision makers by establishing criteria and quality assurance programs, public transportation designs, urban planning and development decisions.

B 3.4
CONSERVED ROLE OF C-TYPE LECTINS IN ANTI-MICROBIAL DEFENSE REVEALED BY RNA-INTERFERENCE IN *ANOPHELES GAMBIAE* MOSQUITOES

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C-type lectins (CTLs) are a family of proteins that share a common structural motif, the carbohydrate recognition domain, and may act as receptors in pathogen recognition. Indeed, some vertebrate CTLs, particularly the collectins, are unequivocally implicated in the innate immune response to certain microbes. While certain studies in insects and other invertebrates have described CTL activation of effector immune responses *in vitro*, the contribution of these CTLs to immune defenses *in vivo* is still poorly understood. Here, we report that two CTLs, *CTL4* and *CTLMA2*, which were shown previously to inhibit *Plasmodium berghei* ookinete melanization in the malaria vector *Anopheles gambiae*, are transcriptionally induced by bacterial challenge. Using *in vivo* reverse genetic analysis we show that both CTLs are required for the clearance of *Escherichia coli*, but not *Staphylococcus aureus*, from adult female mosquitoes. Silencing either *CTL* dramatically reduces mosquito survival to *E. coli* but not to *S. aureus* infections, suggesting a role in defense against Gram-negative bacteria. Further, molecular characterization reveals that both CTLs are secreted into the mosquito hemolymph mainly in the form of a disulfide-linked heterodimer which binds preferentially to the surface of Gram-negative bacteria. This association explains the similar roles of these CTLs in bacterial defense as well as in the melanization response to *P. berghei* ookinetes. Apparently, CTL4 and CTLMA2 serve pleiotropic functions in the innate immune response of *A. gambiae.*

B 3.5
MOLECULAR MECHANISMS OF ANTIESTROGENS REGULATION OF SJSA1 OSTEOSARCOMA CELL GROWTH

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Selective estrogen receptor modulators (SERMs) such as tamoxifen, 4-hydroxytamoxifen and raloxifene and selective estrogen receptor disrupters (SERDs) such as fulvestrant are used in the treatment of human breast cancer and in hormone replacement therapies for postmenopausal women. In addition to their antiestrogenic (antagonist) effects in breast cells, SERMs have estrogenic action (agonist) in the bone. The use of antiestrogens for the treatment of breast cancer might have undesirable side effects such as induction of osteosarcoma whereas the use of SERDs may cause osteopenia. The mechanism by which SERMs and SERDs modulate the growth of bone cells are still poorly understood. We aimed to analyze the effects of SERMs and SERD on the growth of SJSA-1 osteosarcoma, MDA-MB-231 (estrogen receptor negative) and MCF-7 (estrogen receptor positive) human breast cancer cell lines. The effects of tamoxifen, 4-hydroxytamoxifen, raloxifene and fulvestrant on the growth of SJSA-1, MDA-MB-231 and MCF-7 cell lines were studied in different conditions of serum. Our results show that both SERMs and SERDs had antagonistic effect on cell proliferation of breast cancer cells. More interestingly, SERMs showed two different effects on osteosarcoma growth; in low serum concentration SERMs inhibited (antagonistic), whereas in high serum concentration they stimulated (agonistic) cell growth. This opposite effects of SERMs on SJSA1 cell growth was also confirmed by morphological analysis. Fulvestrant was anatagonistic in both breast cancer and osteosarcoma cell lines in presence of low or high serum levels. Western blot analysis showed that the antagonistic effect on SJSA-1 osteosarcoma cell line was associated with stimulation of phosphorylation of p53 on Ser 15 and the overexpression of PCNA . To our knowledge, this is the first report linking the agonistic effect of SERM in osteosarcoma with the inhibition of p53 activity and PCNA activation.

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B 3.6
New Spectrophotometric Method for the Quantitative Determination of Melamine Using Mannich Reaction

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The objective of this study was to develop a spectrophotometric method for the quantitative determination of melamine. The method was based on the complexation of melamine with a mixture of formaldehyde and chemical including a ketone group, as described by the Mannich reaction. The complex was determined by spectrophotometric absorption measurement as it is characterized by specific spectroscopic properties which are related to the chromophore of the ketone compounds. Uranine was tested as a ketone compound. The UV spectrum of the complex presented a maximum of absorption at 214 nm. An internal standard was added to quantify the melamine. The recovery value was 97% and the limit of detection was 0.063µg/mL.

Key words :Melamine, Spectrophotometer, new method, quantification,internal standard addition method, Mannich reactin.

B 4.1

Contribution of biosolid and banana composts to carbon sequestration under Lebanese conditions

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In Lebanon, wastewater is a source of public nuisance, environmental and health threat. The great majority of generated wastewater is dumped wildly into streams, water or directly to the sea. Yet, many localities have been equipped by sewage networks, but only few of them worked on having solutions for treating wastewater. Following the production of biosolids, one of the most common means of disposal is to land as recycling of organic wastes. This disposal obeys rules and regulations in most countries. In this work, we report on the results of the application of a biosolid and a compost of banana plantation wastes. Biosolid originated from a small plant where the system relies on aerated lagoons. Issued from housing wastewater, the biosolid did not contain high concentrations of heavy metals, except for zinc. Its composition was well below that of the medium urban sludge for all of the analyzed elements, especially for copper, lead and nickel. Biosolids and compost were applied to two soils: a loamy sand (*Eutric Anthrosols*) and a calcium carbonate-saturated loam (*Calcareous Anthrosols*). One level of compost (C: 6.55 t ha^{-1}) and 2 levels of sludge (S1: 3.75 t ha^{-1} and S2: 7.50 t ha^{-1}) were applied in early October and immediately followed by the planting of a barley cover crop. In the first season, the dry matter production in barley was increased by the sludges only in the fast draining loamy sand, while this effect was visible in the second year in the loamy soil. This indicated a different pace of release of nutrients, faster in the better drained loamy sand and slow in the confined drainage loamy soil. In parallel, the in-situ decomposition was studied dur-

ing the rainy seasons. It gave a carbon transfer rate of 25 % (loam) to 33.4 % (loamy sand) of the initial C of sludge and of 29.96 % (loam) and 37.78 % (loamy sand) of the C of compost. These losses were compensated by the C fixed by barley in the loamy sand treated with sludges only. In the short-term, studies showed that 15 to 31 % of the biosolid carbons, and less than 35 % of the compost will remain in soils after 5 years. This could significantly balance the emission of C from the Lebanese transport sectors and contribute to the improvement of carbon sequestration particularly in slow-draining soils.

Key-words: biosolid – loamy sand – calcareous loam – in-situ decomposition – C balance

B 4.2
ECOLOGICAL RISKS OF NITRATE ACCUMULATION AND LEACHING IN THE SOIL-GROUNDWATER SYSTEM OF CENTRAL BEKAA- LEBANON

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Agriculture in Lebanon is concentrated mainly in the fertile Bekaa plain, where intensive agricultural practices prevail. Due to lack of appropriate legislation, governmental and public control, farmers apply excessive chemical fertilizers notably nitrogen. Consequently, health and ecological problems may arise due to nitrate accumulation in the soil and groundwater (GW) system. We have monitored the status of soil and GW quality in Terbol area located in Central Bekaa Plain. Soil and water samples were collected between July 2007 and July 2009. The aim was to study soil and groundwater exposure to nitrate pollution and to relate these risks with the background values of nitrate content in non-polluted areas, current agricultural practices, soil vulnerability to nitrate leaching. Soil samples were taken in four representatives plots under four different existing agriculture practices (leafy vegetable monoculture, potato-lettuce rotation, wheat-potato rotation and grape fields). GW samples were taken from 25 wells spread around the Terbol Plain and whose water is used for irrigation, industrial and domestic purposes. The area was previously surveyed in detail and a soil map at scale 1:50,000 describing the profiles morphology and horizon structure and characteristics was consulted. Analytical water results show alarming levels of nitrate concentration in a number of wells mainly in the central part of the plain reaching 517.7 mg L^{-1}. Soil data show large accumulation of nitrates towards the end of the cropping season in the topsoil layer reaching 102 mg Kg^{-1} soil. Due to nitrate leaching by intensive irrigation higher amounts of nitrates are found at deeper layers which completely disappear from the root zone after one winter season. A GIS soil model based on soil properties affecting soil infiltration, like soil depth, soil texture, soil structure type and strength, organic matter content, pore abundance and size, was elaborated to assess soil vulnerability to leaching. Results show medium and high vulnerability in the larger area of the Central Bekaa plain, with very high vulnerability in the foot slope due to larger porosity and infiltration rates. The drawn soil and GW maps are useful tools for decision makers and local stakeholders including consumers delineating critical areas where special care must be applied to control N input and balance in the soil-GW system and food chain. The current ecological status reveals severe ecological risk for the soil-GW system with resulting pollution of surface and ground waters and potential eutrophication of water resources and health danger to the large public consuming fresh vegetables. For these reasons a consortium joining consumers, farmers, scientists, and authorities must be established to elaborate a nitrogen management plan which should be immediately initiated in order to stop and reduce further contamination of the whole fragile ecosystem. The plan should consider the available nitrogen pools (soil, irrigation water) prior to the assessment of the crop nitrogen demands which brings economic and health return. Plots irrigated from wells containing 200 mg L^{-1} nitrate may not need nitrogen fertilizers as the application of 500 mm (5000 m^3 ha^{-1}) of water means applying 234 kg N ha^{-1} with irrigation water, equivalent to 1114 kg ha^{-1} of ammoniun sulfate fertilizers.

Key words: Bekaa Valley, Soil, Groundwater, Nitrate accumulation, Nitrate leaching

B 4.3

STATE OF ART ABOUT WATER NEEDS AND WASTEWATER MANAGEMENT IN LEBANON: A REVIEW

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This paper shows the real situation of managing the water and wastewater in Lebanon and focuses on problems related to untreated water released in environment. Water and wastewater infrastructures have been rebuilt since 1992. However, wastewater management still remains one of the greatest challenges facing Lebanese people, since water supply projects have been given priority over wastewater projects. As a consequence of increased demand of water by agricultural, industrial and household sectors in the last decade, wastewater flows have been increased. At the same time, a qualitative and quantitative degradation of the effluent has been recorded. In this paper, the existing wastewater treatment plants (WWTP) operating in Lebanon are presented. Most of them are small-scale community-based wastewater treatment plants, only two large-scale plants, constructed by the government, are currently operational. Lebanese aquatic ecosystems are suffering from the deterioration of water quality and water resources because of the insufficient treatment of wastewater which is limited mostly to pre-treatment processes. Such problems must be mainly discussed basing on qualitative and quantitative criteria to meet the requirements of the socio-economic development in the country. In fact, domestic and industrial effluents are mainly conducted together in the sewer pipes to the WWTP before being discharged, without adequate treatment into the rivers or directly into the Mediterranean Sea. Such discharges are threatening the coastal marine ecosystem in the Mediterranean basin. Data bases concerning effluent disposal and monitoring the wastewater quality have to be set for helping to assess future improvements made by WWTP. In fact, the available data are limited to academic research without being representative on a national scale. Preliminary results in our study showed many dysfunctions during wastewater pre-treatment. Most of the global parameters like turbidity, suspended and volatile matter are perturbed during the settling operation. As a consequence, heavy metals are resuspended in the released supernatants in the sea. This study will be held during the 2 coming years on five representative sewage collectors located along the Lebanese coast.

Keys words: Wastewater, Management, Water, WWTP, Quality

B 4.4
TREATED EFFECT OF PALM POLLEN GRAINS EXTRACT (*phoenix dactylifera L.)*ON THE ASTERILITY INDUCED BY ACRYLAMIDE IN MALE RABBITS

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The study was performed to know the effect of ethyle alcohol date palm pollen grains extract to treated the asterility that induced by acrylamide injected to the male rabbits.Twenty male rabbits were divided into two equal groups , the first received 35mg/kgBW of acrylamide intramuscularly,the second group treated bythe same dose of acrylamide plus 200 mg/KgBW of ethyl alcohol pollen grain extract orally for four weeks

Histologically;the infertility effect of acrylamide leds into a significant decreased in the number of spermatogonia,Spermatocytes,Spermatides andSpermatozoa, in addition to the weight of the testes,total sperm count,While the second group showed a significant increased in the above parameters and this evidence that the extract was capable of the diminishing of the acrylamide infertility effect.

تأثير مستخلص حبوب لقاح طلع النخيل في علاج حالات العقم المستحدث باستخدام مادة الاكريلامايد في ذكور الأرانب

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الخلاصة

صممت التجربة للتعرف على تاثير مستخلص حبوب لقاح طلع النخيل في علاج العقم المستحدث باستخدام مادة الاكريلامايد في ذكور الأرانب,قسمت عشرون من ذكور الأرانب عشوائيا إلى مجموعتين متساويتين,حقنت المجموعة الأولى بمادة الاكريلامايد بجرعة مقدارها 5 ملغم/كغم من وزن الجسم داخل العضل , بينما حقنت المجموعة الثانية بنفس الجرعة من مادة الاكريلامايد مع إعطاء مستخلص حبوب اللقاح بجرعة 200 ملغم/كغم من وزن الجسم عن طريق الفم ولمدة أربعة أسابيع.

بين الفحص النسيجي أن استخدام مادة الاكريلامايد أدى إلى حدوث العقم من خلال الانخفاض المعنوي في أعداد سليفات النطف,الخلايا النطفية واورمات النطف والنطف ,بالإضافة إلى الانخفاض المعنوي في أوزان الخصى, والعدد الكلي للنطف, بينما أظهرت المجموعة الثانية زيادة معنوية في جميع التغيرات التي طرأت على المجموعة المعاملة بمادة الاكريلامايد,مما يدل على فعالية المستخلص الكحولي لحبوب لقاح طلع النخيل للتقليل من تأثير مادة الاكريلامايد في إحداث العقم.

B 4.5

Rapid Generation of Pulse Flash Free Radicals to Kill Human Cancer Cells, Recycle Human Urine, and Mineralize Organic Chemicals in Wastewater

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This work relates to generate free radicals and undergo subsequent oxidation to destroy organic chemicals and kill human cancer cells.

It has been have demonstrated the following novel applications of the processes described herein which generate free radicals, including, but not limited to:

- Special application for human urine recycling in the aerospace application
- This process effectively kills human cancer cells in saline aqueous solutions
- Rapid destruction of organic chemicals in a few seconds

Keywords : Rapid flash free radicals, killing human cancer cells , protection normal cells , mineralize organic chemicals .

B 4.6
Effect of Some Local Probiotics on Immunological and Biological Systems of Experimental Animals

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The aim of the present study was to investigate the effect of orally administrated probiotics on the physiological and immunological parameters of *Sprague Dawely* rats. To improve the efficiency of some local probiotics, dairy products were used as an excellent delivery system for probiotics to the experimental animals. The experimental animals were divided into seven different groups; **Group I:** control group; **Group II:** Goat-yogurt group; **Group III:** Cow-yogurt group; **Group IV:** Yeast-goat yogurt group; **Group V:** *Lactobacillus acidophilus* –goat yogurt group; **Group VI:** Yeast-cow yogurt group and **Group VII:** *Lactobacillus acidophilus* –cow yogurt group. It was remarkably noticed that the administration of different probiotics result in a significant increase in body weight gain in all feeding rats compared with the control group. Feeding rats with different probiotics led to increase in Hb and PVC in all groups of rats. On the other hand, a significant increase in RBCs in all feeding rats compared with control group. An increase in the count of both white blood cells and lymphocytes occurred in all feeding rats. A general reduction in ALT, AST and bilirubin was observed in plasma of all feeding rats compared with the control group. A significant decrease was observed in creatinine level of all feeding rats compared with control group. Concerning urea, a significant reduction in urea level was found in plasma of all feeding rats. Feeding rats with these probiotics showed improvement in lipid metabolism. A significant reduction in cholesterol level was observed in plasma of all feeding rats compared with the control group. An effective decrease in the level of TG, LDL and VLDL and increase in the level of HDL was observed in plasma of all feeding rats compared with the control group. Administration of probiotics showed significant increase in total serum protein especially globulin compared with control group. ELISA analysis showed the presence of marked variation in immunoglobulins level of all feeding rats compared with control group.

Key words: Probiotics, Immunological, Biological Systems, Experimental Animals

B 4.7
DEVELOPMENT OF ARAB MARINE ENVIRONMENT AND ITS EFFECT ON THE NATIONAL ECONOMY

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Arab countries overlook the Mediterranean, the Red Sea, the Arabian Gulf, the Atlantic and the Pacific Ocean; have swarms of fish and crustaceans that with good management would bring billions of dollars to Arab countries. To achieve this, thorough survey of these sources would be done as well as monitoring the pollution that affects these areas. It is well known, that in addition to the rich fisheries in these areas, there is also a quantity of petroleum, and mineral wealth and natural gas, which would have been of interest in development and will return billions of dollars to these countries.

Note that the Arab States possess scientific skills at high levels of such disciplines, which could lead the development projects for renewable energy of all kinds.

MNP 1.1

ANTI–INFLAMMATORY ACTIVITY OF JUNIPERUS PHOENICIA

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Juniperus species are well known all over the world due to the fact that they have different Pharmacological activities attributed to the diverse chemical nature of their biactive secondary metabolites. Among the reported activities are: the antioxidant, anticoagulant, antihepatotoxic and others. The biologically active constituents occurring commonly in plants of genus *Juniperus* are terpenoids including diterpene acids, flavonoids, and neolignan glycosides. In addition, plants of this genus accumulate volatile oils that differ in their components due to various ecotypes. Accordingly, volatile oils of *Juniperus* species have broad medicinal values.

In Egypt , genus Juniperus is represented by only one very rare species: *Juniperus Phoenicia*, which is in turn grown very commonlly in libya and is sold in the Egyptian market. Our Previous work on *Junipeus Phoenicia*, demonstrated antidiabetic and antihepatotoxic effects of the berries of this plant. In continuation of our previous biological studies on this plant, we report here in this communication, the anti–inflammatory activity of the free fatty acids of both berries and aerial parts obtained from the same source .

MNP 1.2

Antibacterial Activity of the Extracts Obtained From *Rheum Rhaponticum* and *Viola Odorata* on Multi-Drug-Resistant Clinical Isolates of *Escherichia Coli* and *Klebsiella Pneumoniae*

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Aim: This study aimed at determining the antimicrobial activity of two selected indigenous Lebanese plants against extended spectrum beta-lactamases producing *Escherichia coli* and *Klebsiella pneumoniae* and at identifying the specific plant fraction responsible for the antimicrobial activity.

Methods: The antibacterial activity of *Rheum rhaponticum* and *Viola odorata* extracts was studied using the microdilution method as described by the CLSI and the minimum inhibitory and minimum bactericidal concentrations (MIC and MBC) of each plant fraction were determined and quantified in µg/ml. Plant's crude extract was obtained after rotoevaporation of soaked ethanol plant. The ethanolic extracts obtained from plant parts were subfractionated into petroleum ether, dichloromethane, ethyl acetate and aqueous fractions.

Results: A total of 20 *Escherichia coli* and 10 *Klebsiella sp* clinical isolates were used to study the antibacterial activity of the two plants. Inhibitory and bactericidal effects of *Rheum rhaponticum* on *Escherichia coli* and *Klebsiella pneumoniae* were observed with the crude extract, the ethyl acetate and the aqueous fractions of the plant; whereas *Viola odarata*'s antibacterial activity was only identified with the ethyl acetate and aqueous fraction. The majority of the tested microorganisms (90%) were inhibited by 40 µg/µl of *Rheum rhaponticum's* crude extract whereas *Viola odorata*'s crude extract did not manifest any detectable antibacterial activity. The petroleum ether and dichloromethane fractions of both plants exerted rare antibacterial effect. Ethyl acetate extracts of the selected plants presented antibacterial activity with high potency. The aqueous extracts of both plants showed higher antibacterial activity against *Escherichia coli* than *Klebsiella pneumoniae* strains.

Conclusion: This study showed that *Rheum rhaponticum* and *Viola odorata* can have antibacterial activity on ESBL producing strains of *E.coli* and *Klebsiella* sp. depending on the plant extract. This antibacterial activity seems to be much higher with *Rheum rhaponticum* than with *Viola odorata.* The study of medicinal plants in search of new antimicrobial agents should be completed by similar investigation of other plants.

MNP 1.3
DEVELOPMENT AND VALIDATION OF HPTLC AND SPECTROPHOTOMETRIC METHODS FOR SIMULTANEOUS DETERMINATION OF CANDESARTAN CILEXETIL AND HYDROCHLOROTHIAZIDE IN PHARMACEUTICAL PREPARATION

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Two methods are described for the simultaneous determination of candesartan cilexetil (CAN) and hydrochlorothiazide (HYD) in binary mixture. The first method was based on HPTLC separation of the two drugs followed by densitometric measurements of their spots at 270 nm. The separation was carried out on Merck HPTLC aluminium sheets of silica gel 60 F_{254} using chloroform: methanol (8:2, v/v) as mobile phase. Linear regression analysis data used for the regression line were in the range of 0.05–0.70 and 0.05–0.50 µg.band^{-1} for CAN and HYD, respectively. The second method was based on difference and derivative-difference spectrophotometry with a zero-crossing measurement technique. Linear calibration graphs of absorbance difference values (ΔA) at 292 nm and 338 nm were obtained versus concentration in the range 20-100 mg.L^{-1} for CAN and HYD. Also linear regression equations of second derivative difference values (ΔD^2) at 296 nm for CAN and first derivative difference values (ΔD^1) at 299 nm for HYD versus concentration in the ranges 10–100 and 5– 70 mg.L^{-1} for CAN and HYD, respectively, were obtained. The two methods were validated according to ICH guidelines and applied on bulk powder and pharmaceutical formulation.

MNP 1.4

Renal functions in Jordanian children with β-thalassaemia major treated with deferoxamine.

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Abstract:

In β-thalassaemia, profound anemia and severe hemosiderosis cause functional and physiological abnormalities in various organ systems and the most important cause of mortality and morbidity is organ failure due to deposits of iron. The present study aims at evaluating the nature of the kidney injury and possible pathogenetic factors in Jordanian thalassemic patients. Forty two patients with β-thalassaemia major (20 males and 22 females) that undergo periodical blood transfusion and deferoxamine (DFO) as chelating agent were involved in this study. All patients are free from HBV, HCV and HIV. The tested group aged from 4-14 years. The diagnoses of β-thalassaemia major were made based on the clinical, hematological and hemoglobin electrophoresis profiles and the results of β-goblin chain synthesis. Forty controls (20 males and 20 females) of matched age and gender were also included in the study. Significant differences ($p<0.05$) appeared between the experimental and control groups over all the physiological variables measured (urea, creatinine, uric acid, sodium and potassium) except for blood glucose and chloride. We concluded that renal disorders are not rare in patients with beta-thalassaemia major and they may increase in terms of frequency with age, duration of transfusion and DFO usage.

MNP 1.5

Enhancement of Oral Bioavailability of Insulin in Humans

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ABSTRACT

The purpose of this study is to investigate oral absorption of 1, 2 and 3 U/kg oral insulin five test products with different particle sizes in comparison with 0.1 U/kg subcutaneous reference formulation. Twenty five healthy volunteers participated in five studies using a two-phase, two-sequence crossover design with washout period of one day. Mean disposition kinetics was determined by non-compartmental analysis using Kinetica program. Absorption kinetics of insulin products were then determined using SIMCYP simulator utilizing ADAM model. Dimensional analysis results showed the superiority of formula 4: 2 U/kg oral dose with 57 nm particle size over other oral formulations when compared with subcutaneous route. Optimized intestinal permeability coefficients ($x10^{-4}$) of insulin best test and reference formulations were 0.084 and 0.179 cm/sec respectively. Total fraction of insulin dose absorbed (Fa) for the test and reference products were 3.0 % and 19 % respectively. Subcutaneous product exhibited higher absorption rate and extent than oral insulin. Yet that was compensated by the increase in other factors such as Fa*, Peff* and oral dose, leading to similar insulin plasma levels and similar effect on glucose infusion rates. Oral insulin bioavailability was shown promising for the development of oral insulin product.

MNP 1.6
DETERMINANTS OF KIDNEY DIALYSIS ADEQUACY IN LEBANESE HEMODIALYSIS PATIENTS

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Background: Kidney dialysis is a form of renal replacement therapy that helps manage uremic symptoms in patients with kidney insufficiency. Dialysis is described to be adequate when it achieves a reduction in blood urea nitrogen of at least 65% (Spolter et al., 2007). In Lebanon, published studies on renal dialysis are not extensive and do not sufficiently portray existing dialysis practices and outcomes.

Objectives: This study aims at assessing the proportion of patients who receive adequate dialysis in Lebanon, and investigating the determinants of adequacy, including patient demographics, dialysis practices, and clinical parameters.

Methods: Data were extracted from a cross-sectional study conducted by the Clinical Research Unit at the American University of Beirut Medical Center on dialysis patients in Lebanon. The study covered 1155 dialysis patients cared for at 18 dialysis centers. For the current study, only the 782 patients for whom information on urea reduction ratio was available were included. Descriptive statistics, bivariate and multivariate analyses were carried out.

Results: The prevalence of adequate dialysis in the sample was 68%. Adequacy varied by dialysis center and location. Accounting for the center effect, females were more likely to achieve adequate dialysis (adjusted OR=4.32), while patients with higher body weight were less likely to have adequate dialysis (adjusted OR=0.94). Three sessions per week were associated with less adequate outcome compared to 1-2 weekly sessions (adjusted OR=0.25).

Conclusion: The percentage of adequate dialysis in the patient sample reflects the need for quality improvement in dialysis units in Lebanon. Based on the study results, it is recommended to increase dialysis doses in male patients with high body weight.

Implications: This is the first study to investigate dialysis practices and outcomes in Lebanon. Besides underlining the importance of quality monitoring in dialysis centers, the study confirms the need to tailor dialysis prescriptions based on the patient requirements. Furthermore, the study provides the basis for future research on kidney dialysis in the country.

Best regards
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MNP 2.1

Effect of lysine and vitamin B6 supplementation on male subjects with hypertriglyceridemia.

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Lipid profile is known to be affected by fatty acid metabolism. Long chain fatty acid oxidation requires the enzyme carnitine palmitoyltransferase (CPT), which in turn depend on the availability of carnitine. Carnitine can be obtained from animal sources or synthesized utilizing lysine and vitamin B6. The effect of lysine and vitamin B6 supplementation on male subjects with high level of triglyceride (TG>150mg/dl) was studied. Eighty one hypertriglyceridemic subjects were randomly divided into 4 groups: Placebo, lysine (1g/day), vitamin B6 (50mg/day) and lysine plus vitamin B6. Subjects were maintained on the supplement for 12 weeks and plasma glucose and lipid profile were tested at baseline, 6 and 12 weeks. Lysine supplement did not alter lipid profile, but plasma glucose was reduced at 6 weeks. Vitamin B6 and lysine plus vitamin B6 groups showed a decrease improvement in some components of lipid profile mainly related to total cholesterol, LDL and HDL, but TG and glucose were not affected. Although the subjects were all hypertriglyceridemic, but most had other abnormalities in terms of the other components of the lipid profile or glycemia. These confounding factors may have affected the results and more controlled studies are needed. The mechanism(s) by which lysine and vitamin B6 exerted their effect is not clear, especially that both are known to have several metabolic effects. Lysine and vitamin B6 supplement were found to exhibit some effect on the glycemic and lipidemic profiles of subjects with high triglyceride levels.

MNP 2.2
FRONTALIS FLAP ADVANCEMENT AND A MODIFIED WHITNALL'S LIGAMENT SUSPENSION IN TREATING SEVERE CONGENITAL PTOSIS WITH POOR LEVATOR FUNCTION

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PURPOSE: To investigate and compare the efficacy and complications of new techniques, namely Frontalis Flap Advancement & a Modified Whitnall's Ligament Suspension, in treating severe congenital ptosis with poor levator function.
PATIENTS AND METHODS: Group I: Ten patients (14 lids) underwent Frontalis Flap Advancement and Group II: eight patients (10 lids) underwent Modified Whitnall's Ligament Sling. We recorded: Laterality, Marginal reflex distance, levator function, skin crease and any associated conditions. Post-operatively: Eyelid height and contour, symmetry and complications were recorded.
RESULTS: Symmetry after 6 months: Good: Group I (50%), Group II (30%); Moderate: Group I (29%), Group II (30%); Residual: Group I (14%), Group II (20%). Recurrent ptosis: Group I (7%), Group II (20%); No other complications were noted.
DISCUSSION: Results suggested that both techniques seem to be suitable for the correction of severe congenital ptosis with poor Levator Function without the need to use foreign material or harvest it from a site different from the primary surgical site.

MNP 2.3

THE USE AND APPLICATION OF TISSUE MICROARRAYS TECHNOLOGY IN THE BREAST CANCER PROFILING IN LEBANESE POPULATION

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Breast cancer is the leading cause of cancer-related death among women worldwide. Despite significant advances in diagnosing techniques and treatment modalities of breast cancer, several major unresolved clinical and scientific problems remain. These latter are related to (a) the women awareness for prevention, (b) the specificity and sensibility of the diagnostic techniques, (c) the tumor progression and recurrence, (d) to the treatment protocols, and (e) the ability to overcome the therapeutic resistance. Resolving all these problems is complicated by the fact that breast cancer is not a single disease but is highly heterogeneous at both the molecular and clinical level.Wide availability of systemic therapeutic agents has led to a considerable decline in mortality from breast cancer. However, the biology of breast cancer remains poorly understood. Currently, highly accurate markers to predict prognosis and probability of response to a given systemic therapy on an individual basis are lacking, and routinely used clinicopathologic variables fail to fully capture the heterogeneity of breast cancer. As a result, many patients are over-treated, whereas others may not receive the necessary therapy. It has been hypothesized that molecular differences in breast cancers might account for the heterogeneous potential in growth, invasion and metastasis in each individual tumor. The advent of microarray technology has enabled scientists to simultaneously investigate the expression of thousands of genes. Gene-expression profiling studies have provided a molecular classification of breast cancer into clinically relevant subtypes, new tools to predict disease recurrence and response to different treatments, and new insights into various oncogenic pathways and the process of metastatic progression. This technique holds substantial promise for optimizing clinical decision making and tailoring therapeutic regimens to individual patients in the near future. Nowadays, Tissue Microarrays Technology (TMA) enables high throughput tissue analyses of breast cancer. TMA technology enables the placement of hundreds of minute tissue

samples on a single tissue block, thus conserving precious material. In addition, TMAs have increased throughput of *in situ* analysis because of the large numbers of tissue samples that can be evaluated in a single experiment. Sections of tissue microarrays provide large spectrum of targets dedicated for rapid analysis of molecular markers on the same specimen. To date, there is no study that evaluates breast cancer gene profiling in Lebanese population. This project aims to evaluate the immunohistochemical profiling of essential breast cancer markers in stored tissue samples (ER, PR, Her-2/neu, Ki-67, p53 and EFGR). The zones of interest are to be identified microscopically and cored before they are arrayed on blank paraffin blocks. Blocks containing tissue cores will be sectioned and stained with immunohistochemical antibodies directed against the cited tumor markers. These experiments are expected to allow the classification and subgrouping of breast cancer patients for a modulation of their treatment protocols overcoming the breast cancer heterogeneity.

MNP 2.4

KRAS mutation incidence in metastatic colorectal cancer and response to cetuximab:preliminary results in the lebanese population

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Abstract

Background: KRAS mutation status predicts survival in patients with metastatic colorectal cancer (mCRC) treated with cetuximab. KRAS mutation status (KRASMS) analysis started in Lebanon since September 2008. **Methods:** We performed a retrospective study on patients with mCRC who had their KRASMS analyzed in the only centralized laboratory in Lebanon, using the sequencing method. Patients' charts were reviewed looking for demographic information, chemotherapy regimens, response to treatment and PFS. The objective of this study is to determine the incidence of KRAS mutation in Lebanon and to evaluate the response to cetuximab with chemotherapy in wild-type patients compared to what is already published in literature. **Results:** We analyzed tumor samples of 194 patients with mCRC looking for activating mutations in codon 12 or 13 on the KRAS gene. No mutations were found in 108 (55.7%) samples (wild-type), 57 (29.4%) had a mutation (mutated) and 29(14.9%) didn't have amplifiable DNA. We subsequently gathered the information of 36 patients who received their treatment in one large university hospital in Beirut, 23 were wild-type (63,9%) and 13 mutated (34,3%); median age was 61 years (36-79), with 19 males and 17 females. Of the 23 wild-type patients, 19 received cetuximab, 11 of them along with their first line chemotherapy consisting of XELIRI (5patients), FOLFOX (3patients), FOLFIRI (2patients), Oxaliplatine+Irinotecan (1patient). Only 2 of the 11 wild type patients developed a progressive disease after first line chemotherapy with Cetuximab; 6 had stable disease and 3 partial response. Median PFS was 10.2 months. Five out of the 8 wild-type patients who received cetuximab in combination with their second or third line chemotherapy had a response The collection of data is still ongoing. **Conclusions:** The incidence of KRAS mutation in patients with mCRC in Lebanon seems similar to what is described in the literature. Proper identification of wild-type patients who are most likely to respond to cetuximab plus chemotherapy could result in a substantial drug cost savings, especially in a country like Lebanon confronted to health economic issues. Upfront KRAS testing should be done to all patients with mCRC before initiating their treatment.

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MNP 2.5

Complementary and Alternative Medicine for Cancer Patients

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Complementary and alternative medicine (CAM),is a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine. Complementary medicine is used together with conventional medicine. Alternative medicine is used in place of conventional medicine. Conventional medicine is medicine as practiced by holders of M.D. (medical doctor) or D.O. (doctor of osteopathy) degrees and by their allied health professionals, such as physical therapists, psychologists, and registered nurses. Other terms for conventional medicine include allopathy; Western, mainstream, orthodox, and regular medicine; and biomedicine. Some conventional medical practitioners are also practitioners of CAM. This lecture well discuss all the advantages and disadvantages of this practice mainly for cancer patients

MNP 2.6

"The Cost of Maintaining High Academic Standards in Medical Education"

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Professor & Chairman, Department of Orthodontics

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Beirut Arab University Over the past twenty years many health sciences institutions in the Arab World have taken initiatives to improve the quality of their existing systems in terms of medical education and health care delivery services. Decision makers however, in an era of economic crisis and public accountability, are facing serious concerns regarding the imbalance between the available resources and the continuous quality improvement and accreditation of their programs. Medical education to be effective and efficient must be financially self-supported with a continuous sustainable budgeting of their capital and running expenditure, a condition which may not be always secured through the annual increases in tuition. The problem in the Arab World is even more prominent because of the absence of governmental financial support, private funding agencies, and low family income. This presentation aims to review and update the influence of financial constraints on achieving high quality academic standards, scientific research, and safe health care of the public.

Topic

Osun State College of Health Technology Ilesa

STD Statistics Worldwide

MNP 2.7
Aids and Sexually Transmitted Diseases

Sexually Transmitted Diseases (STDs - also known as Sexually Transmitted Infections) present a major public health concern in both industrialised and developing countries. However, information about infection rates is hard to come by, especially for many developing countries. No single organisation regularly collates STD statistics worldwide, and different countries have different types and levels of reporting systems. It is thought that many reports substantially underestimate the number of new STD cases because social stigma and other factors prevent people seeking health care.
A World Health Organisation (WHO) report published in 2001 provides estimates of the extent of the world's STD epidemics as they were in 1999 (previous reports were published in 1990 and 1995). As of early 2007, there are no more recent international estimates. The 2001 report forms the basis of the data on this page.

Curable STD epidemics

The WHO estimates that 340 million new cases of syphilis, gonorrhea, chlamydia and trichomoniasis occurred throughout the world in 1999 in men and women aged 15-49 years. The largest number of new infections occurred in the region of South & Southeast Asia, followed by sub-Saharan Africa and Latin America & the Caribbean. The highest rate of new cases per 1,000 population occurred in sub-Saharan Africa. Infection rates can vary enormously between countries in the same region and between urban and rural populations. In general, however, the prevalence of STDs tends to be higher in urban residents, in unmarried individuals, and in young adults.

Estimated prevalence and annual incidence of curable STDs by region, 1999

Region	Adult population (millions)[1]	Infected adults (millions)	Infected adults per 1,000 population	New infections in 1999 (millions)
North America	156	3	19	14
Western Europe	203	4	20	17
North Africa & Middle East	165	3.5	21	10
Eastern Europe & Central Europe	205	6	29	22
Sub-Saharan	269	32	119	69

Africa				
South & Southeast Asia	955	48	50	151
East Asia & Pacfic	815	6	7	18
Australia & New Zealand	11	0.3	27	1
Latin America & Carribean	260	18.5	71	38
Total	3040	116.5	-	340

Chlamydia

Chlamydia is the most common treatable bacterial STD. It can cause serious health problems such as pelvic inflamatory disease, ectopic pregnancy and infertility if it is not treated.
It is estimated that around 92 million chlamydia infections occurred worldwide in 1999, affecting more women (50 million) than men (42 million). In the period 1995 to 1999 there was an estimated worldwide increase in prevalence of 2.8 million people. Prevalence of chlamydia varies enormously across the world. In the 1990s, rates amongst pregnant women in Europe ranged from 2.7% in Italy to 8.0% in Iceland, while studies in South America found rates of 1.9% amongst teenagers in Chile and 2.1% amongst pregnant women in Brazil. In Asia rates among pregnant women tend to be much higher: up to 17% in India and 26% in rural Papua New Guinea. In Africa, studies amongst pregnant women have revealed rates from 6% in Tanzania to 13% in Cape Verde.
The table below shows that rates of infection fell in some regions while rising in others.

Estimated new cases of chlamydia infections (in millions) among adults, 1995 and 1999

Region	1995			1999		
	Male	Female	Total	Male	Female	Total
North America	1.64	2.34	3.99	1.77	2.16	3.93
Western Europe	2.30	3.20	5.50	2.28	2.94	5.22
North Africa & Middle Europe	1.67	1.28	2.95	1.71	1.44	3.15
Eastern Europe & Central Asia	2.15	2.92	5.07	2.72	3.25	5.97
Sub-Saharan Africa	6.96	8.44	15.40	7.65	8.24	15.89
South and Southeast Asia	20.20	20.28	40.48	18.93	23.96	42.89
East Asia & Pacific	2.70	2.63	5.33	2.56	2.74	5.30
Australia & New Zealand	0.12	0.17	0.30	0.14	0.17	0.30
Latin America & Caribbean	5.01	5.12	10.13	4.19	5.12	9.31
Total	42.77	46.38	89.15	41.95	50.03	91.98

Gonorrhea

Gonorrhea is a bacterial infection. It is sexually transmitted and can infect the cervix, urethra, rectum, anus and throat. Gonorrhea is a curable STD but if left untreated can cause serious health problems such as infertility, meningitis and septicaemia.
An estimated 62.35 million cases of gonorrhea occurred in 1999, affecting more women than men.
Studies of pregnant women in Africa have found rates for gonorrhea ranging from 0.02% in Gabon to 3.1% in Central African Republic and 7.8% in South Africa. In the Western Pacific in the 1990s, the highest prevalence rates (3% or greater) were in Cambodia and Papua New Guinea. Other areas such as China, Viet Nam and the Philippines had rates of 1% or less. Between 1995 and 1999, a significant increase in gonorrhea incidence occurred in Eastern Europe, with the highest rates in Estonia, Russia and Belarus.

Estimated new cases of gonorrhea infections (in million) in adults, 1995 and 1999

Region	1995			1999		
	Female	Male	Total	Female	Male	Total
North America	0.92	0.83	1.75	0.84	0.72	1.56
Western Europe	0.63	0.60	1.23	0.63	0.49	1.11
North America & Middle East	0.77	0.77	1.54	0.68	0.79	1.47
Eastern Europe & Central Asia	1.16	1.17	2.32	1.81	1.50	3.31
Sub-Saharan Africa	8.38	7.30	15.67	8.84	8.19	17.03
South & Southeast Asia	14.55	14.56	29.11	15.09	12.12	27.20
East Asia & Pacific	1.47	1.80	3.27	1.68	1.59	3.27
Australia & New Zealand	0.07	0.06	0.13	0.06	0.06	0.12
Latin America & Caribbean	3.67	3.45	7.12	4.01	3.26	7.27
Total	31.61	30.54	62.15	33.65	28.70	62.35

Syphilis

Syphilis is a bacterial infection that is usually sexually transmitted, but may also be passed from an infected mother to her unborn child. Syphilis is a curable STD which if left untreated can eventually lead to irreversible damage to the heart and nervous system.
An estimated 12.22 million cases of syphilis occurred worldwide in 1999 - slightly below the 1995 estimate.
In contrast to a decline in rates observed in Western Europe, the 1990s saw an alarming increase in syphilis infections in the newly independent states of the former Soviet Union. There, incidence increased from 5-15 per 100,000 in 1990 to as high as 120-170 per 100,000 in 1996.
Rates of syphilis can be very variable within just one region. Studies of pregnant women in Africa have revealed rates of 17.4% in Cameroon, 8.4% in South Africa,

6.7% in Central African Republic and 2.5% in Burkina Faso.. In the Western Pacific, relatively high rates of 8% in the South Pacific, 4% in Cambodia and 3.5% in Papua New Guinea have been reported. In 1997, studies amongst pregnant women in the Eastern Mediterranean Region showed syphilis infection rates of 3.1% in Djibouti, 3.0% in Morocco and 2.4% in Sudan.
The table below shows that increases in prevalence between 1995 and 1999 were seen in Eastern Europe & Central Asia, sub-Saharan Africa and Latin America & the Caribbean; in the last of these regions, incidence more than doubled. Other regions saw a drop in the number of estimated new cases.

Estimated new cases of syphilis (in millions) among adults, 1995 and 1999

Region	1995			1999		
	Male	Female	Total	Male	Female	Total
North America	0.07	0.07	0.14	0.054	0.053	0.107
Western Europe	0.10	0.10	0.20	0.069	0.066	0.136
North Africa & Middle East	0.28	0.33	0.62	0.167	0.197	0.364
Eastern Europe & Central Asia	0.05	0.05	0.10	0.053	0.052	0.105
Sub-Saharan Africa	1.56	1.97	3.53	1.683	2.144	3.828
South & Southeast Asia	2.66	3.13	5.79	1.851	2.187	4.038
East Asia & Pacific	0.26	0.30	0.56	0.112	0.132	0.244
Australia & New Zealand	0.01	0.01	0.01	0.004	0.004	0.008
Latin America & Caribbean	0.56	0.70	1.26	1.294	1.634	2.928
Total	5.55	6.67	12.22	5.29	6.47	11.76

Conclusion

Sexually transmitted diseases are a major global cause of acute illness, infertility, long term disability and death, with severe medical and psychological consequences for millions of men, women and children. The WHO states that "in developing countries, STDs and their complications are amongst the top five disease categories for which adults seek health care. In women of childbearing age, STDs (excluding HIV) are second only to maternal factors as causes of disease, death and healthy life lost". The presence of an untreated STD can also "increase the risk of both acquisition and transmission of HIV by a factor of up to 10".
Unlike HIV, many STDs can be treated and cured relatively easily and cheaply if diagnosed early enough. To fight these epidemics, authorities must act to expand access to testing and treatment facilities; to educate people about safer sex and risk reduction; and to counter the prejudice surrounding STD infections.

By osobu Adebanjo Isreal,

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MNP 3.1

DETERMINATION OF PARABENS PRESERVATIVES IN A LIQUID PHARMACEUTICAL FORMULATION BY HPLC.

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ABSTRACT

Sodium benzoate, potassium sorbate and methyl hydroxybenzoate are commonly used as preservatives in liquid pharmaceutical preparations. The purpose of this study is to determine the amount of the former preservatives in pharmaceutical products as recent studies have reported serious side effects associated with the ingestion of these substances. The content of thirty seven liquid pharmaceutical products was simultaneously determined by high performance liquid chromatography. Preparations were analyzed in triplicate for their preservative content using a sensitive and reproducible HPLC method modified in our laboratory. Preservatives levels were found to fall outside the typical allowed concentration range for 70% of the samples, with some exhibiting significant higher concentrations. The reason behind such finding is unclear and could be due to poor quality control or to intentionally extend the shelf-life of the products. These findings highlight issues related to quality control and to patient's safety. Consequences on patient health need to be evaluated, especially that most of liquid pharmaceutical products are administered to the pediatric population.

Key Words: Pharmaceutical solution analysis - Preservatives - Sodium benzoate - Potassium sorbate – Methylparaben.

MNP 3.2
IMMUNOHISTOCHEMICAL EXPRESSION OF THYMIDINE PHOSPHORYLASE IN NORMAL HUMAN ENDOMETRIUM

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ABSTRACT

Background: *Several polypeptide growth factors regulate epithelial and stromal development in endometrium under the influence of oestrogen and progesterone during menstrual cycle. However, little is known about the angiogenic growth factors that may affect endometrial vasulature. Thymidine phosphorylase (TP) is suggestively a potent angiogenic growth factor in the female reproductive tract.*
Aim of the work: *The purpose of this study was to investigate the expression of thymidine phosphorylase (TP) in normally cycling endometrium using immunohistochemical and morphometrical methods.*
Materials and Methods: *Thirty two normal endometria were studied. The endometria were "dated" on haematoxylin and eosin stained sections. TP expression was assessed with the platelet-derived endothelial cell growth factor (P-GF.44C) monoclonal antibody, using the Avidin Biotin Complex (ABC) method. The mean area percent and the optical density (mean grey) of the TP positive reaction were morphometricaly determined using Leica Qwin image analysis system.*
Results: *In normal proliferative endometrium TP was found invariably patchy. Expression was cytoplasmic in glandular epithelium, and nuclear in stromal cells. This immunohistochemical picture remained almost unaltered during the early secretory phase of the normal menstrual cycle but, most impressively, TP was expressed uniformly in the epithelium of all endometrial glands towards the end of the cycle. At this stage, expression was mixed nuclear/cytoplasmic and there was very little stromal nuclear staining.*
Conclusion: *TP was expressed consistently in normal endometrium, suggesting a role in physiological angiogenesis. It had a definite pattern of distribution, which was dependent on the phase of menstrual cycle shifting from the endometrial stroma to the endometrial glands as the cycle advances.*

MNP 3.3
HOSPITAL RISK ASSESSMENT

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A. Introduction:

The hospital risk assessment is the process of quantifying the probability of a harmful effect to the staff of the biomedical service department from certain maintenance activities. This assessment has to be present at every hospital for the safety of the staff. After visiting several hospitals, we came up with a general form of a risk assessment.

The goal of this assessment is to: identify the problems that may affect the staff, find strategies to improve safety system, and aid hospitals to implement safe environment with minimum hazards.

Methodology that we have used is: a checklist as an instrument for collecting data, observational audit and questionable survey.

B. Possible hazards that can be faced by biomedical servicing staff at any hospital were found to be the following:

- Environmental including noise, absence of proper HVAC, disorganization of the workplace and possible strips, trips, and falls.
- Stress due to the heavy work load, improper work conditions and high work responsibility.
- Odors and smells due to the continuous use of paint, dye, and several types of glue at the workshop which can cause in return allergies and serious headaches followed by the stress.
- Irregular use of personal protective equipment (PPE) designed to protect the staff from several hazards, such as chemical, electrical, mechanical and radiological.
- Personal potential hazards (ergonomics) which is a field that studies human capabilities in relation with work demands; for example, lifting of heavy objects should be done using special equipment and not by the staff themselves.
- Mechanical hazards involved from improper placement of a maintenance machines (or unguarded sharp equipment) which may cause physical injuries.

C. Recommendations followed after the study of the previous hazards are the following:

- Isolate offices from the maintenance department (workshop)
- Provide the schedule of break time for the staff; especially, schedule for regular breaks from a computer
- Provide counseling services to the staff
- Provide continuous training and competency for the use of the PPE
- Guard the maintenance machines properly
- Perform continuous and adequate training for the mechanical equipment
- Perform external training for personal safety

D. Conclusion:

We have presented the hazards to which the biomedical servicing staff may be subjected at the hospitals. Moreover, we have suggested the feasible and applicable preventive actions to be taken to assure the safety of the staff. Therefore, we hope that all the biomedical staff will be always protected from any hazards.

MNP 3.4
TEMPORAL AND SPATIAL VARIABILITY OF THE SURFACE PIGMENTS CONCENTRATION IN THE LEVANTINE BASIN OF THE EASTERN MEDITERRANEAN

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Abstract
Sea-viewing Wide Field-of-View sensor (SeaWiFS) imagery, collected during the period between September 1997 and August 2007, has been used for a time series analysis of chlorophyll-like pigments concentration the Eastern Mediterranean Sea (31–38° N; 26–36° E). The variability of this parameter in the area has not been studied extensively, in the past, due to the lack of in *situ* data at time scales on the order of several years. Therefore, the present study provides novel baseline information concerning the spatial and temporal variability of planktonic agents in a super-oligotrophic region of the Mediterranean . The SeaWiFS data were provided by the archives of the Joint Research Centre, European Commission, via the Environmental Marine Information System (http://emis.jrc.ec.europa.eu/). The open Levantine Basin (30-37°N, 25-37°E), as well as two coastal areas, the Nile River plume impact area (30.5-32.5°N, 29-34°E) and the eastern coastal strip (31-37°N, 34-37°E), were considered for the analysis. A number of large scale plumes originating from the coast, in the eastern coastal strip, are shown in each SeaWiFS scene. Although their shapes are affected by offshore water dynamics, they are systematically anchored at the same coastal locations (corresponding to major urban areas, in general). Moreover, the plumes have constant spectral and thermal characteristics, which show that they are due to coastal runoff, and possibly to fluvial contributions as well along the Lebanese-Syrian coast. The Nile river plume is also a distinct feature in all the images analyzed. Its boundary with open waters can easily be recognized in the SeaWiFS imagery, due to the sharp gradient of pigment concentration. The plume appears to be systematically oriented eastward, in agreement with the main current regime of the eastern Mediterranean . Within the plume impact area, seasonal blooming takes place between December and March. The open waters of the Levantine Basin have the lowest pigment concentration of the region (0.1-0.3 mg m^{-3}), while the Nile plume off the Egyptian coast presents the highest (0.35-0.95 mg m^{-3}). The concentrations seasonal cycle is characterized by a bimodal sequence of summer minima and winter maxima. In fact, the data indicate that in spite of very low concentrations of these super-oligotrophic waters, a typical seasonal bloom (concurrent with minimum sea surface temperature) takes place in February-March. The seasonal cycle of pigments concentration changes strongly from year to year, possibly in relation to the inter-annual variability of wind forcing.
Keywords: Remote sensing; Chlorophyll; Algal blooms; Mediterranean Sea; Levantine Basin

MNP 3.5
HbA1c LEVEL AS A RISK FACTOR IN UTI AMONG TYPE-II DIABETES MELLITUS PATIENTS IN THE UAE

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ABSTRACT

Diabetes mellitus becomes a world wide concern. Reports by the World Health Organization (WHO) indicated that more than 180 million of the world population has diabetes and this number is likely to more than double in the next two decades. Besides the associated complications, diabetes makes the affected person more prone to infections. One of the most common sites for these infections is the Urinary Tract (UTIs) where the presence of high level of glucose in the urine may create a culture medium that supports the growth of the invading microorganisms. The involvement of urinary tract can be acute Cystitis, Pyelonephritis and Asymptomatic Bacteriuria (ASB). However, apart from an increased risk for adverse outcomes in pregnant women, otherwise conflicting evidence have been reported regarding the consequences of UTI in the other subpopulations. It has been noted that data for UTIs are particularly absent from developing countries and it is not known if UTIs are more frequent or sever than in the developed countries. UAE ranks second in the world for the prevalence of diabetes and evidence are accumulating for the association between symptomatic UTI in diabetic patients. Therefore, the present study was carried out to determine the rate of UTI in patients with type 2 diabetes mellitus in UAE and to identify the relationship between HbA1c level to the UTI in type 2 diabetes mellitus patients and responsible microorganisms causing the UTI& resistance to antimicrobial agents. Samples and culture e: Prospective and retrospective study carried on 136 samples age (30-71 years.) (mean value of 53.4 ±SD) For prospective subjects gave their informed consent to participating in this study. Single clean-voided midstream urine (MSU) samples were collected from 80 patients with type 2 diabetes mellitus and who have symptoms of UTIs**.** In addition, 120 clinically healthy individuals, with similar age .Each MSU sample was tested by direct microscopy and culture on BA, MacConkey& CLED media for isolation and identification of bacteria. Confirmation test was carried by different biochemical and serological methods. Glycated Hemoglobin (HbA1c) was measured using Dimention® HA1C Kit DF105 (Dade Behring - USA) in accordance with the manufacturer's procedure (normal range 4.8 % - 6 %). The results showed that the prevalence of UTI was higher among diabetic patients than nondiabetic subjects (16.9& 5.8 % respectively). The prevalence of UTI in diabetic females and males was 12.7% and 19,8% respectively). The prevalence of UTI was the highest in age group of 61-71 years old of diabetic patients (20.4%), where as the prevalence of UTI in non diabetic subject was (7.1%). The level of HbA1c in diabetic patients with UTI was 27.8% (p= <0.009), where as the prevalence of UTI in diabetic patient under control (level of HbA1c <7) was 8.0%. In conclusion, this study showed the prevalence of UTI among diabetic women in UAE to be relatively higher than in other countries. Uncontrolled diabetes appears to be a risk for UTI; hence, it is important that diabetics are screened at regular intervals for HbA1c and UTI. Wider epidemiological investigations needed to identify other risks factors too.

MNP 3.6

THE PROTECTIVE EFFECT OF SALICYLATE AGAINST THE NEHPHROTOXICITY OF CISPLATIN IN RATS

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Background: cisplatin is an antineoplastic drugs with well known nephrotoxicity, meanwhile Salicylate was recently shown to provide protection against cisplatin nephrotoxicity in rats**. The aim of the study** was to investigate the possibility to decrease the nephrotoxic effect of the agent, cisplatin, by incorporation with Salicylate using the histopathology , DNA fragmentation and TNFα. **Subjects and methods**: Rats (total, n = 120) were divided into three groups : G1 was given 20 mg/kg cisplatin, G2 was given 20mg/kg cisplatin and sodium salicylate 100mg/kg and G3 was given saline and used as control. In this study, we investigated how the effects of treatment with cisplatin alone and in combination with sodium salicylate in rats on renal functions, histopathology , DNA fragmentation and TNFα. The effects of cisplatin and salicylate on TNF-a expression, and apoptosis were determined in renal proximal tubular cells of rats. **Results:** Salicylate significantly reduced both the functional and histological evidence of cisplatin renal injury. Cisplatin increased the renal expression of TNF-a . Treatment with sodium salicylate reduced serum TNF-a protein levels.

Conclusion: These results indicate that salicylate inhibit TNF-a production which in turn leads to reduction of cisplatin nephrotoxicity. **Recommendation**: Further experimental and clinical studies on preparations of this combination are thus warranted.

Keywords: Cisplatin, salicylate, nephrotoxicity, rats.

MNP 4.1
PRELIMINARY ASSESSMENT OF NITRATE AND NITRITE DIETARY EXPOSURE IN LEBANON

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Dietary exposure of nitrates and nitrites has been reported to have adverse health effects on humans including methemoglobinemia in infants (blue baby syndrome) and probably congenital malformation, gastric cancers and other chronic effects. Nitrates and nitrites are precursors for the endogenous formation N-nitroso compounds, a class of compounds that have been shown to be carcinogenic in animals and probably in man. People are exposed to nitrates primarily through diet and drinking water with vegetables contributing more than 85% of the total exposure to nitrates and meat and beans containing the highest concentration of nitrites. Absolute nitrates bioavailability and maximum plasma concentration occurring at around two hrs after ingestion was were found. In this study, we developed an estimation of the dietary exposure to nitrates and nitrites from the consumption of main vegetable crops grown in Terbol in Bekaa valley. This town is known to have heavy, extensive agricultural activities with excessive use of fertilizers. Analyses of potatoes, lettuce, tomatoes, spinach, cabbage…..etc were performed using Nitric Oxide (NO2/NO3) Assay Kit (assay designs, Stressgen, Cat. No. 917-010). The estimation of nitrates and nitrites daily dietary exposure was based on food frequency study of 419 individuals (after excluding extreme cases) in Bekaa region. Our results show an average intake of 3363.6 Calories/day and daily intakes of potatoes, tomatoes, lettuce, spinach and parsley to be 140.78, 50.45, 37.07, 20.13 and 40.12 gr/day, respectively. An exposure of 3.32 mg/kg bw/day of nitrates and 0.146 mg/kg bw/day of nitrites from these vegetables, only, were estimated. These doses are on the upper boarder line of the Acceptable Daily Intake (ADI) of 0-3.7 mg/kg bw/day for nitrates and double the ADI of 0-0.07 mg/kg bw/day for nitrites evaluated by the Joint FAO/WHO Expert Committee on Food Additives (JECFA). Such high dietary exposure pose a health risk that have to be assessed and well examined especially if the whole food basket is considered, the picture could be warning. This necessitates further assessment studies and the implementation of tools and strategies to control agricultural practices and the excessive use of fertilizes in Lebanon.

MNP 4.2
FOOD CONSUMPTION PATTERN IN LEBANESE ADULT POPULATION

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Aim: To determine the food consumption patterns and nutritional inadequacies in a nationally representative sample of Lebanese adults.
Methods: A sub-sample of 1873 adult men and women aged ≥20 years, participating in the ongoing national survey on under and over-nutrition, were included in this study. Dietary intake was assessed using quantitative food frequency questionnaire.
Results: The mean energy consumption was 2655 Kcal/person/day where 13.7% of daily energy was derived from protein, 44.4% from fat and 42.3% from carbohydrates. Cereals were the major contributor to daily energy intake (30%) with bread comprising almost half the intake from this group. Fruits and vegetables, meat and poultry, dairy products and sugar and sugar derivatives contributed 13.5%, 12.2%, 11.8%, and 6.4%, respectively. The mean consumption of fruits and vegetables was 538 g/day with 64% of subjects consuming more than the WHO recommendation of 400g/day. Fish consumption was very low (12 g/day) with 99.7% of the subjects consuming less than the recommended two servings per week. The data revealed high energy intake (2863 Kcal/person/day) in young adults (20-35 years) which was associated with high intake of energy from fast food, sugar and sugar derivatives, soda and packed beverages, collectively accounting for 22% of daily energy.
Conclusion: Results from the present study point to an increase in fat consumption on the expense of complex carbohydrates over the past 10 years. The observed shift confirms the existence of an alarming transition to a dietary pattern characterized by reduced cereal intake and increased fat and snacks especially in the young population. Further studies are needed to examine the determinants of food consumption patterns in Lebanon and their association with the growing prevalence of obesity and non communicable diseases. Moreover, findings from this study mark a need for formulating public health policies and strategies to modify the observed nutritional risks in the Lebanese population

Keywords: Food consumption, Energy consumption, Fish intake, Soda and packed beverages, fast food, sugars.

Table 1. Mean consumption values, percentage of consumers and contribution of each food group to energy intake in adult Lebanese men and women

	n=1873		
Food group	Consumption (g day $^{-1}$)	% of consumers	Contribution to energy intake (%)
Meat and poultry	76.26±70.13	99.4	7.29±4.87
Fish	11.96±20.87	84.4	0.50±0.77
Eggs	15.18±24.74	81.4	0.84±1.15
Milk and Dairy products	255.65±209.84	99.0	11.82±7.05
Vegetables raw	213.84±141.20	99.1	4.32±3.28
Vegetable-based dishes	71.63±69.44	98.1	2.53±2.49
Potato and potato based products	41.13±30.14	97.9	3.80±2.82
Fruits and fruit juices*	252.71±207.83	98.4	6.62±5.93
Pulse nuts and seeds	43.35±37.88	96.7	6.30±6.38
Cereals and cereal-based products excluding bread	172.50±120.42	98.8	14.23±7.41
Bread	153.81±109.17	98.8	15.75±8.87
Cereals and cereal-based products including bread	326.31±173.24	99.9	29.97±10.23
Fats and oils added to the table†	71.77±59.20	99.5	12.30±6.58
Sugar and sugar derivatives	30.70±36.40	94.6	6.35±5.56
Sodas and prepacked juices	194.41±189.60	84.4	3.48±3.37
Caffeinated beverages	354.86±314.56	94.3	0.27±0.25
Alcoholic beverages	26.09±68.04	34.0	0.76±2.40

Table 2. Mean consumption values, percentage of consumers and contribution of each food group to daily energy intake in young (20-35 years) and older (35+ years) adult Lebanese individuals.

	Adults20-35 years (n= 708)			Adults 35+ years (n= 1165)		
Food group	Consumption (g day $^{-1}$)	% of consumers	Contribution to energy intake (%)	Consumption (g day $^{-1}$)	% of consumers	Contribution to energy intake (%)
Meat and poultry	84.65±87.57		7.36±5.23	71.17±56.41		7.26±4.63
Fish	12.20±17.08		0.47±0.58	11.81±22.88		0.51±0.86
Eggs	15.64±26.37		0.78±1.14	14.91±23.71		0.88±1.15
Milk and Dairy products	260.71±219.38		10.93±6.74^{a}	252.57±203.85		12.37±7.18^{b}
Vegtable raw	199.75±138.56		3.82±3.15^{a}	222.41±142.16		4.62±3.32^{b}
Vegetable-based dishes	67.60±68.65		2.28±2.53^{a}	74.09±69.83		2.68±2.45^{b}
Potato and potato based products	45.04±27.91		4.18±2.72^{a}	38.74±31.18		3.58±2.85^{b}
Fruits and fruit juices	248.68±215.93		5.96±5.78^{a}	255.16±202.80		7.01±5.99^{b}
Pulse nuts and seeds	46.33±39.21		6.66±6.42	41.53±36.96		6.08±6.35
Cereals and cereal-based products excluding bread	193.12±130.55		15.19±7.75^{a}	159.97±112.05		13.64±7.13^{b}
Bread	155.98±122.57		14.58±9.26^{a}	152.49±100.42		16.45±8.55^{b}
Cereals and cereal-based products including bread	349.11±193.58		29.77±10.66^{a}	312.46±158.11		30.10±9.96^{b}
Fats and oils added to the table†	85.89±66.77		11.08±5.91^{a}	63.20±52.29		13.04±6.85^{b}
Sugar and sugar derivatives	43.81±42.21		8.13±6.21^{a}	22.74±29.68		5.26.16±4.82^{b}
Sodas and prepacked juices	255.48±193.86		4.39±3.31^{a}	157.30±177.03		2.93±3.28^{b}
Caffeinated beverages	289.15±252.31		0.21±0.20	394.80±340.95		0.30±0.27
Alcoholic beverages	26.86±68.13		0.65±1.92	25.62±68.01		0.85±2.65

a,b Values are significantly different at $P < 0.05$

- Values are for added table- added fats and oils including butter, vegetable oil and mayonnaise.

Table 3. Energy and macronutrient intakes in young (20-35 years) and older (35+ years) adult Lebanese individuals.

	Total			Adults20-35 years (n= 708)			Adults 35+ years (n= 1165)		
	g day^{-1}	Kcal day^{-1}	%Kcal	g day^{-1}	Kcal day^{-1}	%Kcal	g day^{-1}	Kcal day^{-1}	%Kcal
Protein (g day^{-1})	90.88±38.86	362.7±156.2	13.73±2.61	97.88±43.69	391.51±174.77	13.65±2.59	86.64±35.05	346.58±140.19	13.79±2.63
Carbohydrates (g day^{-1})	281.19±117.55	1122.4±472.5	42.34±7.21	306.92±129.23	1227.70±516.90	42.93±6.90	265.56±107.13	1062.2±428.53	41.98±7.38
Fat (g day^{-1})	131.01±53.39	1176.6±483.1	44.41±6.52	140.90±57.39	1268.10±516.47	44.31±6.90	124.99±49.96	1124.9±449.63	44.47±6.74
Kcalories		2654.7			2862.8±1093.41[a]			2528.2±911.76[b]	

a,b Values are significantly different at $P < 0.05$

Table 4. Frequency of individuals consuming above or below the recommended intake from fish or fruits and vegetables

Recommended Intake	Total		Adults20-35 years (n= 708)		Adults 35+ years (n= 1165)	
	N	%	N	%	N	%
>2 fish servings per week	5	0.3	2	0.3	3	0.3
< 2 fish servings per week	800	99.7	706	99.7	1162	99.7
fruit and vegetables >400 g	1204	64.1	422	59.6	779	66.9
fruit and vegetables <400 g	674	35.9	286	40.4	386	33.1

B 4.3

STATE OF ART ABOUT WATER NEEDS AND WASTEWATER MANAGEMENT IN LEBANON: A REVIEW

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This paper shows the real situation of managing the water and wastewater in Lebanon and focuses on problems related to untreated water released in environment. Water and wastewater infrastructures have been rebuilt since 1992. However, wastewater management still remains one of the greatest challenges facing Lebanese people, since water supply projects have been given priority over wastewater projects. As a consequence of increased demand of water by agricultural, industrial and household sectors in the last decade, wastewater flows have been increased. At the same time, a qualitative and quantitative degradation of the effluent has been recorded. In this paper, the existing wastewater treatment plants (WWTP) operating in Lebanon are presented. Most of them are small-scale community-based wastewater treatment plants, only two large-scale plants, constructed by the government, are currently operational. Lebanese aquatic ecosystems are suffering from the deterioration of water quality and water resources because of the insufficient treatment of wastewater which is limited mostly to pre-treatment processes. Such problems must be mainly discussed basing on qualitative and quantitative criteria to meet the requirements of the socio-economic development in the country. In fact, domestic and industrial effluents are mainly conducted together in the sewer pipes to the WWTP before being discharged, without adequate treatment into the rivers or directly into the Mediterranean Sea. Such discharges are threatening the coastal marine ecosystem in the Mediterranean basin. Data bases concerning effluent disposal and monitoring the wastewater quality have to be set for helping to assess future improvements made by WWTP. In fact, the available data are limited to academic research without being representative on a national scale. Preliminary results in our study showed many dysfunctions during wastewater pre-treatment. Most of the global parameters like turbidity, suspended and volatile matter are perturbed during the settling operation. As a consequence, heavy metals are resuspended in the released supernatants in the sea. This study will be held during the 2 coming years on five representative sewage collectors located along the Lebanese coast.

Keys words: Wastewater, Management, Water, WWTP, Quality

MNP 4.4
NEW DICAFFOYEL DERIVATIVES FROM ROOTS OF *INULA CRITHMOIDES*

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Inula is a large genus of family Asteraceae, comprising about 100 species, native to Europe, Asia and Africa. In traditional Chinese medicine, Inula species are used to treat cough and shortness of breath, and as antidiabetic. In addition, plants belonging to the genus are well known for their diverse chemical constituents of valuable medicinal activities. The medicinal activities include: antimicrobial, antioxidant, anticancer and antinflammatory. *Inula crithmoides* L. is among the common species of genus, which is distributed along the Mediterranean region. Our current phytochemical investigation of this plant led to the isolation and identification of two new compounds namely; 1-methoxy 3, 4-dicaffoeyl quinic acid, 1-methoxy 3, 5-dicaffoeyl quinic acid, in addition to the known compound: 3, 5-dicaffoeyl quinic acid. The structure elucidation of these compounds was based on the use of different spectroscopic techniques. It is of interest to mention that the chemical structure of the isolated compounds is almost similar to cynarin; a well known compound for its hepatoprotective effect. This fact encouraged us to evaluate the hepatoprotective effect of this plant, and the study is currently in progress. Preliminary results indicated promising hepatoprotective activities.

MNP 4.5

SYNTHESIS AND BIOLOGICAL EVALUATION OF SOME NOVEL FUSED PYRAZOLOPYRIMIDINES AS POTENTIAL ANTICANCER AND ANTIMICROBIAL AGENTS.

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Intervention with cell division is an attractive strategy for combating microbes as well as diseases associated with abnormal cellular proliferation like cancer. DNA is one of the promising targets in this field. A planar or semi-planar pharmacophore with a polyaromatic ring, capable of intercalation into DNA, is the common characteristic feature of DNA-intercalating anticancer drugs. Many of these intercalators, allocated in literature are tricyclic ring system. Furthermore, protein kinases are involved in regulation of all cell functions. Uncontrolled activation of many of these kinases has been shown to result in uncontrolled cell growth. Based on literature reports, linearly fused tricyclic core systems have been used as a promising source for kinase inhibitors. Chemistry of pyrazolopyrimidines has drawn great attention due to their pharmacological importance and structural resemblance to purines. In addition, such core has been used as scaffold for the design of antitumor agents and inhibitors for kinases. Encouraged by the afore-mentioned findings and in continuation of an ongoing program aiming at finding new structural leads with potential chemotherapeutic activities, it was rationalized to synthesize some pyrazolopyrimidines and their annulated tricyclic analogues which might comply with the requirements of DNA intercalators and/or kinase inhibitors. The proposed candidates are designed to encounter a variety of diverse functional groups which would impart various electrophilic and lipophilic properties.

MNP 4.6

EFFET DE L'EMPRISONNEMENT DES STREPTOCOCCUS THERMOPHILUS SUR LEUR ACTIVITE FERMENTAIRE DANS LE LAIT ENRICHI OU NON PAR LA LACTASE

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Les industries laitières libanaises, dans les secteurs de fabrication de yaourts et des laits fermentés, suivent des méthodes traditionnelles en introduisant les bactéries lactiques libres dans le lait sous forme de ferment. Dans le but d'améliorer le rendement ainsi que la production des laits fermentés, une nouvelle technique de fermentation peut être proposée. Il s'agit d'une technique d'immobilisation qui vise à emprisonner les bactéries lactiques à l'intérieur de billes Ca-alginates semi-perméables. Dans ce cas, les bactéries seront isolées du milieu extérieur et de tous les facteurs gênants. Ce qui pourrait se traduire par une meilleure activité fermentaire.

L'objectif du présent travail est donc d'étudier l'impact de l'emprisonnement des Streptococus thermophilus à l'intérieur des billes Ca-alginate, sur la fermentation lactique ainsi que sur la qualité des produits laitiers formés. Ceci est évalué en termes d'acidité et de la variation de la concentration du glucose dans le lait. Différents paramètres sont étudiés en vue d'optimiser la fermentation lactique, à savoir la taille de la population bactérienne utilisée, le stade de croissance des bactéries et l'absence ou la présence de lactase (libre ou emprisonnée à l'intérieur des billes Ca-alginate) dans le lait. La mesure de l'acidité est effectuée par pH-métrie et par titrage acido-basique tandis que la quantification de glucose se fait par une méthode enzymatique. La viabilité des Streptococus thermophilus à l'intérieur des billes Ca-alginate est également étudiée au cours de la fermentation lactique par des méthodes turbidimétriques et par dénombrement sur gélose nutritif. Le piégeage des bactéries ne semble pas les empêcher de se multiplier au cours de la fermentation. L'activité fermentaire des Streptococcus thermophilus est améliorée lorsque ces bactéries sont récupérées en cours de leur phase exponentielle et emprisonnées à l'intérieur des billes Ca-alginate. La présence de lactase libre dans le lait semble un bon moyen d'accélérer le processus fermentaire et d'obtenir des produits laitiers de bonne qualité en un temps plus court.

MNP 4.7

THE EFFECT OF SPRAY DRYING CONDITIONS ON AGING ANDENTHALPY RELAXATIONOF α-LACTOSE

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Abstract

Many foods and pharmaceuticals exist in a disordered amorphous state as a result of some variations in processing conditions, deliberate or accidental. Such a state raises various concerns regarding the stability and quality of the material even if it is stored below its glass transition temperature. Changes in the physicochemical properties may occur below Tg since molecular mobility is not totally eliminated but rather only minimized. During spray drying, the material is subject to high temperatures accompanied by a significant gradient between the inlet and outlet temperatures as well as high cooling rates that contribute to the formation of different amorphous forms. At such conditions, many of the material's properties may be altered. The changes in the material characteristics during processing and/or storage are usually a result of molecular rearrangement referred to as physical aging. These changes can be explained by the enthalpy relaxation phenomena. Since glassy materials below their Tg exist in a non-equilibrium state characterized by excess thermodynamic quantities (volume, enthalpy, etc.), such systems undergo structural and enthalpic relaxations to reduce the excess quantities shifting towards an equilibrium state. This research project aims at exploring the effects of various spray drying conditions on the enthalpy relaxation of α-lactose.

POSTERS PRESENTATIONS

MAMMALIAN TARGET OF RAPAMYCIN (mTOR) INHIBITOR RAD001 INDUCES SENESCENCE AND APOPTOSIS IN HTLV-I-ASSOCIATED ADULT T-CELL LEUKEMIA (ATL)

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Background and Objectives

Adult T-cell leukemia-lymphoma (ATL), an aggressive peripheral T-cell malignancy, is caused by the human T-cell lymphotropic virus type I (HTLV-I). Both ATL and HTLV-I-negative peripheral T-cell lymphomas carry poor prognosis mainly due to acquired resistance to chemotherapy. The viral transactivator protein Tax plays a critical role in HTLV-I-induced transformation, apoptosis resistance, and deregulation of the mammalian Target of Rapamycin (mTOR) signaling pathway. mTOR is a serine/threonine kinase and a key regulator of cell growth and survival in many cell types. Recently, Rapamycin, an mTOR inhibitor, together with newly developed Rapamycin analogs, called Rapalogs, were shown to inhibit growth of tumor derived cells. In particular, RAD001, a promising Rapalog in clinical trials, has shown promise in advanced solid tumors. Using ATL/lymphoma as a model, this study aims at deciphering the mechanisms of growth suppression and cell death by RAD001.

Results

RAD001 exposure caused a cytostatic inhibitory effect on the growth of primary ATL cells, HTLV-I-positive and negative T-malignant cells. However, treatment with ten-fold higher concentrations did not affect the proliferation of normal resting and activated lymphocytes. RAD001 induced Tax degradation and senescence in ATL cells only, as shown by enhanced staining of β-galactosidase and upregulated expression of p21 protein. Short term RAD001 treatment caused a G_0/G_1 cell cycle arrest in all malignant cell lines, as shown by flow cytometry analysis of propidium iodide-stained DNA content. Futhermore, we did not detect apoptosis by TUNEL assay or PARP cleavage. However, prolonged treatment with RAD001 induced apoptosis in senescent HTLV-I-positive, and later in HTLV-I negative malignant cells, as shown by an increase in pre-G_0/G_1 region, TUNEL positivity, and PARP cleavage.

Conclusion

RAD001 inhibits the growth of ATL and HTLV-I-negative malignant T-lymphocytes, induces senescence in ATL cells only, and causes apoptosis after prolonged treatment in all malignant T-cells. This research may support a potential therapeutic role for mTOR inhibitors in ATL and HTLV-I-negative peripheral T cell lymphomas and/or the search of other compounds that synergize with conventional chemotherapeutic drugs.

HISTOLOGICAL CHARACTERISTICS AND LIPID COMPOSITION OF PLASMA MEMBRANE OF HEPATOCYTES OF FORCE-FED GEESE. A RELATIONSHIP WITH THE LIPID LOSS OF FATTY LIVERS?

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In Fatty liver production, the commercial value of the product is dependent upon processing yield associated to the ability of the raw material to retain fat during the cooking process. Lipid composition of plasma membrane of hepatocytes, histological characteristics and relationship with the technological yield were studied in the liver of overfed geese. One hundred and thirty two female landes geese were raised and overfed in experimental station. Force-feeding started at 13 weeks of age for a duration of 18 days to obtain 850 g fatty liver mass.

On the 72 livers selected for processing the mean of the technological yield (% processed liver / liver plus fat loss) was very high (97.8 ± 2.2 %) for a weight mean of 704 ± 146g. If initial live weight of birds, at the onset of force-feeding period, was not correlated with the technological yield of fatty liver, the correlation between the weight of the fatty liver and the technological yield was significantly negative (r= -0.53; $P<0.05$). The lipid content exceeded 40% (40 to 60%) of the fatty liver weight and there was a significant correlation between this fattening level and the lipid loss of the liver (r = 0.67, $P<0.05$). These results implied that among the biggest and most fattened livers was those that had the higher lipid loss and should be penalized. However, some biggest livers conserved a high technological yield.

Moreover, this study did not show a significant correlation between the membrane lipid composition elements and the liver lipid loss, contrary to previous data on fatty livers with larger weight scale and lower technological yield.

On histological sections (10 µm thick), the triglycerides were identified using respectively Nile red and Osmium tetroxyde staining, as well as in raw liver than in cooked liver. The lipid area on raw and cooked livers was then calculated by image analysis (ImageJ software). A strong correlation (R^2 = 0.97) was observed between technological yield (calculated as the weight of cooked liver / weight of raw liver) and the (Nile red staining area of cooked liver / Nile red staining area of raw liver) ratio. The link was less good using the Osmium tetroxyde staining (R^2 = 0.70).

This result suggests that the Nile red is a relevant dye to fastly lipid content and triglyceride distribution is geese fatty livers.

Lastly, a result which requires to be confirmed was the immunohistological observation of laminine in the intercell matrix in lean as fatty liver tissue. This was not reported in mammal liver.

Keywords: Geese, Fatty liver, Hepatocyte, Lipid loss, Technological yield, Nile red, Osmium tetroxyde

CHARACTERIZATION OF SELENOPROTEIN I (SELI) using bioinformatics programs

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Selenoprotein I (Sel I) is composed of 397 amino acid and has single selenocysteine residue located at the position 387. It is widely distributed in tissues of mammals, fish and birds. In this study, we characterized the selenoprotein I among various organisms using computational biochemistry programs. We have found that Sel I has a molecular weight of 45 KDa in human, rat, chicken and xenopus. It is a neutral protein with isoelectric point of 6-7 among various organisms. Leucine is the highest amino acid found in Sel I and it represents 13.5% of the amino acid residues in the protein. We have also found that the amino acid and nucleotide sequences of Sel I have approximately 97% identity among mammals, fish and birds. The SECIS element among these organisms have about 90% identity. Sel I was found to have a type 2 SECIS element and its gene contained 8 exons and 7 introns. Using bioinformatics, we predicted that Sel I is a membrane protein that has 10 transmembrane helices. Our results showed high identity in the amino acid and nucleotide as well as in the SECIS elements among various organisms. Further studies are going to be applied to study the detailed structure of SelI among different organisms.

CHARACTERIZATION OF SELENOPROTEIN N (SELN)

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Selenoprotein N (SelN) is mainly present in human fetal tissues, pancreas, prostate, ovary, and muscles. We used bioinformatics programs to predict the detailed structure of SelN. We found that SelN is an acidic protein with pI of 5.07-5.55, with a molecular weight of about 70 KDa in human cells. SelN nucleotide sequences among different organisms show high similarities. We also found that human SelN SECIS element has a consensus sequence at its apical loop (AA). SECIS element also has a conserved quartet that is involved in the interaction with other proteins and factors useful for the translation of UGA to selenocysteine residue. Using bioinformatics programs, we predicted that SelN is a glycoprotein localized in the membrane of the endoplasmic reticulum involved in calcium flux.

STRUCTURAL CHARACTERIZATION OF SELENOPROTEIN K (SELK) USING BIOINFORMATICS

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Among the 25 human selenoproteins is selenoprotein K (SELK) whose detailed structure and function are not fully understood. Here we used several bioinformatics programs to study SelK structure-function relationship. Our results indicate that SelK is a basic, 10.3 KDa protein which is highly conserved in various animal organisms including mammals, birds, fish and frogs. It has a cysteine containing homolog in plants. Using SECISearch we detected the presence of SECIS element in the 3′-untranslated region in *Ornithorhynchus anatinus*, *Salmo salar* and *Ciona intestinalis* whose NCBI sequences are truncated. Thus Sec should be incorporated into its sequence encoded by UGA codon due to the presence of SECIS element. Multiple sequence alignment of SelK sequences from various organisms showed a highly conserved N-terminal region which was then predicted to contain a single transmembrane helix. It could be localized to both plasma membrane and endoplasmic reticulum. SELK sequence analysis did not show homology to previously indentified proteins. SelK is widespread in representatives of the animal and plant kingdoms and its structure is conserved among these organisms.

ETUDE DU DEVENIR DES COLIFORMES FECAUX DANS LES EAUX DE SURFACE EN REGIME MEDITERRANEEN : BIOFILMS EPILITHIQUES, RESEVOIR POTENTIEL DES MICROORGANISMES PATHOGENES

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Cette étude portée sur la rivière Nahr Ibrahim au Liban a pour but d'établir une base de données sur la qualité de ses eaux. Une analyse spatio-temporelle de chaque paramètre considéré séparément ainsi que sa comparaison avec les grilles de qualité SEQ-Eaux français montre un manque de pertinence dans la détermination de l'état trophique de chaque eau. Une analyse multidimensionnelle à l'aide d'un outil statistique qui est l'Analyse en Composantes Principales (ACP) s'est avérée plus intéressante pour l'évaluation de la qualité des eaux de surface. L'ACP a l'avantage de prendre en considération les réactions du milieu face à l'introduction de polluants de l'extérieur. Par conséquent, cet outil a permis de définir un état trophique pour chaque station. L'ACP a montré aussi que les bactéries sont influencées indirectement par les paramètres du milieu. Ainsi, les corrélations qui existent entre les bactéries dans la colonne d'eau et dans les sédiments montrent que probablement, une partie des bactéries dans l'eau arrivent à coloniser les sédiments et former par la suite les biofilms. En plus, l'ACP a pu discriminer deux rivières différentes. Ceci témoigne de l'intérêt d'utiliser l'ACP comme outil d'évaluation de la qualité des eaux de surface. Enfin, la colonisation des billes de verre utilisées dans cette étude témoigne de la persistance des bactéries fécales dans le milieu, ce qui pose sûrement un problème dans les équilibres hydriques des écosystèmes aquatiques.

EXCITATION-CONTRACTION COUPLING IN CARDIOMYOCYTES ISOLATED FROM HEARTS WITH CORONARY DISEASE

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Male apolipoprotein E knockout ($apoE^{-/-}$) mice fed a high-fat diet for six months, develop occlusive coronary lesions and myocardial ischemia which can results in myocardial infarction. In contrast, female $apoE^{-/-}$ mice on high-fat diet do not show evidence of occlusive coronary lesions or myocardial infarction. We hypothesize that any differences between cardiomyocytes isolated from female mice fed high-fat diet and mice fed normal diet would be the result of remodelling due to high-fat diet. Enzymatically isolated cardiomyocytes from hearts of female $apoE^{-/-}$ fed normal or high-fat diet for 24 weeks were used. In addition, cardiomyocytes isolated from female wild type fed normal diet were used for comparison. Myocytes were loaded with Fura-2 and were stimulated for 2 minutes at 0.2 Hz followed by increasing the frequency of stimulation every 30 seconds to 0.5, 1, 2 Hz and Ca^{2+} transients (Fura ratio) were measured using photometry. It was shown that the amplitude of Ca^{2+} transients is significantly lower in female apoE myocytes fed high-fat diet compared to control and to wild type was seen for most stimulation frequencies. Moreover, Ca^{2+} transients amplitude decreased as the stimulation frequency is increased for all types of myocytes, and the rate of transients upstroke and decay was relatively slower in apoE myocytes compared to control. Hypercholesterolemia alters the characteristics of Ca^{2+} transients in cardiomyocytes. This could be an effect mediated by change in metabolism or liquid induced change in activity of proteins involved in Ca^{2+} cycling.

Antibacterial Activity of the Extracts Obtained From Rheum Rhaponticum and Viola Odorata on Multi-Drug-Resistant Clinical Isolates of Escherichia Coli and Klebsiella Pneumoniae

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Aim: This study aimed at determining the antimicrobial activity of two selected indigenous Lebanese plants against extended spectrum beta-lactamases producing Escherichia coli and Klebsiella pneumoniae and at identifying the specific plant fraction responsible for the antimicrobial activity.
Methods: The antibacterial activity of Rheum rhaponticum and Viola odorata extracts was studied using the microdilution method as described by the CLSI and the minimum inhibitory and minimum bactericidal concentrations (MIC and MBC) of each plant fraction were determined and quantified in µg/ml. Plant's crude extract was obtained after rotoevaporation of soaked ethanol plant. The ethanolic extracts obtained from plant parts were subfractionated into petroleum ether, dichloromethane, ethyl acetate and aqueous fractions.
Results: A total of 20 Escherichia coli and 10 Klebsiella sp clinical isolates were used to study the antibacterial activity of the two plants. Inhibitory and bactericidal effects of Rheum rhaponticum on Escherichia coli and Klebsiella pneumoniae were observed with the crude extract, the ethyl acetate and the aqueous fractions of the plant; whereas Viola odarata's antibacterial activity was only identified with the ethyl acetate and aqueous fraction. The majority of the tested microorganisms (90%) were inhibited by 40 µg/µl of Rheum rhaponticum's crude extract whereas Viola odorata's crude extract did not manifest any detectable antibacterial activity. The petroleum ether and dichloromethane fractions of both plants exerted rare antibacterial effect. Ethyl acetate extracts of the selected plants presented antibacterial activity with high potency. The aqueous extracts of both plants showed higher antibacterial activity against Escherichia coli than Klebsiella pneumoniae strains.
Conclusion: This study showed that Rheum rhaponticum and Viola odorata can have antibacterial activity on ESBL producing strains of E.coli and Klebsiella sp. depending on the plant extract. This antibacterial activity seems to be much higher with Rheum rhaponticum than with Viola odorata. The study of medicinal plants in search of new antimicrobial agents should be completed by similar investigation of other plants.

Evaluation of *Lycopus uniflorus* water extract for anti-inflammatory, anti-ulcerogenic and antioxidant activities.

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Lycopus uniflorus, commonly known as bugleweed, is usually found near freshwater wetland and has a wide abundance in Lebanon. The plant has some folk use for treatment of gastrointestinal disorders and reduction of inflammation. No studies were conducted on *Lycopus uniflorus* , but other species were reported to possess anti-allergic[1], anti-inflammatory [2], antihyperthyroidism[3], antioxidant[4], and anticancer[5] activities. The present study was conducted to investigate the potential role of the freeze dried aqueous extract of the aerial part of *L. uniflorus* on inflammation and gastric ulcer in rat model. Pretreatment with the extract (50, 100 and 200 mg/kg BW by gastric gavage) produced a dose dependent protection against gastric ulcer induced by 60% ethanol. Results showed that 50 mg/kg and 100 mg/kg caused 20.87 and 80.10% respectively, compared to 41.70% for cimetidine at 11.5 mg/kg BW dose. The same doses were used to test for anti-inflammatory activity against edema induced in hind paw by carrageenan. Intra-peritoneal doses of 100 and 200 mg/kg BW of the extract showed significant ($p < 0.05$) anti-inflammatory activity when compared with the untreated control. The highest inhibition of edema development was achieved at 100 mg/kg BW dose and the edema was decreased by 67% compared with diclofenac (60%) at 10 mg/kg BW. No signs of toxicity were observed at used doses. Antioxidant activity was established using DPPH assay and the extract exhibited high DPPH radical scavenging activity (80.4%), and the estimated total phenolic content was 228.5 GAE per gram. These results demonstrate the potential anti-inflammatory, anti-ulcerogenic and antioxidant activities of *Lycopus uniflorus*.

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CHARACTERIZATION OF SELENOPROTEIN S (SELS)

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The human selenoproteome consists of 25 selenoproteins, but functions of some of these proteins are not known. Selenoprotein S (SelS) is a recently identified protein (190 amino acid) with only one selenocysteine residue at position 189. In this study we examined the structure-function relationship of SelS among different organisms using bioinformatics programs and databases. We found that SelS is present in mammals, birds, and fish. The molecular weight of SelS is about 21 kDa and its isoelectric point is about 9.0. The most common amino acid in SelS is the leucine that represents 12.1% of the amino acid residue in SelS. We also found that SelS is localized in the nucleus of liver, lung, kidney, heart, skeletal muscle, testis and pancreatic cells in mammals. The amino acid sequences of SelS among mammals, birds and fish have about 90% identity. In addition, the sequences of SECIS element of SelS among the above organisms have 99% identity. The above data showed that selenoprotein S is present in mammals, birds and fish, and its amino acid sequence among these organisms is highly conserved.

CHARACTERIZATION OF SELENOPROTEIN S (SELS)

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CHARACTERIZATION OF SELENOPROTEIN V

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Selenoprotein V (SelV) is a mammalian selenoprotein encoded on chromosome 19. SelV is a globular protein that occurs in the seminiferous tubules of the testes. Its function is yet unknown. We used bioinformatics programs to study structure-function relationship of SelV. Protein calculator program revealed that the molecular weight of SelV in human is about 37 kDa. Human SelV is a basic protein with isoelectric point (pI) of 9.65. Using bioinformatics programs, we predicted that SelV contains 5 exons, where the selenocysteine (sec) residue was predicted to be in exon 2. SECISearch 2.19 program revealed that the selenocysteine insertion sequence (SECIS) element belongs to type I structure. We also predicted that SelV contains three domains: The N-terminal domain is proline-rich; the second domain is the hydrophobic domain containing 20 amino acid residues as well as the selenocysteine residue; and the C-terminal domain which is rich in glutamate and lysine. Further studies are required to understand why mammalian SelV is rich in proline residues and why selenocysteine residue resides in hydrophobic domain in this selenoprotein.

A PRELIMINARY ASSESSMENT OF HEPATITIS C VIRUS INFECTION AMONG EGYPTIAN HEALTH-CARE WORKERS: PREVALENCE AND ASSOCIATION WITH RISK FACTORS

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ABSTRACT

OBJECTIVE: To evaluate the prevalence and risk factors for hepatitis C virus infection among health care professionals

METHODS: The study was carried out at a university hospital in Cairo Egypt. and included 187 health care professionals (48 resident doctors, 77 nurses, 17 technicians and 45 workers) from different departments of the hospital. A Control group: included 53 of the administrative employees (secretaries, personnel management employees, accounting employees, etc…) in the same hospital who had no contact with patients, or with material used by them. Occupational and non-occupational information was obtained by means of a questionnaire. All participants were tested for ALT level, HCV-antibody and for HCV RNA detection by Real-time RT-PCR. Data were analyzed using Chi-square, and Student's t-test and logistic regression analysis.

RESULTS: The prevalence of HCV viraemia among health care professionals was found to be 8.0% and 5.7% among the control group with no increased risk for health care professionals. The prevalence of HCV seropositivity among health care professionals was 11.2% while in administrative employees it was 13.2% with no significant risk.. Although no significant difference was found between the prevalence of HCV infection in different departments, workers in the dialysis unit and laboratory technicians showed significantly higher prevalences than other job groups in the same departments. The occupational risk factors associated with increased risk of HCV infection were the job category, the duration of employment and not adhering to infection control procedures. On the other hand, needlestick injuries, splash of blood or body fluids (eye. or mucous membranes) and handling body fluids were not found to be significantly associated with HCV infection.

Data on non-occupational risk factors showed that HCV infection was not significantly associated with previous surgery, dental visits or HCV positive family member but there was a significant association between age, rural domicile, blood transfusion and positive HCV viraemia among health care workers

CONCLUSIONS:

No excessive risk was found among the health-care workers as a whole although workers in the dialysis unit and laboratory technicians showed significantly higher prevalences than other job groups in the same departments. Among those with HCV viraemia, occupational and non-occupational factors of greatest risk were job category, the duration of employment, rural domicile, age, non compliance with infection control procedures and blood transfusion.

THE PROTECTIVE ROLE OF PARSLEY EXTRACT AGAINST VINCRISTINE MUTAGENICITY IN DROSOPHILA MELANOGASTER

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Abstract

In this study, *Drosophila melanogaster* males were treated with parsley plant extract and the anticancer drug vincristine (VCR) singly and in combined treatments (pre, co and post treatments) to detect the mutagenic effects by using Sex Linked Recessive Lethal test (SLRL) and estimation of cholinesterase enzyme (ChE) activities in order to compare the sensitivity of the two test systems. A wild type strain Oregon-R (Or-R) male flies of *D. melanogaster* were reared on a medium containing one concentration of each of VCR and parsley (4ml/ 100ml medium) in each single and combined treatment. Also the activity of ChE was estimated in some insects of the two generations: F1 females, F2 bar eye females (heterozygous) and F2 wild types males. The results indicate that both of parsley and vincristine didn't cause significant increases of SLRL test in either the single or combined treatments. In contrast, estimation of ChE activities showed significant increase in all the broods within single and combination treatments, except female of the second generation of spermatid brood which treated with parsley and VCR at the same time .It is concluded that enzyme estimation is more sensitive than SLRL test for detection the mutagenic effect for parsley's extract and vincristine.

Dietary patterns and their association with anthropometric and sociodemographic factors in a sample of Lebanese adults

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Background
Developing countries in the Eastern Mediterranean region are witnessing nutrition transition characterized by a shift from traditional to westernized types of diet. This transition is precipitating alarmingly high rates of obesity, which warrants investigation of the various dietary patterns and their determinants in this region.

Objectives: Investigation of dietary patterns in an adult Lebanese population and their association with various demographic factors and BMI.

Methods: A random sample of 417 healthy men and women 25-55 years old were recruited. Age and sex distribution of the subjects was proportionate to the baseline population. Data was collected by a trained dietitian during a one to one interview and included socio-demographic information (age, sex, marital status, income, education, anthropometric measurements (weight, height) and dietary intake as assessed by a quantitative Food Frequency Questionnaire. Dietary patterns were identified by factor analysis based on the frequency of consumption of food items per month. Mean factor scores were compared using independent t-test and ANOVA. Multivariate linear regression was used to assess the association between the factor scores of each dietary pattern and the demographic variables, macronutrients intake and BMI.

Results: Four intake patterns were identified: Western, Traditional, Prudent and Snacker. The 4 patterns explained 31.36% of the dietary variation in the sample.
The Lebanese traditional pattern was the most dominant pattern among the sample population (45%). Significant differences in mean scores for various patterns were noted for sex, marital status (t-test) and age (ANOVA). Young adults had significantly lower scores on the traditional pattern, but significantly higher scores on the western pattern. A positive association was noted between BMI and scores of the western and traditional patterns (ß=0.99 and 0.76 respectively; $p<0.05$).

Conclusion: In this study, four distinct dietary patterns were documented: Western, Traditional Lebanese, Prudent and Snacker. The findings suggest that a high proportion of younger Lebanese individuals are adopting a western type of diet, an alarming fact given the positive association between this type of diet and non-communicable diseases including obesity, diabetes and cardiovascular disease. These findings need to be confirmed in larger studies in Lebanon and other Middle-Eastern countries.

EFFECT OF HIGH LEVEL OF PROTEIN ON PUBERTY AND SPERM QUALITY OF GROWING AWASSI RAM LAMBS

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Abstract. Two different crude protein (% CP) levels were tested in feeding rations of 16 Awassi ram lambs. The animals were divided randomly into two groups by eight in each. Animals of the high protein level group (HPL) received complete ration mix containing 19% CP while the control received 13.5% CP. The trial included three reproductive periods, prepubertal (14-21 weeks), pubertal – phase I (21-25) and Phase II (25-31) and post pubertal (31-34 weeks of age). Puberty indicators studied included live body weight (LBW), body weight gain (BWG), testicular (volume, circumference, length and palpation) and Penile (prepuce score and urethral process) development. Blood samples were assayed for testosterone level. Semen was collected and checked for sperm quality and fertility.

At the end of the trial average LBW was higher ($P<0.05$) in HPL group (31±0.4 kg) in comparison to control animals (27.6±0.5 kg) and testicular parameters studied developed on 1.2-1.5 folds less in control group ($P<0.05$) due to the level of CP in rations with a noticed delay in the spermatogenetic activity. Urethral process (UP), prepuce (PS) and fertility (FS) scores increased significantly ($P<0.05$) with rapid acceleration in development was observed relating this to the effect of high level of CP in rations fed to HPL group to reach puberty at 27 weeks of age with 30 kg of LBW, while non of the control group could. It was noticed that after three weeks (at 30 weeks of age) only 75% of the control animals reached puberty. Higher testosterone level ($P<0.05$) was observed in HPL animals *Vs* control during pubertal period (Phase I and II). This confirms the fact that nutrition affects positively the production of testosterone and consequently the genital tract of the males. Sperm motility, concentration and anomaly in post pubertal period were significantly better ($P<0.05$) in HPL group than control animals under the effect of good nutrition.

Observing testicular growth mainly volume and circumference coupled with penile development are considered good indicators of animals approaching puberty in case of good nutrition. In contrast poor nutrition affects negatively the sexual development in Awassi ram lambs. The effect of nutrition associated with optimal hormonal level could probably accelerate the entire sexual development and relatively promote earlier maturity and consequently allowing the use of yearling Awassi ram lambs in their first breeding season.

Keywords: Awassi ram lambs; High level protein; Blood testosterone level; Scrotal development; Penile development; Fertility scores; Sperm quality

THERMAL TOLERANCE OF TEMPRATE CRAB SPECIES

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Thermal tolerance is subject to phenotypic alteration within limits that are genetically fixed. The main factor affecting phenotypic plasticity is the immediate thermal history (Cossins and Bowler, 1987). The present study was undertaken to determine the critical thermal maximum (CTMax) of nine species of marine malacostracan crustaceans from different habitats of the same geographical region. Of these, only the CTMax of *Cancer pagurus* and *Carcinus maenas* had been determined before (Cuculescu et al., 1998). In addition, the effect of heat shock on the CTMax of all species, and on the neuromuscular physiology of *Carcinus maenas* was investigated.

QUANTIFICATION OF ANTIBIOTIC RESIDUES AND DETERMINATION OF ANTIMICROBIAL RESISTANCE PROFILES OF MICROORGANISMS ISOLATED FROM RAW MILK IN LEBANON

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The rapid growth of dairy sectors in the Middle East , particularly in Lebanon , led to the extensive use of antibiotics to enhance the health and productivity of animals. Prolonged usage may lead to antibiotic residues in foods of animal origin; hence, the emergence of antimicrobial resistant microorganisms. Data on the antibiotic usage in livestock treatment, antibiotic residues and antimicrobial resistances in raw milk in Lebanon are lacking. This study aimed to investigate the types and usages of antibiotics in cattle; and quantify their residual levels and the potential microbial resistances in raw milk samples. A questionnaire-based survey identified gentamicin and streptomycin as the most frequently used antibiotics; then 22 selected raw milk samples from main dairy regions were analyzed in duplicate by quantitative ELISA for the antibiotics residual levels. The mean residual levels of gentamicin and streptomycin were 90 and 80 µg/L, respectively; which are below the allowable maximum residue limit of 200 µg/L as set by the FAO/WHO. *Staphylococcus aureus, Listeria monocytogenes, E. coli* and total aerobic microorganisms isolated from the milk samples were then tested for resistance against gentamicin and streptomycin by the disc agar diffusion method. All the *S. aureus, E. coli,* and *L. monocytogenes* isolates showed high resistance to gentamicin. However, 95% of *S. aureus,* 60 % of *E. coli* and 58 % of *L. monocytogenes* isolates were resistant to streptomycin. The obtained results provide evidence that antimicrobial resistant strains of the above pathogens have become remarkably widespread in raw milk. This requires better management for antibiotic usages among livestock farmers to control sources of food contamination and reduce the risks associated with the consumption of dairy products.

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THE IMPACT OF SOLARISATION INTEGRATED WITH PLANT BIO-FERMENTATION ON ROOT KNOT NEMATODES.

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The impact of different freshly/dried chopped medicinal or aromatic plant materials as an organic amendment in pot cultures, as well as integrated with solarisation under greenhouse conditions on the root knot nematodes population was evaluated. Results indicated that application of solarisation alone gave good control (72%) but when integrated with different plant materials, the control level increased to 95% with *Allium sativum* and 90% with *Mentha microphylla* and slightly less with other plant materials which ranged from 75 to 80%. The results of pot experiments revealed that the most significant effect on the number of nematodes was achieved with *Tagetes patula* followed by *Pimpinella anisum, Melia azadirach* and *Origanium syriacum* reaching 0.0, 1.2,1.2 and 2.5/g of roots, respectively. Total control was obtained with *Allium sativum. Origanium syriacum* contained the highest amount of essential oil (6%). Results obtained indicated that integrated approach using solarisaion combined with plant materials could be the best alternative control for the root-knot nematodes.

Waste Water treatment Using Modified Silicates

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The present proposal aims to treat waste water using organic macromolecules (resorcarenes) with pendant arms containing hydroxyl groups [1, 2]. The phenolic pollutant are captured due to its interaction with oxygen donor atoms of the pendant arms. The thermodynamic of association was studied to gain information about the stability of the phenolic-resorcarene complex (Guest-host complex): Kf, S, H, and G Optimum uptake parameters: agitation time, temperature and pollutant concentration effects were evaluated. The capacity q (mg/g) of uptake of phenol and sodium phenolate by resorcarene was calculated. The data were fitted using Langmuir and Frendlich models [3]. The kinetic of uptake was studied and was found to follow a second order rate. The thermodynamic activation parameter are also calculated: Ea, $S^{\#}$, $H^{\#}$, and $G^{\#}$.

New modified silicates has been prepared. The resorcarene was anchored onto silicate (Kaolin) as evidenced by thermal analysis.

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Garlic Constituent Diallyl Trisulfide Induced Apoptosis in MCF7 Human Breast Cancer Cells

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Identification of agents that are nontoxic but can delay onset and/or progression of breast cancer, which is the main leading cause of cancer-related deaths among women, is highly desirable. Garlic-derived organosulfur compounds (OSCs) have highly effective antitumor effects, but the mechanism has yet to be investigated. The aim of the present study was undertaken to examine the effect of diallyl trisulfide (DATS), a promising cancer chemopreventive constituent of garlic, on growth of two cell lines respectively, MCF-7 human breast cancer cells and nontumorigenic MCF-12a mammary epithelial cells. The effects of DATS were examined by MTT assay, clonogenic survival assay, ELISA based apoptotic assay, TUNEL assay, immunofluoresence staining, flow cytometry, RT-PCR, and Western blot analysis. Garlic constituent diallyl trisulfide (DATS) suppresses viability of cultured MCF-7 and MCF-12a cells respectively by decreasing the percent of cells in G2/M and inducing apoptotic cell death. DATS-induced apoptosis was markedly elevated in MCF-7 cells compared with MCF-12a cells and this was correlated with elevated levels of cyclin B1. The results from semi-quantitative and real-time RT-PCR indicated that DATS-enhanced the expression levels of FAS and cyclin D1, but in contrast, down-regulated the expression levels of Akt and Bcl-2. Furthermore, the DATS-induced apoptosis was correlated with induction of pro-apoptotic Bax protein and p53 protein expression was up-regulated and translocation to nucleus in MCF-7 cells. Together, the results of the present study show, for the first time, that DATS administration might offer a novel strategy for the treatment of human breast cancer.

Production, Purification and Characterization of *Bacillus subtilis* Protease from Whey

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Production of *Bacillus subtilis* protease under submerged fermentation was investigated using whey as a cheap carbon source. Enzyme yield was maximized by optimizing the composition of the low-cost culture medium. Optimum enzyme production was achieved with 0.3% peptone and 0.6% yeast extract. Inorganic nitrogen sources proved to be less favorable. Strong catabolic repression on protease production was observed with the addition of different carbon sources. The enzyme production was favored in the presence of vitamin C and Cl_2Pb. Protease production was inhibited remarkably in the presence of EDTA and K_2HPO_4. Different purification steps were applied including ethanol precipitation, DEAE-Sephadex A25-120 ion exchange chromatography and Sephadex G-100 gel filtration column chromatography. The purification profile showed a 545.26 fold increase of the specific activity and 49.8% enzyme yield. The molecular weight of *Bacillus subtilis* protease was found to be about 23.44 kDa assayed by SDS/PAGE technique. Kinetic studies on the protease characterization revealed that the optimum pH, incubation period and temperature of the pure enzyme were 5.0, 20 min and 25°C respectively. Thermal stability profile indicated that the enzyme retained its original activity after 30 min at 40°C. K_m and V_{max} for the activity of the purified protease were found to be 0.36 mM and 100 U/ml/min respectively. Protease activity was enhanced in the presence of KCl and $ZnCl_2$.

Key words: Protease, *Bacillus subtilis*, Submerged fermentation, Whey, Optimum production, Purification, Kinetic studies.

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CD437, A PROMISING SYNTHETIC RETINOID, IN THE TREATMENT OF ADULT T-CELL LEUKEMIA/LYMPHOMA

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Background and Objectives
Adult T-cell leukemia (ATL)/lymphoma is an aggressive neoplasm caused by human T-cell leukemia virus type I (HTLV-I); the oncogenic protein Tax plays an important role in disease development. ATL carries a poor prognosis due to chemotherapy resistance. Retinoids are used in cancer treatment; however, their use is limited by side effects and acquired resistance. Therefore, synthetic retinoids with reduced toxicity and increased specificity have been developed, namely 6-[3-(1-adamantyl)-4-hydroxyphenyl] -2-naphthalene carboxylic acid (CD437). The general aim of our studies, using ATL/lymphoma as a model, is to investigate the potential use of CD437 in ATL treatment.

Materials and Methods
Cell growth was assessed in HTLV-I positive (HuT-102, C8166, MT2) and HTLV-I negative (CEM, Jurkat, Molt-4) malignant T-cell lines, primary ATL cells from two patients, and normal resting and activated circulating T-lymphocytes. Cell cycle distribution and mechanisms of cell death were determined using propidium iodide staining of DNA content, mitochondrial membrane potential dissipation by Rhodamine staining, cytochrome c release, PARP cleavage, and caspase and ceramide involvement.

Results
CD437 induced growth arrest and cell death in all tested HTLV-I positive and negative cell lines, and primary ATL cells, while no effect was observed in resting and activated normal lymphocytes. HTLV-I negative T cells were more sensitive to CD437 compared to HTLV-I positive cells. All tested malignant T cell lines are resistant to pharmacological levels of all-trans retinoic acid. CD437 caused a G_0/G_1 arrest and apoptosis in all tested cell lines. CD437 induced mitochondrial membrane potential dissipation, cytochrome c release, caspase 3 activation, and PARP cleavage which were less pronounced in HTLV-I positive *versus* HTLV-I negative cells. Ceramide accumulation was only observed in HTLV-I negative cells. Interestingly, CD437 resulted in early proteasomal-mediated Tax degradation.

Conclusion
This research may support a potential therapeutic role for CD437 in ATL and T-cell lymphomas, especially in those leukemic cells that are resistant to chemotherapeutic agents.

Acute Taxol Nephrotoxicity: Histological and Ultrstructural Studies of Mice Kidney Parenchyma

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Abstract

Taxol is a microtubule inhibitor drug widely used in treatment of many types of cancer. Nephrotoxicity is the most hazardous effect complicating chemotherapy in general and kidney functions must be monitored early during any chemotherapeutic course. The main objective of the present study was to investigate the effect of acute Taxol nephrotoxicity in mice. In the present study Taxol at different doses; MD- ID- and MTD (0.6, 1.15.1.7 mg/kg) respectively was given by intra- peritoneal route to 54 adult male mice with an average body weight of 20-25gm. Kidney samples was taken 6, 24, 48 hour following administration, Fixed in 10% neutral buffered formalin, Paraffin sections 5 μ thick were stained by haematoxylin and eosin and PAS and then examined for histological changes. Samples from animals treated by the maximum dose (MTD=1.7 mg/kg) for 48h were fixed in 3% gluteraldehyde in phosphate buffer (PH 7.4) and processed for transmission electron microscope. Taxol given for short duration was found to produce marked degenerative changes in kidney parenchyma even in minimum tolerated dose (MD=0.6mg/kg).Individual variations were observed regarding the degree of nephrotoxicity.There was marked loss of renal tubules epithelial lining, damage of brush border and formation of hyaline casts within the damaged tubules. The alterations were in the form of both necrotic and apoptotic changes in the kidney tubules. Focal atrophy of glomerular tufts was also observed. Vascular congestion and degenerative changes in renal blood vessels were occasionally Evident in some samples Ultrastructure study revealed damage of glomerular membrane. Proximal tubule showed loss of basal infoldings, damage of brush border, mitochondrial degeneration and nuclear changes. Distal tubules also showed demarked degenerative changes. Increased frequency of micronuclei proved that Taxol had genotoxic effects in mice bone marrow cells. In conclusion Taxol had nephrotoxic effect on mice kidney that must be considered during its use as a chemotherapeutic agent in human.

Key words: Taxol- Nephrotoxicity – ultra - renal tubules- glomerular tufts – micronucleus assay. MTD (tolerated)-ID (dose) –MD.

Introduction

Most cytotoxic drugs interact directly with DNA or its precursors, inhibiting the synthesis of new genetic material or causing irreparable damage to DNA (Ref). Although anticancer or cytotoxic drugs are advantageous in treating cancer, they also have their drawbacks. One of the greatest problems is that cytotoxic drugs may not distinguish between normal and cancer cells. Unfortunately, no currently available agent meets this criterion Salmon and Sartorelli, 2001. Therefore, normal tissues that have higher rates of cellular proliferations such as bone marrow and reproductive organs are very susceptible to anticancer drugs. Liver and kidney are the most sensitive organs for chemotherapy cytotoxicity (Merouani *et al*., 1997. & Schrier, 2002).

Taxol is a new anticancer drug that is isolated from stem park of the pacific yew tree; *Taxus brevifolia*.Its antitumour activity against a variety of rodent tumors was discovered in 1967; when, its unique mechanism of action led to the development of a new class of chemotherapeutic agents called taxanes. In 1991, The National Cancer institute hailed Taxol, (also know as paclitaxel,) as the most important new cancer drug in the past 15 years, and it has recently been called the best new anticancer agent developed from natural agents. Although the drug was discovered forty years ago, it was not tested experimentally until 1977. It took another sixteen years to be approved by the Food and Drug Administration (FDA) for the treatment of ovarian cancer, breast cancer, and Kaposi's sarcoma. It has been shown to be effective against solid tumors, breast, lung and colorectal cancers, which before were unaffected by most chemotherapeutic agents Auzenne *et al*., 2001. Taxol can either be used on its own as monotherapy or in combination with other drugs (Sergey *et al*., 2008). Taxol, when used on its own, produced a response in up to 60% of patients with breast and ovarian cancer (Tresukosol *et al*., 1995). It has been described to have some activity in head and neck gastric cancer, and hematological cancer. Crown and O'Leary, (2000). Paclitaxel (Taxol) prevents cell division by promoting the assembly of stable microtubules from α and β tubulin heterodimers and inhibiting their depolymerisation. Schiff *et al*., (1997).This is an opposite effect to the Vince alkaloids, which inhibit the polymerization of the microtubules. Goodsell, (2000). Taxol has been reported to induce micronuclei (Bajie *et al.,* 2007). Moreover, investigations have shown that Taxol activates a checkpoint pathway that delays cell cycle progression and induces programmed cell death (Sorger *et al*., 1997; Guo -w *et al*, 2002; Ikui *et al*., 2005).

Nephrotoxicity of Taxol was reported with other cytotoxic drugs. Schrier (2002). However, no available literatures dealing with histological changes in kidney parenchyma evoked by Taxol administration. In the present study, acute Taxol nephrotoxicity at 3 different doses was tested. Light and electron microscopic studies were used to demonstrate cytotoxicity. Micronuclei assay was applied for testing aneuogenecity that may delay cell cycle program or induced programmed cell death Ganzaulez *et al*., 1999.

SKIN CANCER CELLS EXHIBIT IRREGULAR CONNEXINS EXPRESSION, INCREASED ADHESION AND INTERCELLULAR COMMUNICATION IN THE MALIGNANT PHENOTYPES OF SQAMOUS CELL CARCINOMA.

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The early stages of cancer are characterized by aberrant connexins expression and gap junction-mediated intercellular communication (GJIC). However, several studies have documented an increase in this communication with the progression of cancer cells towards malignant phenotypes. A coordinated interaction of cancer cells with endothelial cells is a prerequisite for cancer invasion and metastasis. This study was designed to investigate expression of connexins (Cxs) at early and advanced stages of skin squamous cell carcinoma and the establishment of necessary functional communication with endothelial cells which enhances cancer cells ability to invade and metastasize. For this purpose, cell lines of transformed HaCat cells representing Squamous Cell Carcinoma (SCC) progression were studied. The expression and localization of relevant connexins were investigated in normal keratinocytes (NK) and HaCat cell line variants at transcriptional and translational levels. Cellular localization, as well as functional parameters was examined. Data showed expression of Cx26, Cx30, Cx30.3, Cx31, Cx31.1, Cx43, and Cx45. Some Cxs exhibited an initial decrease in their expression at early stages of SCC (HaCat), while in the more advanced form of SCC cell lines (A5 and II-4), all Cx expressions were up-regulated. Immuno-flourescence expression of some Cxs revealed an intra-cytoplasmic localization of these Cxs with increased intense fluorescence in the malignant cell lines A5 and II-4, in addition to punctuate staining in both cytoplasm and plasma membrane of these cells. Our results for adhesion and communication assays confirmed a positive adhesion and gap junction communication established between endothelial cells and SCC HaCat variants. In the invasion assay, invasiveness of A5 and II-4 cells showed increased invasive capacity. Chemokine receptor CXCR4 and its ligand SDF-1, expressed strong signals simultaneously and was associated with increasing adhesion in the advanced malignant phenotype HaCat II-4. It's concluded that various factors of angiogenesis (VEGF and FGF), invasive capacities, homing mechanism (CXCR4/SDF-1), connexins expression and GJIC are associated with increased malignant phenotype in the progressive SCC cell lines. Understanding the expression and role of connexins in malignancy may provide strategies for preventive and curative measures of cancer metastasis.

Production and Purification of Cellulase-Free Xylanase by *Streptomyces* sp. using Wheat bran

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Abstract

Streptomyces sp. was able to produce cellulase-free xylanase enzyme from wheat bran using submerged fermentation technique. Under optimized conditions, maximum yield of xylanase was 41.259 U/ml. *Streptomyces* sp. xylanase was fractionated by acetone (88%) and purified by Anion exchange chromatography on DEAE-Sephadex A-50 followed by Gel filtration chromatography on Sephadex G-100. The overall purification method showed a 98.45% reduction of the original protein content of the culture filtrate. The specific activity was increased by 33.2 folds. All amino acids were detected in adequate levels in the pure enzyme. The protein was rich in glycine, serine, and leucine. Xylanase activity was optimal at pH 7, but showed pH stability in the alkaline range (pH 7-9).Optimal temperature was 50^{o}C, at 60^{o}C >92% of the activity was attained. This enzyme preparation was free from cellulase which is an advantage considering its application in biobleaching pulp for high quality paper.

Key words: cellulase-free xylanase, *Streptomyces* sp., wheat bran, purification.

Rana Al Wafai

Effect of *Nigella sativa L.* and Thymoquinone on Streptozotocin Induced Cellular Damage in Pancreatic Islets of Rats: An Ultrastructural Study

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Abstract

Objective: The aim of this study was to investigate the role of *Nigella sativa* seed aqueous extract, *Nigella sativa* oil, and thymoquinone in ameliorating the cellular damage observed in pancreatic cells of streptozotocin induced diabetic rats.

Materials and Methods*:* Five equal sized groups of male Sprague-Dawley rats were used in this study. These groups included; control group, streptozotocin induced diabetic group, streptozotocin diabetic& aqueous extract-treated (2ml/kg), streptozotocin diabetic & oil-treated (0.2ml/kg) and streptozotocin diabetic & thymoquinone-treated (5mg/kg). After 30 days of treatment, small blocks were obtained from the pancreatic tissues of the different groups and prepared sections were examined by both light and transmission electron microscope.

***Results*:** The nuclear alterations observed including segregated nucleoli, marginating aggregates of heterochromatin and decreased heterochromatin indicate DNA damage in STZ treated rats and are consequently responsible for the development of type 1 diabetes. The aqueous extract of *Nigella sativa* reduced some of the cellular damage caused by STZ on β cells such as chromatin aggregation, reduced heterochromatin, nuclear inclusions, fragmentation and vacoulation of mitochondria as well as cytoplasmic vacoulation and degranulation. In contrast, the use of oil of *Nigella sativa* exacerbated the destructive effect of STZ . The use of thymoquinone; the active ingredient of *Nigella sativa*, ameliorated the toxic effects of STZ on pancreatic β cells.

Conclusion: The present study emphasizes that *Nigella sativa* extracts are effective in reducing the cellular damage caused by STZ on pancreatic β cells. In addition, findings suggest that the active ingredient thymoquinone is most effective against STZ diabetes as its administration ameliorated most of the pathological changes. These effects observed could be attributed to the antioxidant properties of *Nigella sativa* and thymoquinone that prevent or inhibit the cellular damage caused by STZ to the pancreatic cells.

Key words: Type 1 diabetes, streptozotocin, *Nigella sativa*, thymoquinone.

EFFECT OF SOME LOCAL PROBIOTICS ON IMMUNOLOGICAL AND BIOLOGICAL SYSTEMS OF EXPERIMENTAL ANIMALS

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Abstract

The aim of the present study was to investigate the effect of orally administrated probiotics on the physiological and immunological parameters of *Sprague Dawely* rats. To improve the efficiency of some local probiotics, dairy products were used as an excellent delivery system for probiotics to the experimental animals. The experimental animals were divided into seven different groups; **Group I:** control group; **Group II:** Goat-yogurt group; **Group III:** Cow-yogurt group; **Group IV:** Yeast-goat yogurt group; **Group V:** *Lactobacillus acidophilus* –goat yogurt group; **Group VI:** Yeast-cow yogurt group and **Group VII:** *Lactobacillus acidophilus* –cow yogurt group. It was remarkably noticed that the administration of different probiotics result in a significant increase in body weight gain in all feeding rats compared with the control group. Feeding rats with different probiotics led to increase in Hb and PVC in all groups of rats. On the other hand, a significant increase in RBCs in all feeding rats compared with control group. An increase in the count of both white blood cells and lymphocytes occurred in all feeding rats. A general reduction in ALT, AST and bilirubin was observed in plasma of all feeding rats compared with the control group. A significant decrease was observed in creatinine level of all feeding rats compared with control group. Concerning urea, a significant reduction in urea level was found in plasma of all feeding rats. Feeding rats with these probiotics showed improvement in lipid metabolism. A significant reduction in cholesterol level was observed in plasma of all feeding rats compared with the control group. An effective decrease in the level of TG, LDL and VLDL and increase in the level of HDL was observed in plasma of all feeding rats compared with the control group. Administration of probiotics showed significant increase in total serum protein especially globulin compared with control group. ELISA analysis showed the presence of marked variation in immunoglobulins level of all feeding rats compared with control group.

Key words: Probiotics, Immunological, Biological Systems, Experimental Animals

ECOLOGICAL RISKS OF NITRATE ACCUMULATION AND LEACHING IN THE SOIL-GROUNDWATER SYSTEM OF CENTRAL BEKAA- LEBANON

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Abstract

Agriculture in Lebanon is concentrated mainly in the fertile Bekaa plain, where intensive agricultural practices prevail. Due to lack of appropriate legislation, governmental and public control, farmers apply excessive chemical fertilizers notably nitrogen. Consequently, health and ecological problems may arise due to nitrate accumulation in the soil and groundwater (GW) system. We have monitored the status of soil and GW quality in Terbol area located in Central Bekaa Plain. Soil and water samples were collected between July 2007 and July 2009. The aim was to study soil and groundwater exposure to nitrate pollution and to relate these risks with the background values of nitrate content in non-polluted areas, current agricultural practices, soil vulnerability to nitrate leaching. Soil samples were taken in four representatives plots under four different existing agriculture practices (leafy vegetable monoculture, potato-lettuce rotation, wheat-potato rotation and grape fields). GW samples were taken from 25 wells spread around the Terbol Plain and whose water is used for irrigation, industrial and domestic purposes. The area was previously surveyed in detail and a soil map at scale 1:50,000 describing the profiles morphology and horizon structure and characteristics was consulted. Analytical water results show alarming levels of nitrate concentration in a number of wells mainly in the central part of the plain reaching 517.7 mg L^{-1}. Soil data show large accumulation of nitrates towards the end of the cropping season in the topsoil layer reaching 102 mg Kg^{-1} soil. Due to nitrate leaching by intensive irrigation higher amounts of nitrates are found at deeper layers which completely disappear from the root zone after one winter season.

A GIS soil model based on soil properties affecting soil infiltration, like soil depth, soil texture, soil structure type and strength, organic matter content, pore abundance and size, was elaborated to assess soil vulnerability to leaching. Results show medium and high vulnerability in the larger area of the Central Bekaa plain, with very high vulnerability in the foot slope due to larger porosity and infiltration rates. The drawn soil and GW maps are useful tools for decision makers and local stakeholders including consumers delineating critical areas where special care must be applied to control N input and balance in the soil-GW system and food chain. The current ecological status reveals severe ecological risk for the soil-GW system with resulting pollution of surface and ground waters and potential eutrophication of water resources and health danger to the large public consuming fresh vegetables. For these reasons a consortium joining consumers, farmers, scientists, and authorities must be established to elaborate a nitrogen management plan which should be immediately initiated in order to stop and reduce further contamination of the whole fragile ecosystem. The plan should consider the available nitrogen pools (soil, irrigation water) prior to the assessment of the crop nitrogen demands which brings economic and health return. Plots irrigated from wells containing 200 mg L^{-1} nitrate may not need nitrogen fertilizers as the application of 500 mm (5000 m^3 ha^{-1}) of water means applying 234 kg N ha^{-1} with irrigation water, equivalent to 1114 kg ha^{-1} of ammoniun sulfate fertilizers.

Key words: Bekaa Valley, Soil, Groundwater, Nitrate accumulation, Nitrate leaching

CONNEXIN-43 REDUCES THE TUMOR PHENOTYPE OF BREAST ADENOCARCINOMA CELL LINES IN A CONTEXT DEPENDENT MANNER.

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Gap junction intercellular communication (GJIC) is crucial for tissue homeostasis, differentiation and development. Connexins (Cx), the gap junction proteins, are tumor suppressors, and Cx43 expression is often down regulated in breast tumors. In addition to that, Cx43, among others, regulates mammary tissue differentiation. We sought to study the effect of exogenous Cx43 fused to eGFP in the construct P-eGFP-N1 when transfected into the human breast adenocarcinoma cells, MDA-MB-231 cells, exhibiting a high invasive phenotype, and MCF-7 cells, exhibiting a lesser invasive phenotype. MCF-7 cells transfected with Cx43-eGFP showed a 56% decrease in total cell number by day 6 in culture, when grown as 2D on plastic, in comparison to a C-terminus truncated Cx43 (Cx43Tr), a sham transfected (empty plasmid), and to untransfected cells which showed comparable total cell numbers. Similarly, MCF-7 Cx43 transfected cells showed a 21% reduction in total cell number when grown in 3D cultures (on reconstituted basement membrane), and demonstrated a significantly higher amount of small sized spherical clusters. Exogenous Cx43-eGFP expression decreased the invasive potential of MCF-7 cells by 38%, as shown by invasion assays. On the other hand, MDA-MB-231 cells did not show any difference in total cell number when grown in 2D cultures on plastic, but exhibited a 35% reduction in proliferation when grown in 3D cultures. Interestingly, MDA-MB-231 cells, showed a stellate growth cluster morphology in 3D. This phenotype was decreased by 20% in cells transfected with exogenous Cx43-eGFP, and showed spherical clusters instead of stellate ones. Co-immunoprecipitation assays done on MCF-7 cells, as well as dual immunocytochemistry done on both cell lines, suggested that endogenous β-catenin associates with Cx43, indicating that this association, may be partly involved in reduced growth rate, invasiveness, and change in morphology of MCF-7 and MDA-MB-231 cells in 3D cultures. In conclusion, and in addition to having a crucial role in mammary differentiation (Talhouk *et al*. 2008), the assembly of the GJ complex, in association with β-catenin specifically, and perhaps other binding proteins, could possibly have a role in reverting mammary tumorigenesis, to a state of redifferentiation. Lastly, 3D studies suggest that Cx43 expression exerts a context dependent effect, particularly in the higher invasive cell line, MDA-MB-231.

AN ANTI-INFLAMMATORY COMPONENT IN THE POPULAR FOLK MEDICINAL PLANT *ANTHEMIS SCARIOSA* (CHAMOMILE) EXHIBITS PARTHENOLIDE ANALOGOUS ANTI-PROLIFERATIVE ACTIVITIES

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Anthemis scariosa DC, a Lebanese endemic plant commonly known as "Chamomile", has been a popular folk medicinal remedy for centuries, having various claimed therapeutic effects. Using bioactive guided fractionation and spectroscopic techniques, an anti-inflammatory agent in the water extract of the plant, that is capable of suppressing IL-6 production by endotoxin treated SCp2 mammary epithelial cells, was identified by our lab to be the germacranolide 1β,10α-epoxy-6α-hydroxy-1,10H-inunolide. The potent activity of the identified molecule "K100" is most probably attributed to three functional groups: the exocyclic α-methylene-γ-lactone, an OH group adjacent to the α-methylene, and an epoxide. Moreover, the structure of K100 appeared to be analogous to that of parthenolide (PT), the major sesquiterpene lactone extracted from the plant *Tanacetum parthenium* (feverfew), which has been extensively studied and reported to be capable of inhibiting the proliferation of several cancerous cell lines. Interestingly, recent literature reports have shown that di-methyl-amino-parthenolide (DMAPT), a more soluble PT analogue, has similar effects to those of PT *in vitro* as well as *in vivo* and is currently under clinical trials. Molecular docking *in silico* of K100, DMAPT and Salograviolide A (a sesquiterpene lactone isolated by our lab from the plant *Centaurea ainetensis*) against 10 known target proteins of PT, predicted that K100 can bind to all tested targets at similar positions as PT, and that its affinity of binding is either higher than that of PT or second best to it. Although K100 showed less cytotoxicity than PT, it inhibited the growth of two tested cancerous cell lines (MDA-MB-231 and MCF-7) in a dose dependent manner, with MCF-7 being more sensitive to K100 treatment.

DOES VIBRATION ENHANCE STATIC STRETCH EFFECT ON MUSCLE FLEXIBILITY?

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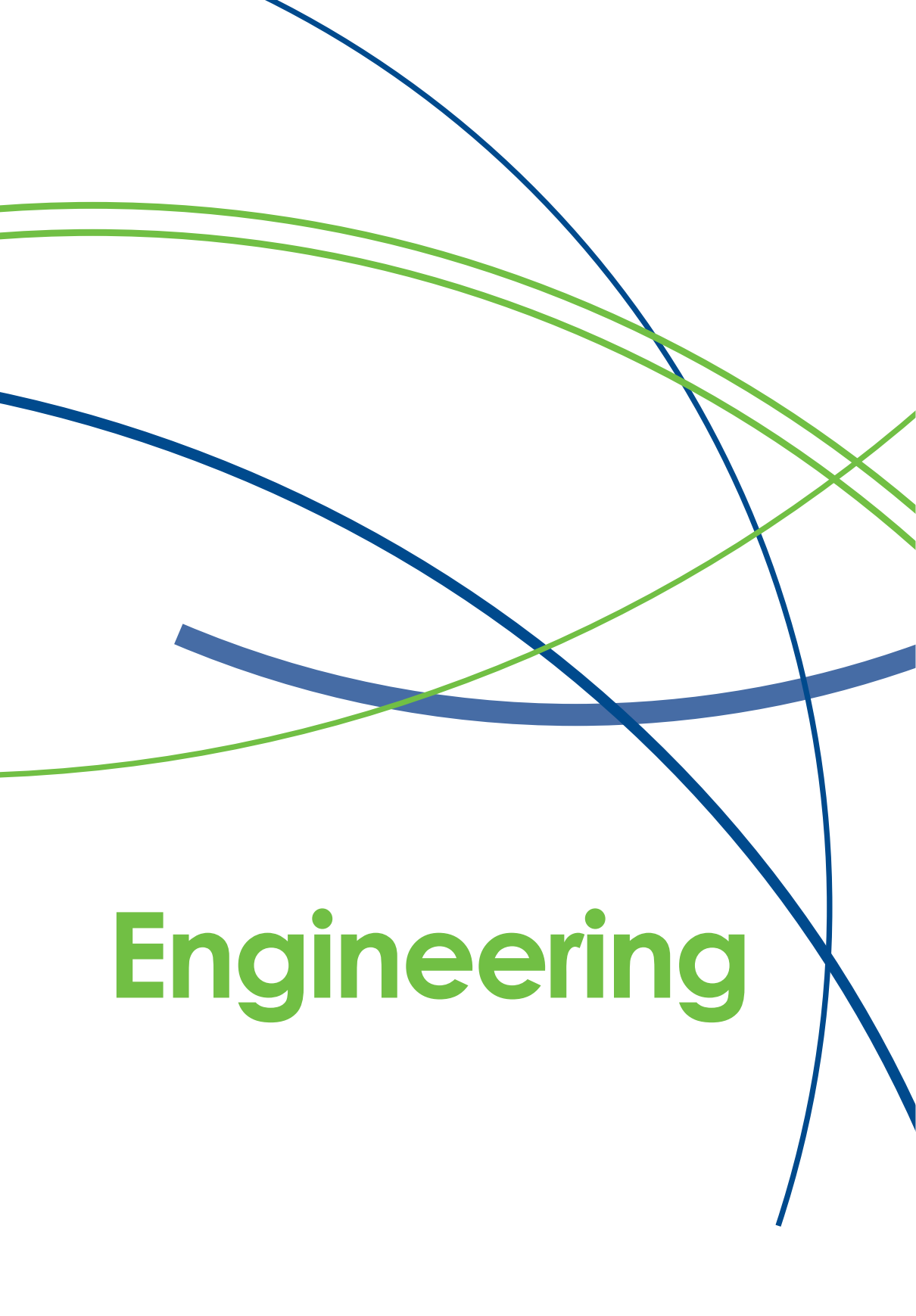
Abstract

static stretching is commonly used to increase flexibility. Vibration with its effect on muscle proprioceptors can also be used to enhance the joint range of motion. **Purpose:** this study aimed to investigate the effects of vibration on static stretching and that to determine if addition of vibration on static stretch enhances range of motion more than static stretch alone. **Methods:** 24 male volunteers aged between 10-13 years were randomly assigned to experimental (N=12) and control (N=12) groups. Measurement of flexibility was done using forward split with the rear knee flexed to prevent pelvic misalignment. Height of the anterior iliac spine of the pelvis was measured at the lowest split position (pretest). Volunteers stretched forward the left leg to the point of discomfort for 10 seconds followed by 5 seconds of rest, repeated eight times (2 min total). The experimental group stretched with a vibrator on the left triceps turned on, the control group stretched with the vibrator turned off. At the end of the stretching session posttest data were recorded. Difference scores were analyzed. **Results:** significant differences were observed in the forward split flexibility ($p<0.05$) between groups. **Conclusion:** adding vibration to static stretch provide a mean of enhancing range of motion beyond that of static stretching alone.


Engineering

ORAL PRESENTATIONS

E 1.1
USE OF CRUMB RUBBER TO IMPROVE ASPHALT BINDERS AND ASPHALT CONCRETE MIXES

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The Hashemite Kingdom of Jordan has invested millions of dollars in road construction over the past twenty-five years. Sections of some roads, which have been built to the best international standards, have shown early signs of distresses due to the harsh environmental and traffic loading. Asphalt binder is a thermoplastic material that behaves as elastic solid at low service temperatures or during rapid loading and behaves as a viscous liquid at high temperatures or slow loading. This double behavior creates a need to improve the performance of an asphalt binder to minimize stress cracking, which occurs at low temperatures, and permanent deformation, which occurs at high service-temperatures. Daily and seasonal temperature variations plus the growth in truck traffic volume, tire pressure and loading have increased stresses on asphalt pavements. Local asphalt pavement temperature ranges between -10^{o}C in the winter to 65^{o}C in the summer. This has lead to an increased demand to modify asphalt binders. Different methods have been used to upgrade the properties of asphalt binders. One of the most commonly used procedures is modification by additives.

Hazardous waste materials are being generated and accumulated in vast quantities causing an increasing threat on the environment. Recycling of materials such as, rubber, glass, demolished concrete, metal, and plastic, represent a clear model of the

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proper disposal of waste materials for a better environment. It has been reported that the United States alone has about 275 million scrap tires stockpiled across the country, with a yearly increase of an extra 290 million tires being generated per year. The consumption of crumb rubber in highway construction was made compulsory by legislation and law enforcement in projects funded by governments like the USA and France. However, most of the developing third world countries have yet to raise their awareness regarding recycling of waste materials in order to develop an effective legislation in respect to the local reuse of waste materials.

In evaluating the suitability of the shredded rubber to improve the asphalt cement, shredded rubber was mixed with the asphalt cement. Different percentages of the shredded rubber were added to the asphalt cement, effectiveness of the added material was determined based on its ability to improve the properties of virgin asphalt.

To evaluate the effectiveness of modification, asphalt concrete mixes were prepared according to Marshall Procedure to find the optimum asphalt content. Then, asphalt concrete mixes were prepared utilizing non-modified and modified asphalt cement. In addition, effectiveness of utilizing the shredded rubber to replace portions of the aggregates, asphalt concrete samples containing different percentages of the shredded rubber as parts of the aggregate were also prepared. Modification effectiveness was judged by the improvement in Marshall Stability, indirect tensile strength, creep, fatigue, rutting and stripping resistance by modified Lottman test. A comparison study, using analysis of variance (ANOVA) statistical analysis for the test results was performed, and showed that modification by adding shredded rubber to the asphalt cement or as a replacement to portions of the aggregate were effective in improving the performance properties of the hot asphalt concrete mixes.

Keywords: Shredded rubber, asphalt modification, waste materials, rutting, fatigue, stripping.

E1.2
ARCHITECTURAL CONSIDERATIONS FOR BUILDINGS PRONE TO EARTHQUAKE EXCITATIONS

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ABSTRACT

Lebanon had suffered a lot from government delinquency for decades precedent to over thirty years of occupation of hostile forces. Consequently, the lack of building regulations resulted in thousands of inadequate structures built in this region. Given the location of Lebanon at the boundary between two tectonic plates, and given the past evidence of seismic activity, Lebanon is certainly earthquake prone, in particular the south of Lebanon. The most active fault today in Lebanon is the Roum Fault in the southern region, branching from the Yammouneh Fault, along which the epicenter of the March 16th, 1956 earthquake was located killing over 130 persons and destroying thousands of houses in the south at that time. If earthquake forces are not taken into consideration in our design and practice we will be vulnerable to a disastrous earthquake damage. New building regulations for construction and rehabilitation must be enforced by building officials for design of buildings, of special consideration are seismic regulations. Lebanon is currently undergoing a huge development phase that includes structures and infrastructures as well as urban planning of the sector similar to what we have witnessed in the central Beirut district area, a decade ago. The opportunity is here, given the range of reconstruction effort to bring up to date and up to seismic standards our new buildings and infrastructure. This paper presents provisions for earthquake resistance and design of buildings, and highlights some of the optimal seismic configurations of buildings as well as architectural considerations that may be adopted by the architect and the structural engineer in the process of designing a new building or retrofitting an existing structure.

Keywords: Seismic, Earthquake, Planning, Retrofitting.

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E 1.3

EARLY SOWING AND EARLY IRRIGATION ON BARLEY YIELD IN THE BEKAA

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In cool Mediterranean areas, early sowings usually leads to early growth and maturity and escapes from terminal heat and drought thus ensuring higher seed yield than late sowings. However, in many years, rains may come late. The objectives of this study were to test whether early sowing followed with a 30 mm irrigation to ensure earlier emergence will increase barley (*Hordeum vulgare* L.) seed yield, and whether this early irrigation (EI) will give higher water use efficiency than later irrigation applied after heading (LI). A four-year, replicated field experiment was conducted at the Agricultural Research and Educational Centre (33°56' N, 36°05' E, 995 m a.s.l.) in the semi-arid northern Bekaa Valley of Lebanon. The long-term annual precipitation of the site is 513 mm, 58% of which falls in December, January and February. Compared to the non-irrigated control, EI led to significant increase in seed (+1790 kg ha^{-1}, or +70%) and straw yield (+2040 kg ha^{-1}, or +51%), and there was no year-by-irrigation interaction. This yield increase was apparent in the dry 2007-08 (+1733% seed and +165% straw), but unexpectedly, it existed in 2005-06 (+29% seed and 36% straw) and 2008-09 (+49% seed and 21% straw) when rains came just one or two days after the early irrigation,

causing little difference in the timing of seedling emergence. Lusher growth, earlier heading and maturity (except in 2006-07), and taller plants were the effects after EI as expected, but EI did not affect thousand kernel weight. Compared with LI, the EI yields were also higher, heading time and maturity earlier, and plant height greater, but thousand kernel weight was lower. Consequently, water use efficiency of the EI was on average 2.4 times higher than the LI. In conclusion, results of the study clearly show that early sowing plus EI give a large increase in barley yields and much higher water use efficiency than LI, suggesting that farmers should try to adopt the technique of early sowing followed by early irrigation.

E 1.4
MODELISATION DYNAMIQUE GLOBALE DE LA STABILITE DES PENTES SOUS CHARGEMENT SISMIQUE – EFFET DU RENFORCEMENT

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Les tremblements de terre destructeurs qui se sont produits récemment dans des pays voisins comme la Turquie, l'Iran, le Pakistan mettent en évidence la vulnérabilité de notre pays face à ces phénomènes.En effet, l'ampleur des dégâts causés par ces séismes était très conséquente du point de vue humain(dizaines de milliers de morts et de réfugiés) et économique (des milliards d'euros nécessaires pour la reconstruction et réhabilitation des zones sinistrées). Plusieurs géologues et experts prévoient un séisme majeur au Liban dans les années à venir. En plus, des secousses sismiques répétitives, de faible magnitude comprise entre 3 et 4 sur l'échelle de Richter, se sont produites récemment dans le sud du Liban. Ces secousses ont augmenté la psychose chez la population. Il est bien connu que les conséquences dues aux séismes sont amplifiées dans les zones de talus et des pentes. Or la topographie libanaise est riche en pentes et talus. Ces zones deviennent surpeuplées en raison de la forte expansion démographique et la fuite de la population des zones urbaines. Le seul moyen de réduire le risque est donc de diminuer la vulnérabilité. Afin de minimiser les risques en cas des séismes et pour éviter un scénario catastrophique similaire à celui produit dans les pays cités ci-dessus, une intervention immédiate s'avère indispensable afin de protéger les zones sensibles en particulier les ouvrages situés à proximité des pentes et des talus. Pour ce faire, on propose dans ce projet d'analyser le problème de stabilité des pentes sous chargement sismique en utilisant une approche dynamique globale. L'avantage d'une telle approche est qu'elle permet d'intégrer les principaux aspects, généralement ignorés avec les méthodes de calcul simplifiées, tels que :

- la composante verticale du séisme, - l'état initial du sol,
- la présence de l'eau (à travers le couplage poro-mécanique)
- la présence des couches de sol de mauvaise qualité en surface
- le comportement non linéaire du sol sous chargement statique et cyclique
- le contenu fréquentiel du chargement % fréquence fondamental du talus.
- l'influence d'éventuels dispositifs de renforcements.

La modélisation numérique de l'étude du comportement des pentes sous chargement sismique est réalisée avec le logiciel des différences finies FLAC3D. On utilise des accélérogrammes enregistrées pendant un vrai tremblement de terre (séisme de Kocaeli en Turquie, 1999). Dans ce papier on effectue d'abord une comparaison des résultats obtenus en utilisant respectivement un comportement linéaire du sol et ensuite un comportement non linéaire de type élastoplastique. Ceci met clairement en évidence l'insuffisance du comportement élastique du sol. Ensuite, on présente l'effet de la mise en place du renforcement sur la stabilité du talus. Des études paramétriques portant sur la longueur, la position, l'inclinaison et le nombre d'éléments de renforcement sont effectuées. La synthèse des résultats obtenus permet de fournir quelques recommandations sur la meilleure configuration du renforcement afin améliorer la stabilité des pentes et par conséquent la stabilité des ouvrages existants à proximité de ces pentes.

E 1.5
SUSTAINABLE CONSTRUCTION MATERIAL INCORPORATING NATURAL FIBERS – PRELIMINARY STUDY

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Abstract

The paper reports on preliminary tests performed at the American University of Beirut (AUB) to produce a sustainable "green" concrete material using natural fibers which consists of a preliminary phase in a multi-phase research program. The study consists of using "natural" fibers as additive components in the proposed cement material or concrete mix while reducing the use of aggregates. Such material would increase the service life and reduce the cost of the structure, and would have a positive effect on social life and social economy. In this study, natural fibers extracted from palm and banana leaves, as well as industrial hemp fibers are added to the concrete mixes, with different volumetric ratios. Samples are prepared with various proportions of aggregates and tested to reach an "optimum" concrete mix. The structural and physical performance of the optimum" mix is tested and evaluated using cubes and standard flexural beams.

The palm and banana trees are extensively grown along the Lebanese cost, while the industrial hemp is currently grown in selected pilot fields under a UNDP experimental project conducted in cooperation with the Ministry of Agriculture (MoA). The demand for such agricultural fibers for concrete production would be a major incentive to Lebanese farmers to grow these plants and benefit from the social impact on the habitat level of living. Moreover, industrial hemp would be an advantageous and viable substitute to its sister illegal drug plant in the agricultural industry.

E 1.6
DYNAMIC SOIL STRUCTURE INTERACTION – A CASE STUDY IN ALGERIA (BREZINA CONCRETE ARCH DAM)

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Abstract
The effect of the surrounding soil as depicted by the soil-structure interaction effect on the dynamic behavior of Brezina concrete gravity arch dam, located in El Beyadh at the west of Algeria, is investigated the present study. Both modal and transient analyses are performed for the dam which are presented and analyzed as a case study for this work. A three-dimensional finite element model (SOLID185) using ANSYS software is created to model the dam body and the adjacent soil. Three different seismic records having identical peak ground acceleration of 0.2g and assuming three different viscous damping ratios (2%, 5% and 10%) are used in the analysis. The results of this analysis are used to prepare a parametric study to understand the soil-structure interaction effect, the mass of soil foundation and the damping ratio on the dynamic behavior of Brezina concrete arch dam. Dynamic analyses for Brezina concrete arch dam for the three studied cases; dam without soil, dam with mass soil foundation and dam with massless soil foundation show that the presence of soil in the model develops more stresses in the dam body, specially when the soil mass is considered in the model. The parametric study shows that the stresses developed in case of dam with mass soil foundation are greater than their counterparts in case of the dam with massless soil foundation for all damping ratios. Also the parametric study shows that the damping ratio has no effect on the model with massless foundation, and has small effect on the model with mass foundation, where the stresses increase with the decrease in the damping ratio.
Keywords: Concrete dams, Inertial interaction, Kinematic interaction, Dynamic soil-structure interaction.

E 2.1

DOMESTIC STOVE BASED STEAM ENGINE FOR SMALL SUPPLEMENTAL POWER GENERATION

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Steam engines, while a thing of the past, may be feasible on a small scale were steam turbines are not. This is enhanced by the ability of such "external combustion engines" to burn virtually any fuel. Furthermore, steam engines are low-pressure devices that have fast responses and low operating speeds thus enhancing safety and durability. A simple steam engine was designed and built such that it could be used to supplement small power requirement in a rural house in Lebanon . The engine was run on wood fuel in a simple domestic stove. This may be assumed to be a renewable energy application so long as the wood is harvested in a sustainable scenario and the emissions are controlled – a matter to be considered in a future project. Basic design calculations gave an indication of the required parameters and an initial test run on the device showed reasonable results. The engine, which was retrofit in a portable manner to a rural stove, ran at about 230 rpm with a boiler pressure of about 3.5 bars. Ongoing work is underway in order to increase

E 2.2
STABILIZATION OF A CAR-CARAVAN COMBINATION USING INTEGRATED CONTROL

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Active chassis control has become a very important subject in the past twenty years through the use of electronic devices. Various control systems have been successively developed for the purpose of improving vehicle handling performance. Recently, significant researches have been reported on the integration of two or more controllers. These integrated control schemes all aim to improve vehicle handling and stability under severe driving conditions.

Most of these systems are available for single passenger cars, but not for heavier or complex vehicles, such as an articulated heavy-duty vehicle, or lighter vehicle configuration (e.g. passenger car-trailer combination). However, when driving a multi-unit vehicle the driver does not have enough information on the behavior of the rear unit(s), thus his/her action (steering, braking, acceleration) mainly depends on the actual state of the towing vehicle. From the forgoing , the stability problems of light and heavy articulated vehicles are in the center of interest of the vehicle dynamicists.

In this paper, different combinations of lateral force and yaw moment control have been proposed aiming at utilizing overall tire ability to maximize both stability limit and responsiveness of a car-caravan combination a) direct yaw moment plus active rear wheel steering (DYC+RWS), b) direct yaw moment plus active front wheel steering (DYC+FWS) and c) direct yaw moment plus active rear wheel steering plus active front wheel steering (DYC+RWS+FWS). The basic process of deriving combined control laws is as follow. A side-slip model response is given as a form of sliding surface of the control and a total lateral force required to follow the model response is calculated analytically using the first order lag type of sliding condition. In a similar way but using the model response of yaw rate a total yaw moment needed to follow the yaw rate model response is derived. It is essential to know the lateral force (L_y) acting at the hitch point to introduce the control laws. It is also essential to know the side slip angle for the control. Under the assumption that the lateral force (L_y) can be measured, the model observer is sued for the side angle estimation. The block diagram, which summarizes the main idea of the above control methods, are shown in the following figure.

The simulation model is composed of a 15-degree-of-freedom non-linear model with a brush type, combined slip tire model. The computer simulation results show that the influence of the combined control is significantly apparent.

E 2.3
ADVANCED ARTIFICIAL HAND

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Introduction

Advanced Artificial Hand was planned from several years for griping objects detected by sensitive fingers, and is based upon the original hypothesis for the development of a hierarchically controlled, myoelectric prosthetic hand. The aim for this paper is to propose an instrument that can be used in study of artificial hand. In the presence of the artificial hand, the command (opening and closing; rotation right and left) for this device is generated by the biological hand muscles (biceps and flexors).
In the past but not so far, controlling prosthesis was done with a programmed device which makes some steps only and cannot go forward in making the human's hand movement as if it is real.
Nowadays, the prosthesis allows the patient to hold objects by means of a three finger clamp using a biofeedback signal which is the EMG, and this had a huge revolution in controlling the prosthesis.

Methods and Materials

We concentrate on devolving the responsibility of grip adjustment from the user to the hand itself. The hand uses sensors, electronics and microprocessor technology to allow this adaptive device to maintain optimum grip (thereby ensuring that objects do not slip from the hand) under the jurisdiction of a state driven control system (which allows easy control of the prosthesis).
EMG card records and amplify EMG signal using two electrodes attached to the surface of the skin (Fig 1). The amplified signal enters the envelope detector to be rectified and converted from AC to DC, then continues to microcontroller to be processed, its result commands the motor controller that controls the hand. It includes 2 motors; one to open-close of finger clamps, the other is for rotation.

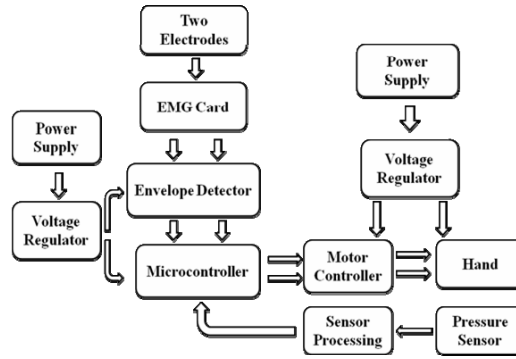

Figure 1 - Block Diagram

Results

The hand opens during contraction of bicep muscles, stops at a certain point, and it will not close unless we relax the muscle (Fig 2). During closure of the hand, sensitive clamp fingers detect for any object to be griped, thus the hand will not destroy it and so the object is safety griped. Moreover it rotates right during contraction of flexor muscles and left during relaxation, where each movement is rotated by 180 degrees.
By covering the myoelectric hand, it will be as a Natural Hand (Fig 3).

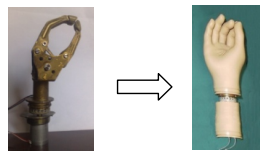

Figure 3 – Covering the Hand

Figure 2 - Hand Movement

E 2.4
FRACTOGRAPHY ANALYSIS OF FATIGUE CRACK GROWTH IN THE ALUMINUM ALLOY 2024 T351

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ABSTRACT
This work present metallography and fractrography analysis of aluminum alloy. Metallographic study showing the distribution of size grains in two orthogonal plans. This alloy is rolled and heated treated named 2024 T351, used generally in aeronautic structures. The metallographic examination is realized by polarized light microscopy. Fractography consist to the examination of the fracture topographies after fatigue test on V-notch specimen in four bending test in T-S direction. The fatigue test is led to a constant amplitude loading at R=0.1.
The examination in various areas of the rough surface is carried out on microscopic with electronic scanning (SEM). The study of these fracture topographies shows the various mechanisms developed during the fatigue propagation and the effect of the size of the grains on the direction of the striations. The final fracture revealed cups, which shown the aspect of ductility of this material.

Keywords: fatigue crack growth, aluminium alloy 2024 T351, metallography, fractography

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E 2.5

DESIGN AND MANUFACTURE INJECTION MOLDING DIE

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Mold making is an important sector in the precision engineering industry since molded parts represent more than 70% of consumer products ranging from computers, home appliances, medical devices, to automobiles, etc. While CAD/CAM technology has found a wide range of applications in the many areas of engineering, its applications to mold design and manufacturing have been relatively limited. This report, containing the methodology of our research and development of plastic injection molds: starts from researching the product to design and manufacture of the mold. It is hoped to promote the use of computer-aided injection mold design systems to stimulate greater Research and Development (R&D) efforts in this critical area.

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E 2.6

COMPARING BETWEEN THEORETICAL AND NANOINDENTATION INVESTIGATION OF EXCIMER LASER SURFACE MODIFICATION

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Abstract

The present work introduces a new analytical solution to predict transient temperature distributions in a finite thickness plate during laser surface treating. This analytical solution was obtained by solving a transient one-dimensional heat conduction equation with constant boundary conditions at the surfaces of the work piece. To calculate the temperature distribution in laser surface hardening processes, laser beam absorption, one of the most important parameters, should first be determined. It was extremely difficult to find an accurate value for laser beam absorptive. Therefore, in this work, absorption were calculated theoretically under various hardening conditions, including variations in hardened thickness as a variation in surface and subsurface temperature. Thereafter, to prove the validity of the model, a series of laser surface hardening calculations and experimental measurements were performed on AISI 304 austenitic stainless steel under various hardening conditions. The results were compared with the isothermal lines predicted by the proposed analytical model, owing to the simplicity of the solution method, the analytical model developed may be easily implemented for simulation work for analysis and prediction of laser surface hardening processes under various hardening conditions.

Key words: Excimer Lasers, nano-measurements, theoretical model, analytical solution, nano-indentation.

E 3.1

FAULT DETECTION AND DIAGNOSIS USING WAVELET DECOMPOSITION COMBINED WITH PARAMETERS ELIMINATION METHOD (PEM) AND RADIAL BASIS FUNCTION (RBF) NETWORKS

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The fundamental purpose of a Fault Detection and Isolation (FDI) method is to generate an 'alarm' when a fault occurs in the system being monitored and to pinpoint the source. The detection of faults is very important as these faults may pose a threat to the safety of the system so the detection becomes essential in order to improve the safety barrier. [1] Model-based techniques concern either the modeling of the process or the modeling of the signal. Methods in the first group require sufficiently accurate mathematical model of the process, then detect and isolate the faults that disturb the process, by comparing the data issued from the process itself, with the estimations provided by the mathematical model. Parity space approach, observers design and parameters estimators are well known examples of such methods. Methods in the second group require a modeling of the signal and are further investigated in our work. [2] The objective of our work is to detect and isolate the faults that occur in industrial machines using on-line monitoring methods based on wavelet decomposition, Parameters Elimination Method (PEM) and Radial Basis Function (RBF) networks. A monitoring method has been developed to detect and identify defaults or disturbances in industrial machines. A usual method is based on classification without decomposition technique: statistical parameters (variance, mean and moments of higher orders) extracted from the input signal applied directly to a Radial Basis Function (RBF) network for classification. The advanced method is based on wavelet decomposition combined with PEM and RBF network classification: the input signals are decomposed to approximations (low frequencies) and details (high frequencies). The extracted statistical parameters from approximation and detail signals pass through Parameters Elimination Method (PEM) to get rid from parameters that are useless for accurate classification. If a parameter is not affected by the variation of a default signal, it will be eliminated and then the remaining parameters are classified by an RBF network and classified using a supervised learning. The two above methods are applied on mechanical systems (Electric motors, gears, bearings and belts) and on a chemical reaction process (Tennessee-Eastman process) for ability test and to evaluate their performance in fault detection and isolation.

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E 3.2

A TWO-SIDED DIJKSTRA-BASED CONVOLUTIONAL DECODER

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In view of the current trend in the communication industry of using programmable devices to perform communication functionalities (in such as software-radio and software-defined radio architectures), we consider the class of convolutional codes and specifically the algorithmic problem of decoding such codes. With the flexibility of being able to use rather advanced algorithms and data structures, researchers have investigated the use of an A_ search [1] for example, or a "traditional" shortest path search that is based on Dijkstra's algorithm [2]. In this study we adopt the shortest path approach and extend the "lazy Viterbi decoder" of [2] to be better equipped to deal with burst-patterns of errors. More specifically, we adopt a modified *two-sided* Dijkstra algorithm that was studied in [3] in the context of routing in data networks. The algorithm is based on finding the shortest path between two vertices of a directed and acyclic graph by expanding simultaneously from both, the starting vertex and terminal vertex. We expect that the use of such an algorithm will decrease the number of "processed" or "expanded" vertices whenever the encountered channel results in errors that are bursty in nature. In addition to the potential benefit in terms of computational complexity (and therefore running time) of such an algorithm, we argue that the resulting memory consumption is also advantageous. As opposed to the single-sided approach which may require a large number of expansions of vertices, the two-sided one adopted here often requires a smaller number of vertices to be created and hence results in significant savings in terms of memory which is crucial to limited-memory devices. Accordingly, we judge the "quality" of our algorithm by the number of expanded nodes as this number encapsulates both, the running time and memory consumption of the convolutional decoder. The channel model We

consider the class of convolutional codes and the problem of hard-decoding such codes. The channel model is accordingly chosen to be a Binary Symmetric Channel (BSC). To account for error-bursts, we adopt a channel model with memory. More precisely, the cross-over probability of the channel during the nth transmission is equal to e whenever no transmission-error occurs during the previous (n − 1)th transmission and equal to d (typically larger than e) whenever an error occurs during the previous transmission.

Results

Several experiments with different testing scenarios have been performed. As a result, the twosided algorithm was found to expand around 27% less nodes than the single-sided lazy Viterbi. Naturally, these numbers depend on the block-length as well as the actual choice of the code.

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E 3.3

LOCATION BASED SERVICES USING GSM NETWORKS

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A location-based service is an information and entertainment service, accessible with mobile devices through the mobile network and utilizing the ability to make use of the geographical position of the mobile device. LBS services include services to identify a location of a person or object, such as discovering the nearest banking cash machine or the whereabouts of a friend or employee. They also include parcel tracking and vehicle tracking services, personalized weather services and even location-based games. One of the key issues to be addressed is the positioning technology itself, since providing a user's position accurately, reliably, and securely should be guaranteed if effective LBS are the goal. There two available positioning systems: the Global Positioning System (GPS), and the systems based on existing infrastructure (such as telecommunications). Due to many drawbacks that the GPS suffers from, and the advantages of GSM- based positioning systems. It is well known that GPS is the most popular radio navigation aid and has overtaken virtually all other forms of radio navigation aids because of its high accuracy, worldwide availability, and low cost. The major drawback of GPS is that at least three satellites must be visible to the GPS receiver. Thus GPS is not suitable in a densely populated urban area where the buildings could block the visible paths. It also fails to work in indoor environments. On the contrary, GSM signals can easily penetrate buildings; and, therefore, Cellular Geo-location technique or Mobile Positioning technique based on GSM has much merit

There are a variety of ways in which the position can be derived from the measurement of the signals, and these can be applied to any cellular system. The most important measurements are Cell Identification Technique, Nearby Cell Signal Strength-Independent Technique, Nearby Cell Signal Strength-Dependent Technique, Weighted Centroid Technique, Propagation Time Technique, Time Difference Of Arrival (TDOA), Carrier Phase Technique and Database Correlation Technique. But the existing GSM network in Lebanon cannot support these techniques since some data are not available.

On the other hand, the Fingerprinting Technique can be used, it utilizes signals that are already being exchanged in the network such as the received signal strength (RSS). This technique is the most suitable one in our case, for the facts that it does not suffer from the non-line-of-sight (NLOS) error and multi-path, unlike other techniques, it does not require the current height of the mobile user while positioning, it does not necessitate additional hardware in the infrastructure, and it has high accuracy compared to other techniques.

In general, the fingerprinting positioning technique consists of two phases: 'training' and 'positioning'. During the training phase a database of location fingerprints is established using measurements of RSS at many so-called reference points (RP). From the measurements the characteristic feature of the RP is determined, and is then recorded in the database. This process is repeated until all RPs are visited. In the positioning phase, the RSS is measured by the MU at a place where position is to be determined. The database is retrieved and the MU's 'fingerprint' data is compared to the 'fingerprints' of the RPs using an appropriate search/matching algorithm in order to identify the likeliest MU location.

According to this technique, the RSS was measured in Beirut – Central District at 100 reference points (RP), 50 meters apart. The collected data was logged into a database. The practical system consists of a GPRS modem, a microcontroller and a screen. The system was tested in Beirut with a good accuracy.

E 3.4
How much penalty for the wrong answer ?

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Extended Abstract

This paper addresses the problem of choosing the grades in multiple choice exams such that maximum classification (discrimination) and proper ranking (ordering) of students are achieved. The term multiple choice exams in this paper refers to any exam for which the evaluation to the answer of any question has one of three possibilities: Correct, Wrong and No-answer. WLOG we assume that the grades assigned to the three possible answers are whole integers : C marks for correct answers, W marks for wrong answers, and 0(zero) for no-answer. In addition, we made the following reasonable assumptions: $C > 0$, $W < 0$, and $|C| \geq |W|$. The first goal of achieving maximum classification (discrimination) was motivated by the following observation: In an exam consisting of n questions, there are a total of $\frac{(n+1)(n+2)}{2}$ possible answer patterns. Any answer sheet can assume anyone of these possible patterns. Let us consider a popular grading assignment: 2 for a correct answer, -1 for a wrong answer and 0 for no-answer. For simplicity let us assume n=5 then an answer sheet consisting of three correct answers, and two wrong answers gets a total score of 4; an answer sheet with two correct answers and three no-answers also gets the same total score of 4. In this paper we do not discuss which one of the two papers should get a better grade, this is left to the examiner to decide; we simply make the observation that due to number theoretical properties of the chosen grades (2 and -1 in this example) discrimination among certain answer patterns is no longer possible. We were motivated further after running a brute force program that generates all possible answer patterns, and computes the percentage of different total scores obtained (based on an input for C and W) relative to the total number of scores possible, and getting the following table:

[W = -1]	Percentage of Scores to Patterns		
n	[C = 1]	[C = 2]	[C = 3]
10	31.82%	45.45%	57.58%
50	7.62%	11.31%	14.93%
100	3.90%	5.82%	7.73%

In this paper we show that it is always possible to assign values for C and W such that different answer patterns end up with different total scores. In addition, we also show that it is possible to assign grades that enable maximum classification (discrimination) while at the same time achieving a given ranking (ordering) chosen by the administrator of the exam. The only constraint on the ranking(ordering) is that it has to be consistent with our assumptions mentioned in the first paragraph(as trivial examples: the answer pattern of all correct answers must be always ranked the highest and the answer pattern of all wrong answers must be always ranked the lowest in any ranking).

E 3.5

SECURITY OF MULTIMEDIA TRANSMISSION OVER INTERNET PROTOCOL

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The objective of this paper is to study the available security algorithms for multimedia transmission over the internet. The paper begins with an overview of transmitting Voice and Video over Internet Protocol. A survey of the existing security systems in the network such as: Firewalls, Network Address Translation (NAT), Virtual Private Network (VPN) is discussed. Selecting the appropriate security algorithms used for transmit Voice and Video over Internet Protocol, and making these algorithms flexible according to the need of each user are defined. Three programs using Visual Basic 6 for encryption and decryption based on: Advanced Encryption Standard – AES algorithm, Serpent algorithm, and Twofish algorithm are presented. A program using Visual Basic 6 for adding bit errors in files is also presented. Two materials: one for voice, the other for video, are selected and the different encryption programs are applied on these materials. By adding bit errors to the encrypted materials and decrypt them without using error correction a comparison between the original and the restored materials is performed.

Practical results are discussed and compared to the published results in the same area.

- For voice:
  - BER = 10^{-4}, the data has been completely dropout.
  - BER = 10^{-5}, 2/6 of data is recovered without error correction.
  - BER = 10^{-6}, the data has been completely recovered without error correction
- For video:
  - BER = 10^{-5}, the data has been completely dropout.
  - BER = 10^{-6}, 9/22 of data is recovered without error correction.
  - BER = 10^{-7}, the data has been completely recovered without error correction

The results have been taken from the average of 45 subjects:

Quality for Voice Over IP		
BER	Without Error Correction (Without FEC)	With Error Correction (FEC)
10^{-4}	Bad	Bad
10^{-5}	Fair	Excellent
10^{-6}	Excellent	Excellent

Finally a general conclusion on this work and the different suggestions for future work are presented.

E 3.6

Comparaison between different techniques in speech recognition process

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Speech recognition is the process of converting an acoustic signal, captured by a microphone or a telephone, to a set of words. The recognized words can be the final results, as for applications such as commands & control, data entry, and document preparation .Speech recognition is a vast and complex subject; It is really interesting to study the ability of understanding the full complexity and variations of a certain language. In this paper , three different methods for speech recognition will be presented.

Feature extraction which include the extraction of the features of different words and comparing between themin a training model .the three different coefficient : linear prediction coefficient (lpc) ,linear prediction cepstral coefficient (lpcc) ,Mel frequency Cepstral coefficient(MFCC) .

Artificial neural network (ANN): An artificial neural network(ANN) is an information processing paradigm that is inspired by the way biological nervous systems, such as the brain, process information. An important application of neural network is pattern recognition. it can be implemented by using a feed forward neural network that has been trained accordingly. we conduct NN by first trying to deduce the essential features of neurons and their interconnection. we then typically program a computer to simulate these features .LPC parameters are the feature vector for any speech they can be used to be compared with the target vector then compute the mean square error and according to this error we will make training for the network by changing the weights.

In case of Hidden Markov Modal(HMM): One of the effective ways to study a certain language and use that study in speech recognition is HMM (Hidden Markov Models). Now a natural language often ex-

hibits significant structure, The initial part of a message often greatly influences subsequent events. Such a stochastic process can be described by a j^{th} order Markov process, in which the current event depends only on the j most recent events which is the Markov property. In a Hidden Markov Model the observation attached to a certain state corresponds to an output probability distribution instead of a deterministic event. The underlying stochastic process, the proposed state sequence, is hidden; we can only observe it through another set of stochastic processes that produce the sequence of observations. Probabilities are obtained from Arabic speech material of newspaper, comparison between the best method of recognition will be presented

E 3.7

THE ELECTRICAL POWER NETWORK IN OMAN AND THE NEED FOR FACTS

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Abstract

The Sultanate of Oman has been playing a pioneering role in the strategy of electricity de-regulation and privatisation in the gulf countries and the Middle East. The Sultanate has set a goal to privatise all state-owned companies in the power sector by 2009 which is considered to be the right environment for the implementation of Flexible AC Transmission Systems (FACTS) technology. This paper firstly presents an overview of the status of the power network in Oman that highlights the currently undergoing major projects such as the Gulf Co-Operation Council (GCC) electricity grid interconnection system and the new strategy of electricity de-regulation. The paper also sheds the light on the hurdles that confront the Omani power network such as blackouts and voltage stability problems. Secondly, this research work proposes various methods that will help to improve the power quality and ensure an interruptible power supply in the network of the Sultanate such as investigating the need for such innovative technology of FACTS.

Introduction

The power industry in Oman is flourishing as a result of the modern renaissance and the recent growing steps towards development and evolution. However, frequent blackouts and voltage stability problems face the quality of the Omani power network at the generation, transmission and distribution levels. The richness in energy resources in the Sultanate, such as oil, natural gas, nuclear, solar and tidal, ensures the abundance of power generation. One of the major undergoing projects is the Gulf Co-operation Council (GCC) electricity grid system interconnection that is viewed as the backbone of the power reform in the GCC states. On the long run, the expected promising success of this huge project will create the possibility of a common GCC electricity market, which will definitely benefit the participating GCC countries.

Advances in silicon sciences have produced breakthroughs in computing and communications. These same advances have also produced high power electronic devices that could be applied to electrical power transmission systems. Flexible AC Transmission Systems (FACTS) devices is one of the new technologies emerging from research laboratories that offer the potential of revolutionising the way electrical power is transmitted and delivered to utility customers. Due to its enormous advantages, this technology is attracting the attention of electrical power researchers worldwide since 1988.

In this research work, FACTS technology is explored and the options of implementing this technology on the transmission level in the Sultanate of Oman, based on the current status of the power network, are investigated.

The paper also provides an overview of FACTS devices and offers solutions for the economical obstacles that always deterred the progress of this technology worldwide and specially in Oman. Moreover, the paper proposes various steps to be considered in order to impove the power quality of the Omani power network and offers recommendations for whether FACTS devices are crucial for the power network in the Sultanate or not.

E 4.1

PERFORMANCE OF VIDEO COMPRESSION & TRANSMISSION OVER IP

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Compression is a way of expressing digital audio and video & images by using less data than those required for the uncompressed materials. It is a technique used to trade off quality and error tolerance against bit rate. The basic compression standards are JPEG and MPEG. JPEG (and JPEG 2000) is associated with still digital pictures, whilst MPEG, Motion JPEG and Motion JPEG 2000 are dedicated to digital video sequences. Compression invariably decreases picture quality, but if done well, many effects and artifacts that it introduces are not noticeable. Application concerning this technology varies from broadcast –high- quality services such as terrestrial & satellite transmission, storage, non linear editing down to internet streaming …& *Data exchange for compressed video over IP networks …..*

Video transmission between distant sites is one of the main applications, needed by broadcast companies, as for example transferring video signals with acceptable quality between offices of a TV station in different regions of the world, or transferring live video signals files from field to main stations. The internet network, which covers the whole world now, may be the right medium for such applications.
This paper covers mainly the video compression using MPEG-4 standard, which is one of MPEG (Motion Picture Expert Group) standards used for video compression for variety of applications. The goal is to compress the high bandwidth SDI signal, 270Mb/sec. to a few Megabits in order to deliver the signal over existing IP networks.
In the applied tests different bit rates of H264 codec (MPEG-4 part 10), to compress a raw digital video signal with bit rate of 270Mb/s, are examined. Then by monitoring the received signal as quality versus bandwidth used and comparing the results the optimum needed results will be reached. Note that this experience is done for the benefit of TV stations, and studio applications, hence the resolution, aspect ratio, format must be within a certain standard for example (720 x 576 pixels , 4/3 or 16/9 , PAL/ NTSC…) , so that the received signal can be reused for further broadcasting. It was noticed that compression rate of 1M b/s is useful for news application where a journalist is reporting from a field, where as bit rate between 2M-2.5 Mb/s, is very practical for interview application, as there are only limited motion in the picture, but for sports and speed actions, the bit rate has to be increased to 4 Mb/s, to avoid pixelarization.
The Delay decreases as the bit rate increases, being maximum at 300 Kb/s and minimum the 6 Mb/s. but it is very important to note that with all bit rates except 300kb/s, we had a live continuous stream with certain difference in quality between different bitrates.

The results had showed clearly, that this type of communication and data transmission is safe and cheaper for use for application in TV world, as it was only used for consumer purposes, saving thousands of dollars than using the conventional way of satellite system for video transmission.

E 4.2
NOISE MEASUREMENTS IN BEIRUT

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Noise in Beirut has become a major issue to be dealt with. Among many causes of it are traffic jams, continuous use of car horns by taxi drivers and even by regular people at traffic lights along with building workshops and their active equipments during the day and the night. As for the evening, restaurants, coffee shops, and pubs made a major role in increasing the noise levels. All this noise is kind of pollution known as "Noise Pollution".

Despite the fact that our capital is small and not one of the most crowded cities in the world, it has crossed in many areas the level set by the World Health Organization by 70 dBA, and recorded the highest levels human may undergo.

And since the residential areas were not isolated from the street noise, this makes human exposed to the same street noise level. In other meaning, it has crossed what is stipulated in the European Standard Specifications, which considers that the noise level inside must not exceed 50 dB in the morning, and 45 dB during the evening.

Noise levels were measured in every area in Beirut. It has reached its highest level in Ain el Tineh, with an average of 79.2 dB, and its lowest level 61.2 dB in the area around New TV in Wata Al Mousaitbeh. These measurements are obtained by students in BAU in the Electrical Engineering Department.

E 4.3

IMPLEMENTATION AND TESTING OF SURROUND SOUND SYSTEM

PROF. ONSY ABDEL ALIM, DANA KIBLAWI

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A surround sound system in a certain place can be a dream to reach when it requires destroying the ability of people to localize the sound so they can feel it, as in music concerts for example. The aim of this paper is to implement a surround sound system; a place where listening to any sound, will certainly make any listener perceive it. Moreover, sound illusions where a person will localize the sound while listening to it using speakers, as in hearing the sound in real life.

The task of a main experimental approach for the surround sound was to determine the angle of aperture of more than one speaker radiating simultaneously. The test person stands in the middle (center) of the hemisphere; the light of the room is turned off so that the person has no ability to distinguish the second sound source by sight and to concentrate more on the sound. In this experiment, switching the two speakers in a way that both are on and separated by 180 degrees, then fixing one of the speakers and start moving the other towards the fixed one while the test person follows the moving speaker depending on the hearing sense, different angles of aperture, due to hearing the two sources as one, were noticed. These angles are depending on the different hearing ability of the test persons.

Based on this experiment, the surround system installed in the anechoic chamber in EE Dept. Faculty of Engineering, BAU on a hemispherical cage was able to create a 3-D surround sound system. Dolby 7.1 design is the same as the proposed design, thus the system is working properly.

Since the delay factor was not realizable by the software, electronic (hardware) delay can be modified with two multiplexers in order to create the illusion of a moving sound around the listener.

E 4.4
ADAPTIVE LMTS SYSTEM UNDER PERFECT CHANNEL ESTIMATION

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Targeting high transmission rate and low complexity, **L**ayer-controlled **M**ultiple-input multiple-output **T**ransceiver **S**cheme (LMTS) for wireless systems with an equal number of transmit and receive antennas is developed. It is named Layer-controlled since the LMTS differ from each other by their layer length or, equivalently, the total number of channel uses for the D-BLAST codewords. Accounting for error propagation across layers, we show that not all layers should be necessarily encoded as the other layers. In addition to retaining most advantages of LMTS, an optimized LMTS is proposed. This optimized scheme offers flexibility to tradeoff among transmission rate, performance and complexity. The optimized proposed LMTS possesses better performance than ZF-VBLAST for (3bps/Hz) spectral efficiency. The improvement in dB is 5dB at a target bit error rate (BER= 10^{-3}). So, LMTS arise as a solution to jointly achieve spatial multiplexing and diversity gains. With LMTS, it is possible to considerably increase the data rate while keeping a satisfactory link quality in terms of bit error rate (BER).

Since the optimized scheme suffers from a slightly higher complexity than the other schemes, Adaptive MIMO Switching (AMS) is use. AMS is a scheme to switch between different LMTS modes to maximize spectral efficiency with no reduction in coverage area. In an adaptive LMTS switching system, the system at the transmitter side is adapted to the changing channel conditions through link adaptation techniques that can track the time-varying characteristics of the wireless channel. The goal is to maximize the resources available in multiple antenna channels by using optimal schemes at all time with a trade-off between complexity and BER performance. In this paper, adaptation is made among the optimized LMTS and other schemes. Feedback control bits are used at the receiver to make the transmitter select one of the modes. For simplicity, adaptation is done under perfect CSI.

The channel matrix **H** is changed every block. So, adaptation is made every each block. At the receiver side, *Eb/N0* (dB) is measured to decide which mode will be selected at the transmitter side. Selection mode is done at the transmitter side by using feedback control bits. In our system we have to adapt between the five modes L4-BLAST, V2-BLAST, V1-BLAST, V-BLAST and No-Transmission so we need three bits to define each mode. Feedback control-bits is employed to choose which scheme is to be used. Feedback control channel has a low rate, so we can assume that the communication over that channel is error free. Since the data rate is low, we can employ a strong channel coding technique to protect the feedback control bits.

E 4.5
AN OPTIMIZATION TOOL FOR UMTS RADIO NETWORK PLANNING WITH POWER CONSTRAINTS

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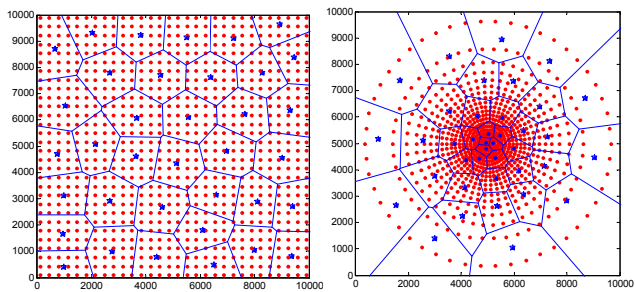
With the prevailing transition to UMTS networks worldwide, the development of sophisticated algorithms and tools for optimized network deployment is important. In this work, we address the problem of finding the optimal deployment of UMTS base stations (BSs) in a certain geographic area with a given user distribution to minimize the total transmitted power while maintaining a satisfactory level of downlink signal-to-interference ratio (SIR) for all users.

The addressed problem is composed of continuous and integer components. The continuous component involves finding the optimal BS locations given a fixed number of BSs in the area of interest. We model the continuous problem as a constrained optimization problem with the BS locations as decision variables and the powers allocated to their assigned users as state variables. An algorithm is proposed and implemented using mesh adaptive direct search (MADS) and augmented Lagrangian pattern search (ALPS). On the other hand, the integer component of the problem is a combinatorial optimization problem which involves finding the minimum number of BSs given fixed candidate BS locations. The selected set should cover the area of interest and satisfy the SIR constraints for satisfactory performance. While this problem is combinatorial in nature and computationally hard, we devise an efficient algorithm based on successive elimination of BSs in order to obtain a minimal BS set. Additionally, the integer and continuous optimization components are combined to achieve a generic algorithm that is particularly useful when the initial BS set is in excess for the required target quality performance. Sample results are shown below for uniform and Gaussian user distributions (BSs are marked as stars and users are marked as dots). It can be seen that the optimal number and locations of BSs highly depend on the user distribution inside the area of interest.



Acknowledgements: This work was supported by The National Council for Scientific Research – Lebanon (CNRS Grant).

E 4.6
REAL TIME PCR FOR SPECIFIC DETECTION AND QUANTIFICATION OF ZEARALENONE PRODUCING *FUSARIUM GRAMINEARUM* AND *FUSARIUM CULMORUM*

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Abstract

Zearalenone (ZEA) is a polyketide mycotoxin produced by some species of *Gibberella*/*Fusarium*, especially by *Gibberella zeae* and *Fusarium culmorum*. ZEA is a major concern because it has estrogenic activity and can be a significant contaminant of maize, barley, wheat, and other cereals. It causes hyperestrogenism and reproductive problems in experimental animals and livestock. Early detection and control of ZEA producing species is crucial to prevent its entering the food chain and a useful tool in disease management practices. In this study, we developed a real-time PCR conjugated with SYBR® Green I dye for the direct detection and quantification of *F. graminearum* and *F. culmorum* based on primers targeting the gene encoding polyketide synthase (PKS) involved in ZEA biosynthesis. This study is the first reporting on the molecular detection and quantification of ZEA producing fungi.

Keywords: *Fusarium graminearum*, *Fusarium culmorum*, Zearalenone, real-time PCR, polyketide synthase gene

E 4.7

A New Arabic Keyboard Layout Based on Ergonomic Criteria

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Most existing keyboards layout is not designed in an optimal way which significantly influences the user's comfort and typing speed. It is even more difficult to use them if the text language is not based on the Roman alphabet. The Arabic language is a very good example, with repetitive muscular injuries emerging and the amount of text to be treated increasing, the need for a better Arabic keyboard arrangement has come forth. To solve the problem, a new design of the Arabic keyboard for convenient typing and effective use is proposed. The design is based on the ergonomic criterion which is used to evaluate and compare different keyboards. This criterion is a mathematical formulation of keyboard optimality in terms of the distribution of the typing effort among the ten fingers, accessibility of commonly used keys and various other factors.

The optimization problem can be presented in a standard optimal design problem form as follows;

Given: Arabic characters of 34 letters with their monograph and diagraph frequencies, the standard Arabic keyboard. This is created based on the holy Qura'an.

Find: $x_i ; i = 1:34$ where x_i represents the index position of the letter i in the keyboard.

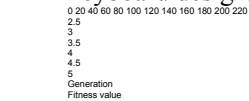
To Minimize:

$$f(x) = \sum_{j=1}^{6} \gamma_j \left(v_j - v_{j,ref} \right)^2$$

Subject to: x_i is integer and $1 \le x_i \le 34$

where $v_j \left(1 \le j \le 6\right)$ are the six optimization criteria (v_1= Load Distribution, v_2= Key Number, v_3= Hand Alternation, v_4= Consecutive usage of the same finger, v_5= Avoidance of big steps, v_6= Hit Direction), $v_{j,ref}$ is the reference keyboard (the current keyboard) and γ_j is the multiplying by a relative weight coefficient.

The study describes a Genetic Algorithm based optimization framework used to find a new keyboard design for the Arabic language. The iteration to reach the optimal solution using Genetic Algorithm is shown in Figure 1. Figure 2 shows the new optimal design of the Arabic keyboard layout. The proposed optimal design is better than the existing keyboard designs with 36.3% total improvement in the ergonomic criteria.



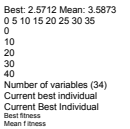


Figure 1. Evaluation of the optimal solution for 220 generations and 2000 population.

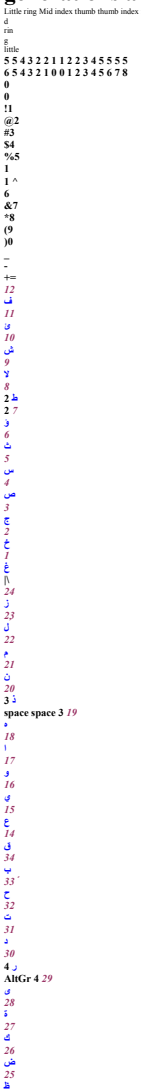


Figure 2. The new optimized arrangement for Arabic language keyboard

POSTERS PRESENTATIONS

MATHEMATICAL MODELLING OF ATHEROMA PLAQUE DEFORMATION

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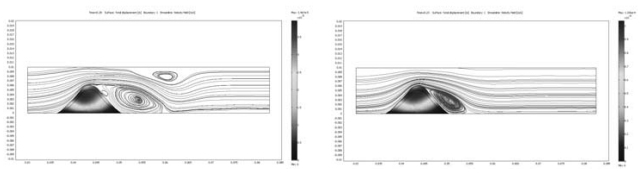
Abstract: The development of atherosclerosis leads to the formation of an atheroma plaque which takes place in the artery. This plaque is composed of two parts: a lipid deposit and a fibrous cap. This fibrous cap covers the lipid deposit and isolates it from the blood flow. The blood flow which circulates in the artery modifies the geometry of the atheroma plaque and can cause dangerous effects as the rupture of the plaque and liberating solid parts which can block the blood circulation. The problem is modeled as a fluid-structure interaction between the blood and the plaque.

Mathematical model The model's geometry is composed of a rectangular domain representing the artery which contains the plaque. We consider two cases for the blood model: a Newtonian fluid with constant viscosity or a non-Newtonian fluid. The blood flow enters the artery by the left side with a Poiseuille profile and exits by the right side. Both parts of the plaque are modeled with the hyper-elastic Mooney-Rivlin model. The fluid viscosity is modeled by the Carreau law. In the Carreau law, the parameter n describes the properties of the fluid: n=1/3 takes into account the non-Newtonian aspect and n=1 corresponds to the Newtonian fluid.

Equations The fluid is governed by the Navier-Stokes equations: $\rho_F\left(\frac{\partial u}{\partial t}+u.\Delta u\right)+\Delta p=\nabla.\sigma_F+f_F$, $\nabla.u=0$. Carreau's model of viscosity: $\eta=\eta_\infty+(\eta_0-\eta_\infty)(1+(\lambda\dot{\gamma})^2)^{(n-1)/2}$ where $\dot{\gamma}$ is the shear rate. The two parts of the plaque are governed by the Mooney-Rivlin model for hyper-elastic materials where the displacement energy w is given as: $w=C_{10}(I_1-3)+C_{01}(I_2-3)+\frac{1}{2}\kappa(J-1)^2$, where I_1 and I_2 are the first invariants of the Cauchy tensor, κ is the bulk modulus and J is the jacobian of the Cauchy tensor. Two formulations for the initial condition on the left boundary are used, the first one is a constant function with a Poiseuille profile and the second one is a function of time t: $U_{in}=4U_{max}t^2/\sqrt{(0.04-t^2)^2+(0.1t)^2}$ with $U_{max}=0.1$ to 0.4 $m.s^{-1}$. We note that the geometry of the domain changes in time. Therefore the numerical mesh should be adapted to it. Comsol Multiphysics controls the moving geometries and moves the mesh distribution with respect to the geometry change by using the **ALE** application (Arbitrary Lagrangian Eulerian).



Results We simulate the model using Comsol Multiphysics. After a short time, we can see that equilibrium takes place. Note that each simulation was performed for four seconds. The blood flow creates some vortices at the beginning of the simulations. The number of these vortices depends on the initial velocity. The presence of the vortices can influence the blood coagulation. Fluid-structure interaction can also result in the plaque rupture which is the most dangerous from the clinical point of view.

Impedance spectroscopy of the ions diffusion in fiber reinforced cement-based composites

ABSTRACT

A new method was proposed based on impedance spectroscopy, in order to determine chloride diffusion coefficients for fiber reinforced cement paste composites. The measurements of impedance was performed in the frequency range 1Hz up to 10^6 Hz. The determined diffusion coefficients agree with those reported in the literature and those obtained using traditional diffusion and migration tests. It was found that the paste samples reinforced with copper have less diffusion coefficients than that reinforced with slag. The porosity for conductive copper fibers and nonconductive granules of slag reinforced cement paste composites samples was determined. The overall porosity is less for samples reinforced with copper fillers. Electrical parameters, such as conductivity, permittivity, and electric modulus were reported and an equivalent circuit models were proposed

Resonant Mode Suppression in a Vibratory System: Application to Earthquake Engineering

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ABSTRACT

This paper presents a method for the suppression of a resonant mode in a damped single-degree-of-freedom system under the action of a general periodic force using Fourier series. The method is based on identifying the dominant mode in the Fourier series expansion of the system response and removing it by loading the system with a new force made up of the original force minus the dominant component suspected of causing the system to attain a resonant state. The method thus presented can be useful in the design of a device, such as an actuator, capable of reacting to an earthquake by identifying the resonant component of the seismic (excitation) force, and applying a load on the structure to counter the destructive effect of the seism and mitigate the damage. A case study is treated to illustrate the application of the method to a framed structure.

MATLAB SIMULATION OF SISO, MISO, SIMO & MIMO SYSTEMS USING SIMULINK

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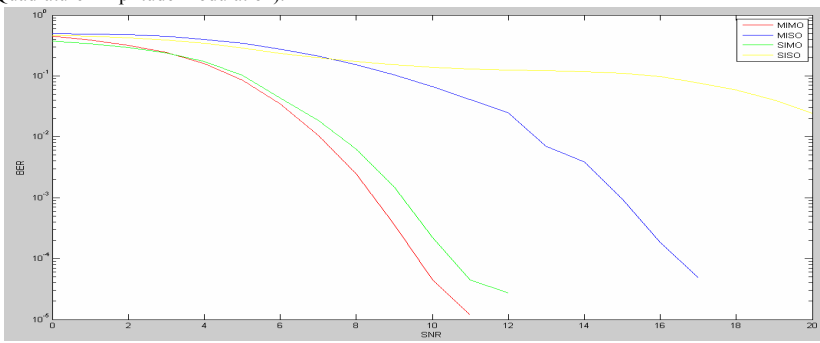
Since the beginning of wireless systems, the main problem was to achieve high data rates without compromising the quality of the reception. Recent studies have shown that multiple antennas with appropriate signaling techniques can increase the capacity of the channel, so MIMO systems began to take place as a promising solution of the opposed problem. The core idea of MIMO is to use multiple antennas both for transmission and reception. This increases the capacity of the wireless channel. Hence the basic idea is to develop codes and schemes that would enable systems to approach their Shannon capacity limit.

Four systems are simulated with Simulink which is software package integrated in MatLab that models: SISO (Single-Input-Single-Output) is the traditional communication system, where single antennas are used at the transmitter and receiver. MISO (Multiple-Input-Single-Output), has multiple transmitting antennas and a single receiver antenna. It provides an increase in the array gain. SIMO (Single-Input-Multiple-Output), where a single transmitter and multiple receivers are used. It provides an increase in the array gain at the receiver by combining the data at the different receivers. We have modified the SISO system to obtain the SIMO model. MIMO (Multiple-Input-Multiple-Output) where multiple antennas are used at the receiver and transmitter. It increases the array gain at both the transmitter and receiver. We have combined the ideas of the MISO and SIMO systems to come up with the MIMO model.

We have varied the values (initial seed) of the fading channels in the four systems, and then by changing the SNR value of the AWGN block, we can get the BER value in the BER Display block. The following figure shows the result for **16 QAM½:** (Quadrature Amplitude Modulation).



The results have shown that MIMO system performance is much better than the other systems. SIMO system is better than MISO system because in SIMO channel estimation is less complex than in MISO system. We have also noticed that at higher modulation options MIMO and SIMO systems became very close to each other, but at high SNR values the MIMO system is always better than SIMO. So we have demonstrated the significance of MIMO as the most efficient and reliable system to use.

PARAMETRIC STUDY OF PLANAR INVERTED-F ANTENNA (PIFA

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Compact antennas have been the center of much research interest because of the rapid progress in wireless communications. The low profile, light weight and low fabrication cost make microstrip antennas very attractive for wireless communications. The size of the microstrip antenna, however, may cause inconveniences for wireless applications at the lower microwave frequencies. To reduce the microstrip antenna size, a potential candidate is the planar inverted-F antenna (PIFA), which is a modified form of the microstrip antenna. The PIFA is a quarter wavelength shorted patch, which consists of a finite ground plane, a top radiator, a feed and a shorting mechanism that shorts the top radiator to the ground plane.

In this paper, the effect of physical parameters of this antenna are investigated. We have studied the effect of the patch height above the ground plane (which represents the thickness of the substrate), slot length, slot width, width of the short circuit plate and ground plane dimensions on different designs to get optimum performance of the PIFA element.

Different PIFA designs, as simple PIFA element (without slots), L-shaped slot PIFA, U-shaped slot PIFA and V-shaped PIFA are studied.

The proposed antenna designs and performances are analyzed using Ansoft High Frequency Structure Simulator (HFSS). These results are very useful in the design of PIFA Antennas

Dependence of backgating on the type of deep centres in the substrate of GaAs FETs

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Abstract—The reduction of the conductance of GaAs FETs by a negative voltage applied to the substrate, termed backgating or sidegating, is numerically modelled to clarify which type of traps is responsible. Modelling is carried out for several sets of deep levels in the substrate. It is observed that deep acceptors are mainly responsible for backgating independently of the shallow level type in the substrate. In this case there is no threshold. When deep donors are present in the substrate, it is observed that backgating is reduced and there is a threshold. The presence of a buffer layer between the channel and the semi-insulating substrate also helps in reducing backgating**.**

Watertight Concrete Construction in Hydraulic Structures

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Abstract

Watertight concrete is achieved by a combination of good materials, good workmanship and attention to detail both in the design office and in site. This paper aims, to highlight the factors which a designer should consider when preparing a design for a watertight structure (tanks, dams and other hydraulic structures) and the practical problems which must be foreseen by those on site concerned with the superposition and actual construction. Particular attention is given to the selection of concrete materials (cement, aggregates, concrete quality and admixtures), and exposure conditions. Previous test results on this area were studied and analysed and conclusions were made. Design provisions and crack control for thermal and moisture movements for ground slabs, walls, roof slabs and joints (sliding, horizontal and vertical joints) are highlighted. Methods of construction that include joint preparation and curing are also presented. Joining materials such as waterbars, sealant and joint filler are also emphasized.

Keywords: Watertight, Concrete, Workmanship, Construction.

FPGA Implementation of Ternary Inverter

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The FPGAs (Field Programmable Gate Arrays) approach for ternary logic mplementation provides flexibility in programmable systems. VLSI ternary logic chip design suffers from the limitation in time and cost. With ternary logic design, FPGAs provides high speed and small size for real time applications more than that of the VLSI design. This paper presents new hardware implementations of ternary logic problem using Xilinx FPGA. Multiple-Valued Logic (MVL) has been possible alternative to binary logic. The binary logic is limited to only two states '1' and '0', where as MVL is a set of finite or infinite number of values with a system having a radix greater than 2. Ternary logic has better accordance with human informal thinking. Unfortunately, the modern researches of the multi-value (non-binary) logic are formal and are not associated with practical requests. In this paper ternary logic system is introduced .We will use the values {0, 1, 2}, which means true=1, false=2, and "may be true may be false"=0. The output of the inverter in ternary logic can be defined as the ternary complement of the input signal. Then we discuss FPGA versus ASIC ternary logic showing some advantages and disadvantages. This paper proposes Ternary inverters that are implemented on FPGA using VHDL code and Xilinx simulators. Finally major results from the paper are summarized as a conclusion.

ON SCHEDULING IN REAL-TIME SYSTEMS WITH RECHARGEABLE BATTERIES

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ABSTRACT

The performance of power-manageable hardware resources (such as processors and memory) has increased at the expense of increased power consumption. The increased power consumption not only reduces the operation time for battery-powered embedded systems (such as PADS and laptops), but also increases the sophistication/cost of the cooling infrastructures for dense clusters (such as web servers).

Many of these systems, in fact, are powered by *rechargeable* batteries and the goal is to execute the real-time tasks at the same time the battery is recharging during rechargeable periods and to rely entirely on the battery energy when system cannot recharge so as to extend the autonomy of the system as much as possible.

Moreover, all the previous research work focus on minimizing the energy consumption or maximizing the system reliability. Two techniques have been used to perform these objectives: dynamic voltage scaling or dynamic power management. This work have disregarded an important aspect of these devices, namely rechargeability of the batteries or have assumed that there will be a interval in which recharging is done that will suffice for generating enough energy for all applications being run in the embedded device. On the other hand, sometimes the recharging systems (e.g., solar cells) have specific recharging characteristics that might provide more or less energy than the consuming applications. Several studies have explored the problem of scheduling real-time tasks in a monoprocessor rechargeable system. However, few of them extend the work to multiprocessor systems.

This paper summarizes the state-of-art research results of periodic uniprocessor and multiprocessor rechargeable systems with a full analysis about the previous work and the future work.

FOUR-QUADRANTS FOUR TRANSISTORS SYNAPSE CURRENT-MODE ANALOG MULTIPLIER

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ABSTRACT
Neural networks are particularly attractive for CMOS VLSI implementation as each parallel element (neuron or synapse) is relatively simple, allowing the complete integration of large networks on a single chip. Moreover, Neural Networks are most efficiently implemented by asynchronous analog circuits because they are generally faster and require less hardware (lower transistor count) than digital VLSI implementations. In this research, a new implementation of CMOS four-quadrants analog synapse multiplier circuit for multi layer perceptron neural networks will be proposed. The proposed multiplier is composed of only four transistors and it will multiply two input current and produces an output current. The multiplier circuit consists of ten transistors; but only four of them will be implemented inside the synapse, while the others will be implemented inside the input and the neuron. The main characteristics of the proposed circuit are the small silicon area and the low power consumption. A comparison among some other multipliers will be presented.

Key Words:

Analog multipliers, Analog signal processing, Neural Networks, Synapses, CMOS VLSI implementation.

ONLINE CONTROL OF TERPOLYMER PROPERTIES IN STYRENE/ METHYL METHACRYLATE/METHYLACRYLATE TERPOLYMERISATION REACTOR

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An advanced model based control strategy was developed to ensure real time optimal operation of the emulsion terpolymerisation reactor. Linear multivariable constrained model predictive control was developed and implemented for enhanced operation and product characteristics such as the particle radius, average molecular weight and terpolymer composition and the process conversion. To achieve this implementation, novel generic multilayer control architecture for real-time implementation of optimal control policies for particulate processes was developed. A mechanistic dynamic model for emulsion terpolymerisation, developed in our previous work, is used as a real-time soft-sensor. The methodology was developed within a gPROMS-API-DCS environment allowed real-time implementation of model-based control of the process. The optimal control problem was implemented via an interface to a dynamic optimization code. Case studies involving manipulation of flow rates of monomers (styrene, MMA, MA), surfactant and initiator, and the reactor temperature were performed for process control investigation. Although some offsets were observed with a degree of model mismatch, the experimental results agreed well with predictions.

Keywords: Emulsion terpolymerisation; Dynamic model; Model predictive control; Soft sensor; Terpolymer composition; Average molecular weight; Particle radius.

DESIGN OF A SINGLE POLARIZATION FIBER WITH ZERO POLARIZATION-MODAL DISPERSION

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Abstract
The geometrical birefringence of an elliptical-core optical fiber is calculated using a dual effective index method. The polarization-mode dispersion is also obtained as a function of the core ellipticity and the relative refractive index difference between the core and the cladding. It is predicted that a high geometrical birefringence . 10-4 can be obtained for fibers with high core ellipticity and having a large relative-index difference. A novel design for a high birefringent fiber with nearly zero-polarization-mode dispersion is presented taking into account both material and geometrical birefringence. In that design the normalized frequency, the core refractive index, the relative refractive index difference, and the core ellipticity are calculated to match the conditions of zero polarization dispersion

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A contribution to 3D modeling of manufacturing tolerance optimization

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ABSTRACT

The study of the generated defects on manufactured parts shows the difficulty to maintain parts in their positions during the machining process and to estimate them during the pre-process plan. This work presents a contribution to the development of 3D models for the optimization of the manufacturing tolerances. An experimental study allows the measurement of the defects of part positioning for the determination of and the choice of an optimal setup of the part. An approach of 3D tolerance based on the small displacements method permits the determination of the manufacturing errors upstream. A developed tool, allows an automatic generation of the tolerance intervals along the three axes.

Keywords: Modeling; Manufacturing Tolerance; 3D

Watertight Concrete Construction in Hydraulic Structures

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Abstract

Watertight concrete is achieved by a combination of good materials, good workmanship and attention to detail both in the design office and in site. This paper aims, to highlight the factors which a designer should consider when preparing a design for a watertight structure (tanks, dams and other hydraulic structures) and the practical problems which must be foreseen by those on site concerned with the superposition and actual construction. Particular attention is given to the selection of concrete materials (cement, aggregates, concrete quality and admixtures), and exposure conditions. Previous test results on this area were studied and analysed and conclusions were made. Design provisions and crack control for thermal and moisture movements for ground slabs, walls, roof slabs and joints (sliding, horizontal and vertical joints) are highlighted. Methods of construction that include joint preparation and curing are also presented. Joining materials such as waterbars, sealant and joint filler are also emphasized.

Keywords: Watertight, Concrete, Workmanship, Construction.

Automatic System of Human Face Detection and Recognition Using Haar Wavelet Transformation With PCA

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Abstract: Human Face Detection and Recognition consists of five steps. 1st step: Input image decomposed using "Haar Wavelet Transformation" and reducing redundancy. 2nd step: "Facial Edge Detection", in this step convert all elements of the sub-bands HL and LH are into binary and mixing by NOR operation. The result image is partitioned into blocks, the size is 8x8 pixels by selecting ≥ 8/64 as an edge block. Finally, "Facial Edge Block" is yielded by matching between edge block and special type of mask called "T-Ship Mask". This stage use a T-Shape mask to the process of this mask, and matching in the output of previews of secondly stage by some condition. Target areas were successfully reduced to less than 20% of the entire area of edge image on average.3rd step: called symmetry axis detection, is narrows down face areas further using "Gradient Orientation", and identifying the face location from image by make a horizontal vector divide matrix of human face image.4th step: face detection, this step is restrict face like areas by "Tamplet Matching". 5th step: face recognition, in this step we determined the best face location in the face like area and identify the face using the principal component analysis (PCA). The performance of system is tested by using more than 300 images with different background and illumination angle of human faces.

Keywords: *Wavelet transform; Edge detection; Symmetry detection; Face detection; Face recognition; Template matching; Correlation; Principal component analysis.*

Introduction: As continual research is being conducted in the area of computer vision, one of the most practical applications under vigorous development is the construction of an automated face recognition system. With the recent major terrorist attacks to world there have been increasingly substantial interests in the developed systems, that can automatically detect and recognize known criminals as well as suspicious characters, so that humans began to seek support from computer systems to aid in the process of identification and location of faces in every day scenes.

The solution to the presented task is performed by face recognition system. The problem of recognizing faces under gross variations remains largely unsolved, in other words it may change its appearance because of facial expression, beards , mustaches, hair styles, make-up, glasses, aging, surgery,…..etc, as shown in Figure 1. In addition to these internal variations, consider the external distortions such as scale, lighting, position, tilt and orientation of the face, It should be also noted that a complex background in an image makes it far more difficult to locate faces and facial features. Therefore, it is always necessary for an automatic face recognition system to set some constraints on input images.

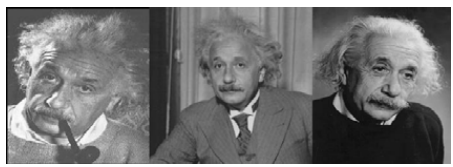

Figure 1: Three different images of Albert Einstein, easily recognized as the eminent physicist even though the images may vary greatly.

STUDY OF FEASIBILITY OF PLASTIC GEAR TO REDUCE NOISE IN A GEAR PUMP

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Generally, gear pumps are classified as noise producing machines. With a view of reducing overall radiated noise level from gear pumps, without affecting the mechanical efficiency, an experimental investigation was carried out. In this study the possibility of utilizing a plastic gear instead of the conventional one was exanimate. On the rig built up for this purpose, two different kinds of tests were made.

The first part of the experiment was devoted to measurements related to mechanical performances and the radiated noise level from a conventional pump with a metal gear mesh, under different operating conditions. The second series of tests was carried out mainly to know the effect due to the replacement of the idler metal gear with the plastic one. This test also was performed under various operating conditions.

Serious difficulties were encountered with the plastic gear testing. On several occasions the plastic gear was destroyed. The debris from the plastic gear gave considerable trouble in some elements of the hydraulic circuit. In the plastic gear case, significant flow was observed. The results of the performance test on the plastic gear seem to be disappointing. Even though the plastic gear has good damping vibrations, there is no significant reduction in the overall radiated noise level from the gear pump. At low speeds, the plastic gear gave a lower performance rate compared to the conventional gear pump. However, at higher speeds, the performances were nearly the same. Further, the plastic gear seems to be unable to withstand a high level of loading. This can cause damages in the plastic gears and reduce the life period.

INTERET DE l'INGENIERIE ASSISTEE par ORDINATEURE:IAO
Cas d'un moule d'injection de plastique

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RESUME: Le travail présenté dans ce document consiste en la conception d'un outillage de mise en forme (moule) pour la fabrication de pièces en plastiques en utilisant les techniques et moyens de l'ingénierie assistée par ordinateur .
L'intégration de logiciels évolués, (IAO : ingénierie assistée par ordinateur, encore plus connu sous CAE : computer aided engineering) de conception et de simulation par ordinateur, permet de résoudre différentes difficultés sans avoir recours à la réalisation de prototypes.
Vu la complexité de la conception des moules (outillage), l'utilisation des techniques de simulation par éléments finis ont permis de résoudre des problèmes de conception de prototypes avant leurs réalisations. Cette nouvelle technique nous a permis dans cette étude de cas de faire face aux problèmes de conception éventuels et permet d'optimiser les paramètres (coût, délai et qualité).

ABSTRACT.
This paper is about how to design plastic part's mould. In every industry, the goal of development of injection plastic product is to improve productivity, decrease costs and increase quality control. If we need to do that we should use computer aided engineering techniques known as CAE based on finite elements methods in order to solve some technical problems.
Because the mould design is very complex, the CAE techniques permit to design easily the prototype, avoid and solve many manufacturing problems by simulation. So, the decision is immediately taken about the design or the feasibility.

MOTS –CLES: ingénierie, simulation, moule, conception, plastique

.**KEY WORDS: engineering, simulation, design, plastic, mould.**

ELECTRICAL DROP FOOT PROTHESIS

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Introduction:

Drop Foot is considered one of the most serious disabilities that describe a neuromuscular disorder that affects on the patient's ability to raise their foot at the ankle in which most of treatment ways are expensive and complex. The following paper shows a special method called the Drop Foot Prosthesis that is a simple method aiming in a way to solve such problem in less complexity and cost using inexpensive sensor to detect the foot movement as a first step then these signal from the sensor will be used to control the whole system in runtime for a smooth foot movement of a drop patient while walking. The system will be then synchronized with an EMG electronic card to show the behavior of the leg muscle in the two phases of the ankle status as an effect of stimulation. The final device obtained is considered as an assistive device used to solve gait problems and improve walking phases.

Work Description:

This block diagram represents the system we have worked on, it represents the electrical drop foot prosthesis, such system uses the strain gauge sensor as an electrical sensor that is able to detect the ankle status then such signal obtained will be amplified and compared to a certain threshold to act as an interrupt for the PIC in a way that the signal obtained will be supplied by a step up chopper circuit in order to stimulate the target muscle.

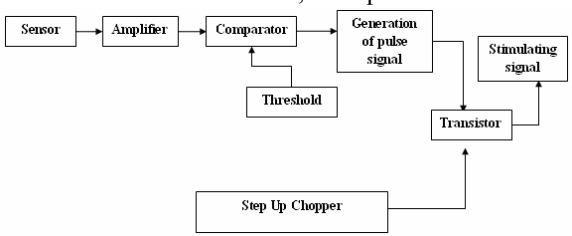

Fig 1. Block diagram for Electrical Drop Foot

Results:

At last the system will be able to generate square signal 30V peak to peak and period 2 ms in order to be used as simulating signal.

When the ankle is being raised up as shown in the figure the system will stimulate the target muscle where such response (Contraction of the target muscle) is represented by the same way by the EMG signal. When the ankle with the ground no stimulation required for the muscle and the behavior of such muscle (Relaxation) is represented also by EMG system.

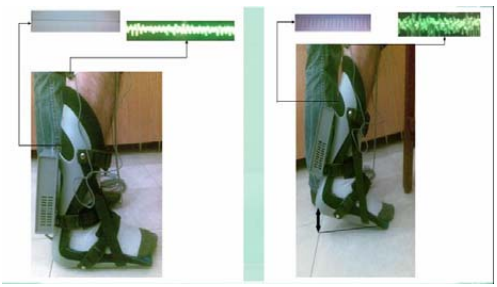

Fig 2. Results for Electrical Drop Foot prosthesis

A NONLINEAR PERTURBATION METHOD FOR TIME DEPENDENT INTERFACIAL WAVES WITH RIGID UPPER SURFACE OVER A RAMP WITH A GENTLE SLOPE.

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In this paper a nonlinear perturbation method has been introduced to solve problem of time dependent interfacial waves with rigid upper surface and propagating over a ramp with slowly varying slope. Equations were derived for the case of an arbitrary shaped obstacle then results were computed for the case of a ramp of a gentle slope. A general differential system was derived leading to the famous Boussinesq equation of the first order. The number of terms which have been obtained in the expression for the interfacial profile seems to be sufficient for the purpose of illustrating the effect of the density ratio, the thickness ratio, the inclination angle , the ramp height and the effect of time stepping on the wave. The obtained expressions for the interfacial waves are up to order ε^6 , where ε is a small parameter of order 10^{-2} that provides a measure of weakness of dispersion. The calculations are limited up to the second-order approximation since the difference between the second and fourth order approximations in the interfacial profile for the two approximations has been found to be of order 10^{-7}.

TELEMEDICINE OVER WIMAX

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In a world that gets more globalize everyday, it's up to the telecommunications to interconnect people across the globe. In the biomedical field, Telemedicine affords the ability to collect and transfer medical data from one hospital to another, thus it is considered positive for both patients and economy. These data are related to electro-biological measurements that the modern medicine applies for the human body through variety of imaging techniques, such as electroencephalography (EEG, brain), and electrocardiography (ECG, heart). The objective of this paper is implementing the transfer of medical data related to biosignals between hospitals via WIMAX. This new technology is expected to change the life of many persons due to its high speed and increased security. Medical data are connected between hospitals in a certain area where the data are transmitted from a certain hospital, pass through the WIMAX base station, and received by the next hospital. In this paper, we follow the medical data from the transmitter to the receiver in Saida city; also we introduce the significant factors to maintain high signal power at the receiver side. The main tasks that we achieved are summarized by selecting the important components for WIMAX implementation, and choosing the best modulation techniques; considering the factors essential for transmitting and receiving signals over WIMAX, such as signal power, bandwidth, and bit error rate. Also the calculation of transmitted and received powers considering the losses in the way of transmission are performed, and finally the role of WIMAX in the health care applications is illustrated.

MATHEMATICAL MODELLING OF ATHEROMA PLAQUE DEFORMATION

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Abstract: The development of atherosclerosis leads to the formation of an atheroma plaque which takes place in the artery. This plaque is composed of two parts: a lipid deposit and a fibrous cap. This fibrous cap covers the lipid deposit and isolates it from the blood flow. The blood flow which circulates in the artery modifies the geometry of the atheroma plaque and can cause dangerous effects as the rupture of the plaque and liberating solid parts which can block the blood circulation. The problem is modeled as a fluid-structure interaction between the blood and the plaque.

Mathematical model The model's geometry is composed of a rectangular domain representing the artery which contains the plaque. We consider two cases for the blood model: a Newtonian fluid with constant viscosity or a non-Newtonian fluid. The blood flow enters the artery by the left side with a Poiseuille profile and exits by the right side. Both parts of the plaque are modeled with the hyper-elastic Mooney-Rivlin model. The fluid viscosity is modeled by the Carreau law. In the Carreau law, the parameter n describes the properties of the fluid: n=1/3 takes into account the non-Newtonian aspect and n=1 corresponds to the Newtonian fluid.

Equations The fluid is governed by the Navier-Stokes equations: $\rho \frac{\partial u}{\partial t} + \rho (u \cdot \nabla) u = -\nabla p + \sigma \Delta u + f$, $\nabla . u = 0$. Carreau's model of viscosity: $\eta = \eta_\infty + (\eta_0 - \eta_\infty)(1 + (\lambda \dot{\gamma})^2)^{(n-1)/2}$ where $\dot{\gamma}$ is the shear rate. The two parts of the plaque are governed by the Mooney-Rivlin model for hyper-elastic materials where the displacement energy w is given as: $w = C_{10}(\bar{I}_1 - 3) + C_{01}(\bar{I}_2 - 3) + \frac{1}{2}\kappa (J - 1)^2$, where $\bar{I}_1$ and $\bar{I}_2$ are the first invariants of the Cauchy tensor, κ is the bulk modulus and J is the jacobian of the Cauchy tensor. Two formulations for the initial condition on the left boundary are used, the first one is a constant function with a Poiseuille profile and the second one is a function of time t : $U_{in} = 4 U_{max} (0.1 t)^2 / (0.04 + (0.1 t)^2)$ with $U_{max} = 0.1 m.s^{-1}$ to 0.4 $m.s^{-1}$. We note that the geometry of the domain changes in time. Therefore the numerical mesh should be adapted to it. Comsol Multiphysics controls the moving geometries and moves the mesh distribution with respect to the geometry change by using the **ALE** application (Arbitrary Lagrangian Eulerian).

Results We simulate the model using Comsol Multiphysics. After a short time, we can see that equilibrium takes place. Note that each simulation was performed for four seconds. The blood flow creates some vortices at the beginning of the simulations. The number of these vortices depends on the initial velocity. The presence of the vortices can influence the blood coagulation. Fluid-structure interaction can also result in the plaque rupture which is the most dangerous from the clinical point of view.

SPEECH RECOGNITION OVER DIFFERENT TRANSMISSION CHANNELS

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Speech recognition is the ability of a machine or a program to identify words or phrases in spoken language and converts them to a machine readable format.

Speech recognition applications include call routing, speech to text conversion, and voice dialing. It also has applications such as speech controlled computers in offices, speech controlled applications for disabled persons or simple speech information system in buildings and companies. The recognizer could be used only in specialized systems with corresponding equipment such as telephone dialogue information system or phone talking.

The performance of well trained speech recognizers using high quality full bandwidth speech data is usually degraded when used in real world environments. Telephone speech recognition is difficult due to the limited bandwidth of transmission channels; therefore, neural network based adaptation methods are applied to telephone speech recognition. The advantage of neural network based approach is that the retraining of speech recognizers for telephone speech is avoided furthermore because the multilayer neural network is able to compute nonlinear functions, and it can accommodate for the nonlinear mapping between full bandwidth speech and telephone speech.

In case of speech recognition over different transmission channels we will set demands to the parametric encoded /decoded speech. The effects of different types of noise have been studied and the effect of the parameterization process in speech has been known to cause degradation in decoded speech when compared to the original speech.

In case of large vocabulary continuous speech recognition over GSM, it may be tested and compared with the published papers. The speech materials used in the speaker–independent data are from the resource management (RM) database. Various training and test conditions are investigated: three different types of speech codecs in combinations with their error patterns simulating transmission quality degradation and one telephone handset masking pattern .The results indicate that speech codecs are the reason for poorer performance. Finally a distributed scheme is proposed to overwhelm speech quality degradation from the recognizer point of view.

ELECTROMYOGRAPHIC SIGNAL ANALYSIS AND ASSESSEMENT

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The Electromyographic (EMG) signal is a biomedical signal that measures electric currents generated in muscles during their contractions representing neuromuscular activities. Since the nervous system always controls the muscle activity (contraction/relaxation), hence, the EMG signal is a complicated signal, that is controlled by the nervous system and is dependent on the anatomical and physiological properties of the muscles.

Electromyography (EMG) is a technique for evaluating and recording the activation signal of muscles. EMG is performed using an instrument called an electromyograph to produce a record called an **electromyogram** which is measured by either applying conductive elements or electrodes to the skin surface and is called surface electromyography sEMG, or invasively within the muscle. An electromyograph detects the electrical potential generated by muscle cells when these cells are both mechanically active and at rest. The signals can be analyzed in order to detect medical abnormalities or analyze the biomechanics of human movements.

After the signal is acquired, we have to process the signal, to extract the interesting features, to generate effective information using different transforms, and to make some classifications using different methods of pattern recognition. In pattern recognition we identify some characteristics of the EMG signal and classify them according to different motions. The classification relies on the similarity of the incoming data to the training data. The most important task is concerned with the design of the classifier that is able to correctly classify the incoming data using Artificial Neural Networks. Then the decision will depend on the results of the classification. Recent advances in technologies of signal processing and mathematical models have made it practical to develop advanced sEMG detection and analysis techniques. Various mathematical techniques and Artificial Intelligence (AI) have been developed for sEMG detection and analysis. Mathematical models include, autoregressive model (AR), wavelet transform and it's applicability for analyzing an EMG signal and discriminating different classes , time-frequency approaches, Fourier transform, Wigner-Ville Distribution (WVD), statistical measures, and higher-order statistics. AI approaches towards signal recognition may include Artificial Neural Networks (ANN). In this paper a brief explanation about sEMG signal and a short historical background of EMG signal analysis will be presented. This is followed by highlighting the up-to-date detection, decomposition, processing, and classification methods of EMG signal along with a comparison study to show the performance of various EMG signal analysis methods. This provides researchers with a good understanding of EMG signal and its analysis procedures.


Social,
Economic &
Behavioral
Sciences

ORAL PRESENTATIONS

SE 1.1

Cancer Phobia and its relation to personality

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Abstract

Pathophobia or nosophophobia is an old phenomenon in spite of the differences in specific diseases by humans from period to period in history of mankind. This phenomenon is also a factor in Fear Survey Schedules. Fear of cancer or cancer phobia is one of these pathophobias. It has been defined as a morbid apprehension or dread of contacting cancer or the belief that the person already has this disease, notwithstanding the lack of medical evidence. This fear has psychological, physiological and cognitive concomitants.

A sample of 200 male and female Lebanese undergraduates was recruited. They responded to the following questionnaires: Fear of Cancer, Death Anxiety, and Fear of Death in addition to a battery of personality scales.

The results revealed sex-related differences in fear of cancer were not significant.

Finally, significant and positive correlations were found between fear of cancer and personality variables used in the study.

Results were discussed in the light of the theoretical frame work, previous studies and the environment surrounding the study samples.

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SE 1.2

Insider Trading During the 2008 Financial Crisis

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Abstract

The Literature suggested that insider trading may outperform the stock market by buying or selling stocks of their company in the short run and/or long run. For this research we construct a daily index consist of the most liquid and large company for each tested market: New York Stock Exchange (NYSE) and Kuwait Stock Exchange (KSE) to test for insider trading.

Our finding indicates that insider trading at NYSE and KSE outperform the market in the short run only. The results suggest that both types of insider trading, buying or selling, is profitable in the short run. At the same time our results conclude that all insiders trading are not profitable in the long run. Stocks that were sold or bought by insiders under-perform the market in the long run. We also conclude that both types of insider trading activity significantly increased during the last quarter of 2008 and the first two month of 2009 in both NYSE and KSE.

JLE classification: G14; G15

Key words: anomalies, insider trading, efficiency, emerging markets, GCC

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SE 1.3
A Profit Maximization Approach to Municipalities in Wastewater Reuse Management: A Comparision of With and Without Storage Facilities

by:

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Abstract

Although land application (or reuse of treated wastewater in irrigation and crop production) is a potentially successful alternative to the disposal of secondary treated wastewater into fresh water streams, its economic feasibility has not been adequately examined. Several studies addressed the technical aspects of the direct use of the secondary treated effluent while fewer have tackled the economic impacts of such use, especially in the presence of a reservoir facility. The focus of this study is to investigate the economic feasibility of land application in the presence of a reservoir

with different capacities and to compare the outcome to the application without a storage reservoir, under several scenarios.

A five-year linear dynamic programming model was developed to determine the optimal cropping pattern that; will consume all or most of the effluent throughout the optimization horizon, utilize all the effluent's nitrogen (being the most limiting constituent) and bring in the highest revenues. A case study in Tyre Region, South Lebanon , was used for model application. Three scenarios in the presence of a storage facility were developed and then compared to similar scenarios with no-storage facility. The first scenario represents the current existing cropping pattern in the study area, while in the second and third scenarios new crops to the area were selected and incorporated in the study models in addition to the current ones. Supplementary irrigation with fresh water was allowed in the first and the third scenarios, while refrained from the second scenario. The three scenarios were tested at different reservoir capacities (namely; daily effluent stored at one week, two weeks and a month reservoir capacity). The results indicate that the presence of a reservoir will; significantly increase the net revenues, enhance the efficiency of wastewater usage, add to the flexibility of the associated cropping pattern, and further reduce environmental hazard. The results also indicate that there is a trade-off between the storage capacity and the presence of supplementary irrigation of fresh water. As the storage capacity increases, less land and fresh water are needed, more effluent volume is consumed and higher net returns are achieved as compared to no reservoir situation for the same conditions.

SE 1.4
The Historicisation of Autobiographical Memories in Contexts of Chronic War and Political Violence

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It is important to understand the relation between history and memory. This is true, in part, because memories of historical events are critical to the construction and maintenance of group identity and to the persistence of group conflict (Bar-Tal, 2007; Cairns & Roe, 2003; Halbwachs, 1992; Pennebaker, Paez, & Rimé, 1997; Tessler, Konold, & Reif, 2004). In addition, wars, natural disasters, terror is t attacks, and other forms of collective upheaval can leave their mark on the individuals who experience them directly and those who learn about them through the media. Support for this latter claim comes from research indicating that important historical events are remembered for many years (Schuman & Scott, 1989), that surprising and/or consequential public events sometimes trigger *flashbulb* memories (Brown, & Kulik, 1977), and that memory for events and event contexts is influenced by group membership and nationality (Conway, et al., 1994; Schuman & Rogers 2004).

These series of studies examine the relation between history and memory from a new and different angle. Whereas prior research has focused on identity is sues and event memory per se, the current projects concern memory organization. Here, we provide evidence for the existence of *historically-defined autobiographical periods* (*H-DAP*s; "during the war," "after the earthquake") and explore whether H-DAP formation is related to the intensity, duration, and novelty of the precipitating public events and to their proximity to a given population.

H-DAPs are a form of *lifetime period* (Conway, 2005). A lifetime period is a high-level structure which subsumes personal memories laid down during some block of time and coordinates period-specific generic knowledge. Life periods are often bounded by *landmark events* (Shum, 1998). Landmarks can be positive (e.g., wedding) or negative (e.g. divorce); predictable (e.g., retirement) or unpredictable (e.g., job loss); socially normative (e.g., high-school graduation) or aberrant (e.g., expulsion). Regardless, what these events have in common is that they signal and/or cause numerous life changes. In other words, personal landmarks indicate important transitions in the *fabric of daily life* – in what people do, where they do it, and with whom.

Like personal landmarks, public events sometimes have a dramatic effect on the fabric of daily life, producing economic hardship, social disruption, and psychological d is tress (Blaikie, Cannon, Davis, & Wisner, 1994; Levy, 1997; McNally, 2003). It follows that these events might also define lifetime periods, and hence spawn H-DAPs. If so, the presence or absence of H-DAPs can be seen to index the entwinement of the historical with the personal. On this view, the frequent appearance of H-DAPs indicates that the sampled population includes many people whose lives have been directly affected by the events of the day – people who have been "living in history." In contrast, an absence of H-DAPs indicates that public events, even very important ones, have had at most a limited impact on the day-to-day lives of the people in the sample.

A two-phase procedure will be used to test for the presence of H-DAPs and identify conditions that foster their formation. During Phase 1, participants will be presented 20 cue words; their task was to respond to each by recalling (in writing) the memory of a specific cue-related autobiographical event. We used this task because it produces a representative sample of the contents of autobiographical memory (Rubin & Schulkind, 1997). During Phase 2, participants will be required to think aloud as they date each of their Phase-1 memories. When dating autobiographical events, individuals often mention lifetime periods and landmark events to support temporal inferences (Brown, 1990; Friedman, 1993; Thompson, Skowronski, Larsen, & Betz, 1993). By extension, dating protocols collected from people whose lives have been shaped by history should often mention H-DAPs (e.g., "during the civil war") and/or period defining news events (e.g., "after the assassination of the prime minister). In brief, dating protocols should measure the impact of public events on private lives.

With th is cueing method for assessing historical consciousness, we go on to investigate whether the impact of historical events on autobiographical memories is related to exposure to war and political violence and whether a historical consciousness is related to an individual's internalisation of collective narratives.
The War Events Questionnaire (Karam, 1988) will be used to assess whether a person, or someone very close to him/her, has witnessed or experienced the following types of events: house damage, kidnapping, bodily injury, business loss, forced migration, resource shortages, and unsafe living conditions. Currently we are working on two different measures to assess the internalisation and endorsement of collective

on two different measures to assess the internalisation and endorsement of collective narratives and memories. One method of assessment provides participants with pictures of pivotal historical events and their knowledge of the event, its causes and consequences. The second method of assessing internalised collective narratives is under development. We are currently content analysing the official historical texts to extract key statements that represent the official positions of the main political groups with respect top pivotal historical events (i.e. the Wimpy operation by Khaled 3lwaan resulted in the withdrawal of Israeli troops from Beirut). These statements will be used to develop a set of questions that will allow us to evaluate whether individuals show the following features commonly present in those who have internalised collective narratives:

a. no intention to provide an objective history of the past.
b. Biased, selective and distorted recollections of the past.
c. Collective memories are treated as truthful accounts
d. Knowledge of the official memory of a group as expressed by key public figures.
e. Knowledge of printed material which expresses and represents collective narratives.
f. Memories which contradict claims/memories of out group.
g. Justification of the outbreak of an event
h. Convey a positive image of in-group.
i. Delegitimize the opponent
j. The in-group is conceptualized as victim.

The issues raised above will be examined in a series of 2 studies as described below. **Please note that Study 2 is underway.**

Study 1: Associations between AUTOBIOGRAPHICAL AND HISTORICAL MEMORIES: THE LIVING IN HISTORY EFFECT AMONG LEBANESE LIVING IN CHRONIC POLITICAL AND WAR RELATED VIOLENCE

The study aims to answer the following questions:

1) Does living in a chronic violence situation lead to the re-organisation of autobiographical memories such that individuals use historical landmarks to date their autobiographical memories?
2) What is the relationship between personal autobiographical memories and historical memories?

Sample: The Data will be collected in Lebanon from native Lebanese in their 50's and 60's. One sample (n=25) will be from Beirut as they are more likely to have lived in contexts of chronic political and war related violence. The second Lebanese sample (n=25) will be from the Bekka and will include individuals that have not lived for extended periods of time in chronic war and violence.

The Results of th is study show a strong Living in history effect and the effect varies significant depending on one's level of exposure to war.

Study 2: LEBANESE YOUTH, H IS TORICAL CONSCIOUSNESS AND THE INTERNAL IS ATION OF COLLECTIVE NARRATIVES.

This study aims to answer the following questions:

1) Are historical events significant cognitive landmarks for the autobiographical memories of Lebanese university students?
2) For those who show a tight association between personal and historical memories (i.e. a Living in History Effect, LiH), do they also endorse collective narratives?

Sample: Two groups of university students are being recruited. The first group cons is ts of students who are politically active. The second group will be a random sample of university students from the Lebanese American University who are not politically active.

SE 1.5

A la recherche de l'éco-entrepreneur libanais….

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RESUME.
S'intéressant à l'*éco-entrepreneuriat* (c'est-à-dire, en première analyse, aux entreprises conduites par des acteurs contribuant au développement durable), et prenant appui sur des études de cas et sur une enquête réalisées dans le contexte libanais, l'objet de ce travail est à la fois de définir l'éco-entrepreneuriat et de questionner son éventuelle singularité. Par la suite, cette réflexion et les résultats obtenus peuvent permettre d'éclairer la réflexion des pouvoirs publics sur les moyens d'encourager le développement de l'éco-entrepreneuriat et nous concluons l'article en proposant quelques leviers d'actions concrets.
Mots cléfs : Entrepreneuriat ; Eco-entrepreneuriat ; Liban ; Eco-tourisme ; Recommandations.

ABSTRACT.
Considering *ecopreneurship* (that is business environment oriented) and based on lebanese case-studies and quantitative inquiry, this work first discusses the definitions of the phenomenon. Its singularity is then questioned. The reflexion is finally oriented in a prescriptive way to help governments to take decisions for developing ecopreneurship.
Key Words : Entrepreneurship ; Ecopreneurship ; Lebanon ; Eco-tourism ; Recommandations.

Introduction

En phase avec l'engouement croissant des populations et des pouvoirs publics pour les problématiques du développement durable, un nouveau terme (« *ecopreneur* ») a émergé pour caractériser des entrepreneurs qui ne seraient pas motivés que par le seul profit mais qui mettraient l'environnement au cœur de leur projet (Bennet, 1991). La construction du mot est assez signifiante puisqu'elle combine les termes « écologique » et « entrepreneuriat ». Ainsi, pour Anderson et Leal (1997, p.3), « *Ecopreneurship refers to entrepreneurs using business tools to preserve open space, develop wildlife habitat, save endangered species, and generally improve environmental quality* ». Si la retranscription littérale en français autoriserait les néologismes « écopreneur » et « écopreneuriat » (Levy-Tadjine, Kharrouby, 2006), nous privilégierons dans ce travail, l'emploi des mots « éco-entrepreneur » et « éco-entrepreneuriat », considérant avec Berger-Douce (2006) que cette terminologie est plus élégante.

Si les études sur cette catégorie singulière d'entrepreneurs abondent dans l'espace anglo-saxon et sont en essor en France (Berger-Douce, 2006, 2007), il n'en n'existe pas à notre connaissance qui traite de cette problématique dans le contexte des pays en voie de développement. Tel sera l'objet de ce travail qui vise à définir l'éco-entrepreneuriat et à questionner son éventuelle singularité dans le contexte libanais. Pour ce faire, nous avons conduit six entretiens exploratoires auprès d'entrepreneurs libanais engagés dans l'éco-tourisme[1]. Après avoir été considéré comme étant un tourisme durable et respectueux de l'environnement, l'écotourisme est défini par l'Organisation mondiale du Tourisme comme « *satisfaisant aux besoins présents des touristes et des régions hôtes, tout en protégeant et en mettant en valeur les opportunités pour le futur. Il conduit à une gestion des ressources qui remplit les besoins économiques, sociaux, esthétiques tout en maintenant l'intégrité culturelle, les processus écologiques essentiels, la diversité biologique et les systèmes qui supportent la vie* ».(OMT, 1998)[2].

Cette étude sur des éco-entrepreneurs œuvrant dans le secteur de l'éco-tourisme au Liban, a été complétée d'une enquête quantitative auprès de 150 citoyens libanais dont le but était de mesurer la sensibilité sociale aux pratiques éco-entrepreneuriales. Pour rendre compte des résultats obtenus, cet article sera structuré comme suit.

Dans une première partie, nous essaierons de résumer comment la littérature justifie la singularisation du phénomène éco-entrepreneurial en présentant pour conclure, nos hypothèses de travail et notre méthodologie. Sur la base de nos observations, la seconde partie discutera de la réalité de l'éco-entrepreneuriat au Liban et nous conclurons ce travail en nous efforçant de livrer quelques pistes visant à l'encourager et l'accompagner. (2)

1. La singularité théorique de l'éco-entrepreneur et la méthodologie mise en place pour l'appréhender dans le contexte libanais

La plupart des travaux dédiés aux éco-entrepreneurs (Bennet, 1991; Berle, 1991 ; Elkington et Burke, 1989 pour ne citer que les précurseurs) prennent soin d'affirmer que les individus qu'ils étudient sont pleinement des entrepreneurs dans le sens ou peuvent leur être associé les items traditionnellement caractéristiques de l'aventure entrepreneuriale: prise de risque, identification ou création et développement

d'opportunités, innovation, création de valeur et recherche de rentabilité. Schaper (2002) souligne, en outre, que les deux catégories d'acteurs sont soumises au risque permanent d'échec de leur affaire qui constitue aussi une des caractéristiques entrepreneuriales typiques.

Pour autant, la singularité de l'éco-entrepreneuriat viendrait, si l'on en croit Anderson et Leal (op. cit.) de l'objet entrepreneurial (l'environnement) et des mobiles de l'aventure entrepreneuriale (un ethos qui ne se limite pas au profit mais incarne des ambitions écologiques). Ivanko et Kivirist (op. cit.) ont prolongé l'effort d'Ánderson et Leal pour singulariser l'éco-entrepreneuriat. Selon eux, sept caractéristiques que nous résumons et discutons dans les lignes qui suivent, permettent de distinguer un éco-entrepreneur (pur) d'un entrepreneur quelconque.

1. L'objectif visé

Alors que l'entrepreneur met en avant la recherche du profit, l'éco-entrepreneur, sans nier la recherche de rentabilité, aurait souvent comme objectif conjoint, de sensibiliser les consommateurs aux aspects environnementaux et de transmettre sa passion de la nature. Cet aspect essentiel et unanimement avancé dans la singularisation de l'éco-entrepreneuriat (Anderson, 1998) constituera une de nos hypothèses principales pour notre enquête (**Hypothèse 3**).

2. Les critères d'évaluation de la performance

Quand l'entrepreneur traditionnel se base sur les ratios financiers tels que le *Return On Investment* (ROI), ou sur le taux de rentabilité, les éco-entrepreneurs (purs) s'intéresseraient au « *Return on Environment* » (ROE) c'est-a-dire aux impacts positifs que leur éco-entreprise a exercés sur l'environnement

3. La Sensibilité au commerce équitable

L'éco-entrepreneur serait particulièrement sensible au commerce équitable (*Fair-Trade*). Le commerce équitable prolonge la démarche écologique dans la mesure où il contribue au développement durable en offrant de meilleures conditions commerciales et en garantissant les droits des producteurs et des travailleurs. Dans les termes de Boltanski et Thévenot (1987, 1991), l'écopreneur légitimerait son action à l'aune de « *la cité civique* » et de la « *cité verte* » (Latour, 1995 ; Thévenot et Lafaye, 1993). Ainsi, outre des missions environnementales (« *trouver l'équilibre entre l'intérêt du tourisme et l'intérêt de l'environnement* », « *protéger l'environnement et ne pas lui nuire tout en permettant aux touristes de profiter de la nature* », etc), la MAPAS (qui gère le site touristique des grottes de Jeita dans le but de « *préserver le patrimoine écologique libanais pour le transmettre aux générations futures*…. ») et son fondateur, Nabil HADDAD s'attribuent des objectifs sociaux. « *La durabilité de ce projet sert à procurer du travail au peuple libanais et à leur assurer un salaire fixe* »[3].

4. Le rapport aux réglementations environnementales

Tandis que pour l'entrepreneur classique, les nouvelles législations imposées par les Etats en faveur de l'environnement, seraient des contraintes auxquelles, ils devraient se conformer, Ivanko et Kivirist soutiennent que les éco-entrepreneurs sont souvent à l'origine des changements de réglementation. Ils jouent ainsi le rôle d'entrepreneur institutionnel[4].

5. Les parties prenantes

Bien qu'il essaye de satisfaire toutes ses parties prenantes et de mettre à leur disposition la valeur qu'ils attendent, l'entrepreneur standard privilégierait les actionnaires ce qui, pour Ivanko et Kivirist, s'appliquerait moins nettement aux éco-entrepreneurs.

6. Le rapport à la technologie

Caricaturalement, Ivanko et Kivirist considèrent que les entrepreneurs cherchent continuellement les nouvelles technologies et les adoptent afin d'améliorer la qualité de leurs produits alors que les éco-entrepreneurs ne choisiraient leurs technologies qu'en fonction de leur mission et parmi celles qui ne nuisent pas à l'environnement.

7. La taille de l'entreprise

Les auteurs remarquent pour finir que les ambitions des éco-entrepreneurs sont souvent moindres que celles des autres entrepreneurs et qu'ils se satisfont de petites entreprises sans rechercher systématiquement la croissance. Pour eux, « *small is beautiful* ». Ce trait servira de fondement à une de nos hypothèses (**l'hypothèse 4**). Ne faisant pas de la croissance, un objectif premier, les éco-entrepreneurs seraient sensibles à la Pérennité et à l'Indépendance de leur affaire. En suivant Marchesnay (1998) ou Julien (2000), il est d'usage, en effet, dans la recherche contemporaine en entrepreneuriat, de distinguer les entrepreneurs au profil PIC (qui, dans une logique patrimoniale, privilégient Pérennité et Indépendance par rapport à la Croissance qui pourrait les obliger à ouvrir leur capital ou qui les encouragerait parfois à vendre « *leur bébé* ») de ceux qui sont plutôt CAP, préférant au contraire la Croissance à l'Autonomie financière ou décisionnelle et à la Pérennité de leur affaire (ils sont prêts a céder leurs parts si on leur en offre un bon prix). Les éco-entrepreneurs seraient plutôt des PIC.

La description d'Ivanko et Kivirist constitue davantage un idéaltype de l'éco-entrepreneur que la réalité universelle de l'éco-entrepreneuriat. En contre-point, certains auteurs soulignent qu'il existe différentes graduations dans l'engagement écologique de l'Eco-entrepreneur, la peinture d'Ivanko et Kivirist en constituant certainement l'idéal absolu.

Proposant des typologies des éco-entrepreneurs qui cassent la vision uniforme de l'éco-entrepreneuriat, Linnanen (2002), Schaltegger (2002) comme Schaper (2002) soulignent ainsi qu'il existe des « *éco-entrepreneurs par accident* » (*accidental ecopreneurs*), individus qui ont lance une affaire en rapport avec l'écologie sans que cela n'ait été anticipé dans leur modèle d'affaires et n'ait fait partie de leur vision stratégique. C'est souvent davantage la détection d'opportunités que la conviction écologique qui les aura conduits vers cette activité "*verte*". Inutile de dire qu'alors, ils ne se reconnaissent pas totalement dans la description d'Ivanko et Kivirist[5]. Pour ceux qui n'entreprennent pas dans le domaine environnemental par hasard, le modèle des auteurs comme les travaux de Levy-Tadjine et Kharrouby (2005) laissent à penser qu'il existe, pour l'éco-entrepreneur, des trajectoires individuelles préparatoires.

Tous les cas étudiés par Levy-Tadjine et Kharrouby, étaient, en effet, déjà sensibilisés à la cause environnementale et/ou humanitaire depuis plusieurs années, avant de se lancer en affaires. Ils étaient notamment membres d'associations œuvrant dans ces secteurs. Parmi ceux-ci, Guy Le Masson (Français, 52 ans) en est l'archétype. Il crée en Juin 2001 « *Alternative Environnement* » dont l'objet est « *l'entretien, restauration et dépollution de sites sensibles ainsi que la prévention des dégradations* » après avoir consacré toute sa carrière à l'entretien du patrimoine bâti et naturel (Plus de 15 années d'expériences dans ce domaine en tant qu'artisan, chef de chantier et chef d'équipe). Il a aussi préalablement

encadré des bénévoles et formé des jeunes en recherche d'emploi au respect de l'environnement et à la restauration de sites. En 2000 et 2001, il se mobilise pour le nettoyage du littoral breton suite à la marée noire de l'*Erika*. S'il décide en 2001 de se lancer, ce n'est donc pas un hasard. Si ce trait est d'importance dans une perspective de développement de l'écopreneuriat puisqu'il présume que c'est au cœur des associations et entreprises sensibilisées à l'environnement que se trouverait le vivier principal d'éco-entrepreneurs potentiels, nous en ferons la base pour nos deux premières hypothèses (**H1 et H2**).

Enfin, suivant Levy-Tadjine et Kharrouby (2005) qui recommandaient d'encourager toutes les actions (notamment celles émanant des associations écologistes) qui contribuent à sensibiliser le public au développement durable dans la mesure où celle-ci était alors source d'opportunités pour les éco-entrepreneurs, nous supposerons qu'un environnement ouvert à l'éco-entrepreneuriat est propice à son développement. Admettre cette hypothèse (**H5)** impose au chercheur d'étudier le contexte dans lequel peuvent émerger les projets éco-entrepreneuriaux, ce qui constituera un des objectifs de la seconde partie de cet article.
L'encadré 1 récapitule l'ensemble des hypothèses exploratoires qui ont été soumises au test et dont la seconde partie rendra compte.

H1 : La plupart des éco-entrepreneurs libanais qui ont choisi l'écotourisme leur secteur d'activité, ont des antécédents dans le domaine.
H2 : La plupart des éco-entrepreneurs libanais ont déjà une expérience dans l'écotourisme.
H3 : La plupart des éco-entrepreneurs ne cherchent pas uniquement le profit.
H4 : La plupart des éco-entrepreneurs libanais sont des PIC.
H5 : L'initiative éco-entrepreneuriale est encouragée par le soutien de la société aux actions en faveur de l'environnement.

Encadré 1 : Nos hypothèses de travail.

Seules hypothèses 1 à 4 ont fait l'objet d'une confrontation exploratoire aux faits à partir d'études de cas. Dans notre travail, le statut de l'hypothèse 5 est de nature différente. Celle-ci a davantage une valeur d'axiome sur la base duquel nous avons cherché à décrire le contexte sociétal libanais pour voir s'il était favorable ou non à l'éco-entrepreneuriat. Elle se fonde notamment sur les travaux de Krueger (1998) qui, transposent les modèles de l'intention entrepreneuriale (Shapero et Sokol, 1982 ; Ajzen, 1991), au cas particulier de l'éco-entrepreneuriat. Ce faisant, l'auteur montre que l'intention de lancer une affaire éco-entrepreneuriale dépend de la faisabilité et de la désirabilité perçues d'un tel projet, par l'entrepreneur. Or la désirabilité est fortement dépendante du regard social.

Notre travail ayant une vocation d'exploration[6] compte tenu du nombre limité d'entrepreneurs œuvrant dans le secteur de l'éco-tourisme au Liban[7], nous avons privilégié la méthode des cas recueillis par le biais d'entretiens semi-directifs (Yin, 1989 ; Plane, 1998). La méthode des cas permet, selon ces auteurs, de mener une étude en profondeur et de recueillir de manière exhaustive des informations permettant de proposer une modélisation de l'objet étudié[8]. Deux éco-entrepreneurs libanais avaient fait l'objet d'interviews en 2005 (Levy-Tadjine et Kharrouby, 2005) et quatre autres ont été étudiés au cours de l'année 2009 (Younes, 2009). En complément, et afin de

constituer un groupe témoin, quatre entrepreneurs du secteur touristique ont également fait l'objet d'interviews. Les cas sont résumés dans le tableau 1.

Cas d'Eco-entrepreneurs étudiés	
A Nabil Haddad a fondé, en lien avec l'Etat Libanais, et dirige MAPAS qui gère le site touristique des grottes de Jeita dans le but de « *préserver le patrimoine écologique libanais pour le transmettre aux générations futures….* ». Il a été primé en 2002 du prix du « *développement durable dans le tourisme* »	**4** Pascal Abdallah, fondateur de *Responsible Mobilities.* Il était déjà à l'origine du projet *Cyclamen* avec d'autres mais a choisi de créer, seul, son propre projet éco-touristique en critiquant le manque de professionnalisme de ses anciens partenaires. Très engagé, il est, par ailleurs, membre fondateur et président de l'association *Lebanon Mountain Trail association* et membre de l'association des *Amis des Cèdres de Tannourine.*
B Dunia Baroud-El-Khoury a fondé en 1994 et préside la Women's Association of Deir El Ahmar. Son association vise à fédérer les femmes de cette région rurale de la Bekaa pour qu'elles développent collectivement éco-tourisme rural et agro-tourisme. Son action a été récompensée par l'attribution du *Dubai International Award for Best Practices to improve the environment* en 2002.	**Cas d'entrepreneurs « standard » intervenant dans le tourisme (Groupe Témoin)** **5** Mme Viviane qui dirige une agence de voyages se plait *à* raconter qu'au début elle a commencé dans « *un tout petit bureau* » puis avec le temps son agence réalisant des profits, elle s'est agrandie et a commencé à recruter…
1 Joe Rahme, fondateur de *l'Eco-club-Becharre* pour « défendre » son village auquel nuisait le tourisme ordinaire. Son but est de « *montrer à la population libanaise qu'on peut faire du tourisme tout en préservant et protégeant l'environnement et la nature ».*	**6** M. Bouez. Considérant que le secteur du tourisme était l'un des secteurs les plus rentables au Liban, il a fondé son agence de voyages.
2 Paul Hariss, fondateur de la *Reserve d'Afqa* à Mnaitra qui offre « *aux amoureux de la nature et aux fans de sports outdoors de se promener en pleine nature, de goûter une vraie cuisine libanaise et de dormir dans un camp en pleine forêt* ».	**7** M. Assad, propriétaire-dirigeant d'un restaurant qu'il a hérité de son père. Il lui parait difficile de servir dans son restaurant des plats biologiques « *puisque c'est couteux et qu'en plus, cette idée n'est pas encore répandue chez ses clients. Si les préférences des consommateurs changent et demandent cette option* », il pourrait s'y mettre.
3 M. Karim, fondateur de *L'Eco-Village* au Chouf. Apres quelques années de travail à l'étranger suite à l'obtention d'une Licence en Relations Internationales, il a trouvé que sa vie était « *sans objectif et sans gout* ». Il a alors décidé de revenir au Liban et d'aider sa mère dans son restaurant qui sert des plats bio. Par la suite, il a eu l'idée de fonder *l'éco-village*, ferme biologique qui utilise des énergies renouvelables et comporte un restaurant et un gite d'étape.	**8** M. Sfeir. Il dirige l'hôtel Montebello qu'avait fondé son père, dans le village montagnard d'Ajaltoun.

Tableau 1 : Présentation des six cas exploratoires d'éco-entrepreneurs étudiés (et des quatre cas « témoin » utilisés en « contrepoint »).

Les entretiens étaient complétés d'observation directe (visite en face a face sur le site de l'entreprise) et d'études documentaires.
L'entretien semi-directif auquel ils ont accepté de répondre durait environ deux heures. Suivant les prescriptions de J.M. Plane (2000, p.126-128), le déroulement de l'entretien comportait trois phases : la phase de mise en condition mentale de l'interviewé, la phase d'hygiène mentale, et la phase de l'entretien proprement dite[9] qui interrogeait notamment l'entrepreneur sur les difficultés rencontrées dans le montage de son projet et sur ses représentations et ambitions[10].

Le traitement des données a fait l'objet d'une analyse de contenu manuelle en utilisant les outils de Huberman et Miles (1991) et en particulier, « *la méta-matrice non ordonnée* » qui présuppose un codage des variables observées par site. Une fois ce codage établi, on réalise une Méta-Matrice qui synthétise les données observées. Cette matrice s'apparente en fait à un tableau de tri-croisé. Elle est représentée dans le tableau 2 et permet de visualiser dans quelle mesure les hypothèses préalablement formulées sont vérifiées ou non. Les six premiers cas correspondent aux éco-entrepreneurs observés tandis que les quatre suivants constituent le groupe témoin. Nous les discutons ensuite en illustrant le propos de verbatim issus des entretiens.

Cas	**Projet**	**Genre**	**Diplôme**	**Expérience antérieure**	**PIC/CAP**	**Antécédent**	**Motivations**	**Membre d'une association**	**Difficultés**
A	MAPAS	H	Ingénieur		PIC	Non	*protéger l'environnement, sensibiliser, crer de l'emploi*	Oui	Manque de soutiens de proximité
B	Women's Association of Deir El Ahmar	F	Licence en Droit		PIC	Non	*Créer de l'activité, participer au développement local*	Oui	*besoins d'expertise en matière de formation à l'entreprenariat*
1	*L'éco-club*	H	Licence en sciences de gestion	Non	PIC	Non	La passion pour la nature	Oui	Manque de soutiens de proximité
2	*La Reserve d'Afqa*	H	License en science de gestion	Non	PIC	Non	La passion pour la nature et le profit (étude de marche…)	Oui	Manque de soutiens de proximité et difficulté de financement

3	*L'eco-village*	H/F	Licence en relations internationales	Non	PIC	Sa mère avait ouvert un restaurant bio	Le besoin de sensibiliser les libanais aux aspects environnementaux	Non	Manque de soutiens de proximité
4	*Responsible Mobilities*	H	EMBA en tourisme	Oui	CAP	Non	La passion pour la nature, la nécessité de préserver l'écologie	Oui	Manque de soutien de proximité
5	Viviane travel agency	F	Licence en tourisme	NON	CAP	NON	*La guerre libanaise ; presque par hasard…*	NON	Pas de difficultés financières
6	Bouez travel agency	M	Licence en tourisme	NON	CAP	NON	A l'époque, le tourisme était en expansion	NON	Pas de difficultés financières
7	Mr Assad propriétaire d'un restaurant	M	Pas de diplôme	NON	PIC	Oui, le restaurant est à son père	A l'époque de l'expansion économique	NON	Pas de difficultés financières
8	Mr Sfeir Hôtel Montebello	H	Diplôme en hôtellerie	NON	PIC	Oui, l'hôtel est à son père	A l'époque, le tourisme était en expansion	NON	Pas de difficultés financières

Tableau 2 : Méta-Matrice non ordonnée appliquée aux 10 cas étudiés.

2. Les résultats obtenus : réalités et perceptions de l'éco-entrepreneuriat au Liban

L'examen détaillé des résultats invalide l'hypothèse 1 puisqu'on constate que dans la majorité des cas (5 cas sur 6), les parents des éco-entrepreneurs ne s'intéressaient guère à l'écotourisme et n'étaient pas des éco-entrepreneurs. Au lieu de les encourager, ils étaient bien souvent contre l'éco-projet de leur fils. M. Joe Rahmé, fondateur de l'éco-club de Bécharré (cas 1) mentionne ainsi : « *Mes parents étaient contre la fondation de l'éco-club, ils voulaient que je trouve un emploi comme tout autre étudiant ayant obtenu nouvellement sa licence au lieu de prendre le risque de fonder l'éco-club qui n'intéressera pas les libanais* ».

Le seul éco-entrepreneur qui pouvait s'appuyer sur l'expérience éco-entrepreneuriale d'un de ses parents, affrontait l'opposition de l'autre. M. Karim (*L'éco-village*, Chouf, cas 3) nous confiait : « *Le premier obstacle auquel je devais faire face, c'était le refus de mon père de l'idée de fonder l'éco-village, il préférait que je travaille entre quatre murs enfermé dans un bureau or, ce n'est pas mon style. Il me disait que je suis toujours étrange et je pense différemment des autres jeunes de mon âge. Par contre, ma mère, dés*

que son restaurant bio a commencé à réaliser des pertes, elle a décidé de le fermer et de m'aider dans la gestion de l'éco-village ».
Pour autant comme cela est assez classique en entrepreneuriat pour de petits projets (De Bruin, Lewis, 2004), la plupart des interviewés soulignent le rôle important du soutien du conjoint dans la conduite du projet et notamment le fait qu'il partage avec eux, la même passion pour la nature (cas 1 et 2).

L'hypothèse 2 est également invalidée dans la mesure ou aucun des éco-entrepreneurs interviewés au Liban n'a d'expérience antérieure dans le domaine de l'écotourisme ou de l'engagement écologique. Comparativement aux résultats obtenus par Levy-Tadjine et Kharrouby (2005) en contexte français, ce trait semble singulier au cadre libanais et traduit le retard du pays des cèdres dans le domaine de l'action environnementale. Les éco-entrepreneurs rencontrés sont donc des pionniers et ont du se former par eux-mèmes comme le précise Joe Rahmé (cas 1). « *J'ai dû lire des livres, assister à des formations, et bénéficir de l'aide de l'association de la protection de l'environnement à Bécharré dont je suis membre.* ». Mr Khatib (cas 3) nous expliquait qu'il avait, lui aussi, des cours à *l'American University of Beirut* sur la vie et l'histoire des plantes, et en Allemagne, sur sur l'énergie renouvelable. Ces engagements prouvent la motivation de ces individus. Cette dernière est largement fondée sur une sensibilité très forte vis-à-vis des problèmes environnementaux et notamment de la pollution au Liban. Comme le suggéraient Ivanko et Kivirist, la plupart se donnent des objectifs sociétaux et rêvent presque de changer le monde. Ainsi, l'éco-projet de Joe Rahmé (cas 1) aurait vu le jour suite à sa constatation des effets néfastes du tourisme ordinaire sur son village. Il explique: « *J'ai remarqué que le tourisme ordinaire est en train de nuire à mon beau village riche de sites touristiques… Par conséquent, j'ai décidé de fonder l'éco-club. Mon but est de montrer à la population libanaise qu'on peut faire du tourisme tout en préservant et protégeant l'environnement et la nature* ». Il précise qu'en s'investissant dans ce projet, il savait qu'il n'obtiendrait pas de gratification à court terme, conscient que «*de tels projets réalisent des pertes les cinq premières années* ». « *Etre patient* », « *il s'agit d'une œuvre de longue haleine* » sont des thèmes récurrents dans les discours analysés. Nabil Haddad (Cas A) est le plus explicite sur ce sujet. « *On travaille pour les générations futures. Il ne faut pas s'attendre à un profit rapide et avoir le souffle long* ».
Pour chacun de ces éco-entrepreneurs, l'objectif de rentabilité n'est qu'un objectif secondaire qui est une condition nécessaire pour leur permettre de poursuivre leur mission. Joe Rahmé (cas 1) est assez direct dans son propos. « *L'éco-club pour moi, est un logement qui accueille les touristes avec de petits tarifs juste pour couvrir les charges et afin d'assurer sa pérennité. L'objectif de l'éco-club ne se limite pas à la sensibilisation des touristes, à la nécessité de protéger l'environnement mais c'est aussi d'aider les jeunes de mon village en leur assurant un emploi, ainsi que les femmes en leur permettant d'y vendre leurs produits alimentaires naturels*». Dans le même ordre d'idée, Paul Hariss (cas 2) nous confiait avoir créée la réserve d'Aqfa pour «*partager sa passion de la nature avec les autres libanais et avec les touristes arabes et étrangers qui ne connaissent que le côté citadin du Liban, sensibiliser le maximum de personnes au besoin de protéger la nature libanaise, sa faune, sa flore et tous ses atouts naturels, et plus globalement, générer un projet de tourisme durable en formant et recrutant le maximum de jeunes des régions voisines et en achetant des produits des fermiers locaux* ».

De même M. Khatib (cas 4) nous confiait :
« *Si je voulais uniquement réaliser du profit j'aurai travaillé avec mon père qui est un grand commerçant de vêtements ou peut être pu être un employé ce qui est plus profitable que la prise du risque de fonder l'éco-village* ».
Pour lui, « *Un éco-entrepreneur est un individu qui voudrait réaliser un profit à l'instar d'un entrepreneur mais qui, en plus, possède quelque chose à apprendre aux autres, objectif auquel il accorde plus d'importance* ».

L'hypothèse 3 sur lequel s'ancre la singularisation de l'éco-entrepreneuriat semble donc accréditée.
De ce fait, fort logiquement, défendant des valeurs qu'ils souhaitent faire partager, les éco-entrepreneurs s'inscrivent davantage dans une logique patrimoniale (PIC) que dans une logique de croissance (CAP). Cette orientation est manifeste dans la plupart des discours. Ainsi M. Karim (cas 3) affirmait : « *Mon projet ne me permet pas de réaliser un profit à court terme, je ne cherche pas une richesse rapide mais je cherche à s'amuser dans ce que je fais*». M. Rahmé (cas 1) est encore l'un de ceux dont les propos illustrent le mieux ces résultats. *« Malgré les problèmes politiques que j'ai rencontrés en particulier la guerre de juillet en 2006 et les pertes que j'ai réalisées, j'ai décidé de continuer mon activité tout en réduisant mes charges puisque ce qui compte c'est le but pour lequel j'ai fondé l'éco-club. Je suis très attaché à mon éco-projet et j'aimerais que mes enfants dans l'avenir prennent le relais. »*
L'hypothèse 4 semble donc corroborée.
Si comme nous l'indiquions plus haut, nous ne cherchions pas à éprouver l'Hypothèse 5 dans ce travail et la prenions davantage comme un axiome, l'invalidation des hypothèses 1 et 2, renforce l'enjeu de mesurer le degré de soutien de la société libanaise aux actions éco-entrepreneuriales. Tel était l'objet de l'étude quantitative que nous avons conduite sous la forme d'un questionnaire administré auprès de 150 libanais âgés de 20 à 50 ans. Ce travail qui s'inscrit dans un programme plus large de recherches sur l'intention entrepreneuriale dans le contexte libanais[11], reposait donc sur une adaptation de questionnaires bien éprouvés sur le sujet, en particulier celui de TOUNES (2007). L'une des questions interpelait le répondait sur le fait de savoir si pour lui, les éco entrepreneurs (dont une définition était proposée en ouverture du questionnaire) sont bien valorisés et reconnus dans la société libanaise. Cette question visait à évaluer la désirabilité sociale de l'éco-entrepreneuriat. Une majorité d'interviewés émettant un avis favorable (97 sur 150), nous avons procédé à quelques croisements notamment en fonction de l'âge, du sexe et du milieu natal (rural ou urbain) du répondant, en soumettant les données à un test d'indépendance du Khi-Deux.

Test 2			Degré d'encouragement des éco-entrepreneurs par la société libanaise				Total
			Très en désaccord	Plutôt en désaccord	Plutôt en accord	Très en accord	
Sexe	Homme	Effectif Observé	14	12	26	20	72
		Effectif Théorique	12.5	13.0	25.9	20.6	72.0
	Femme	Effectif Observé	12	15	28	23	78
		Effectif Théorique	13.5	14.0	28.1	22.4	78.0
Total		Effectif Observé	26	27	54	43	150
		Effectif Théorique	26.0	27.0	54.0	43.0	150.0

Les résultats nous renseignent sur l'attitude de la société libanaise vis-à vis du phénomène éco-entrepreneurial. Comme le montrent les séries de tableaux 3 et 4, il n'était statistiquement pas possible de différencier les réponses selon le sexe ou selon le milieu natal, le test du Khi-Deux conduisant à conclure à l'indépendance entre ces variables et la variable dépendante retenue. Les hommes et les femmes, les ruraux et les urbains, ont donc, toutes choses égales par ailleurs, la même attitude (positive) vis-à-vis de l'éco-entrepreneuriat.

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.531(a)	3	.912
Likelihood Ratio	.532	3	.912
N of Valid Cases	150		

Tableau 3 : Croisement Genre/ Attitude vis-à-vis de l'éco-entrepreneuriat

Test 3			Degré d'encouragement des éco-entrepreneurs par la société libanaise				Total
			Très en désaccord	Plutôt en désaccord	Plutôt en accord	Très en accord	
Milieu Natal	Village	Count	14	12	23	27	76
		Expected Count	13.2	13.7	27.4	21.8	76.0
	Ville	Count	12	15	31	16	74
		Expected Count	12.8	13.3	26.6	21.2	74.0
Total		Count	26	27	54	43	150
		Expected Count	26.0	27.0	54.0	43.0	150.0

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.460(a)	3	.216
Likelihood Ratio	4.496	3	.213
N of Valid Cases	150		

Chi-Square Tests

Tableau 4 : Croisement Milieu natal / Attitude vis-à-vis de l'éco-entrepreneuriat

Par contre, l'âge est apparu comme une variable discriminante comme l'illustre la série de tableaux 5. Il est possible de conclure que la nouvelle génération libanaise est plus motivée à soutenir des projets écologiques et comporte en son sein, des éco-entrepreneurs potentiels. Ce résultat encourageant pour l'avenir, traduit l'impact de la sensibilisation aux questions écologiques. Cet impact se mesure également dans les propos des entrepreneurs « témoins » interrogé. La plupart sont potentiellement des « éco-entrepreneurs par accident » pour reprendre la terminologie de Linnanen (2002), Schaltegger (2002) et Schaper (2002). Les verbatim de M Sfeir (cas 8) l'illustrent bien.

« *L'éco-entrepreneuriat est une idée intéressante. Et je remarque que tout ce qui est naturel commence à attirer les consommateurs. J'ai essayé plusieurs fois d'utiliser des énergies renouvelables dans mon hôtel afin de réduire la consommation de Mazout, or il m'est avéré que ça va me couter plus cher. Cependant, si tous les autres hôtels concurrents commencent à adopter de tels moyens ou si mes clients me demandent un jour par exemple des plats biologiques je le ferai afin de les satisfaire.* »

Pour autant, comme le rapportent Mme Viviane (cas 5) et M. Bouez (Cas 6), l'éco-entrepreneuriat relève d'une logique radicalement différente de leur propre logique entrepreneuriale.

nombreux ; cela réduirait mes bénéfices. Dans ce cas, je n'exclue pas la probabilité d'intégrer une activité éco-touristique à côté du tourisme au cas où l'écotourisme devient plus connu au Liban et devient plus rentable ».
Ces propos corroborent donc les efforts des chercheurs pour singulariser la logique éco-entrepreneuriale.

Conclusion

Ce travail exploratoire contribue donc à valider partiellement les travaux qui singularisent les éco-entrepreneurs. Dans notre cas, cela se matérialise par les discours concordants des éco-entrepreneurs et des entrepreneurs standards et par la validation de deux de nos hypothèses (H3 et H4). Il est donc possible de tenir que les éco-entrepreneurs ne cherchent pas uniquement le profit mais ont des ambitions sociétales et qu'ils sont généralement des PIC, c'est-à-dire qu'ils ne recherchent pas la croissance pour la croissance.
Pour autant, la validation réelle et définitive des hypothèses discutées dans cet article, supposerait la conduite d'une enquête quantitative de plus grande ampleur auprès d'un échantillon moins restreint d'éco-entrepreneurs. Celle-ci devrait être possible au Liban dans quelques années du fait de l'engouement de la société pour les projets éco-entrepreneuriaux que notre seconde enquête a mis en exergue. En effet, sur cette base, il est possible d'espérer un essor de ces projets. Les pouvoirs publics pourraient l'accompagner et l'encourager. Selon nous, le célèbre modèle des 3 E (Paturel, 1997; Levy-Tadjine, Paturel, 2006) peut servir à identifier trois niveaux d'actions comme l'illustre le tableau 6. Ce modèle considère, en effet, que tout projet entrepreneurial suppose la mise en action et en coherence de trois elements (l'entrepreneur et ses aspirations, E1; l'entreprise, c'est-à dire, l'ensemble des resources mobilisées par l'entrepreneur, E2 et l'environnement, E3). Promouvoir l'éco-entrepreneuriat suppose d'agir à ces trois niveaux.

Domaine d'Action	**Elément**
Sensibilisation entrepreneuriale localisée	E1
Accompagnement technique et financier du projet	E2
Large sensibilisation environnementale du public	E3

Tableau 6 : Actions de développement de l'écopreneuriat.

En premier lieu, le développement de l'éco-entrepreneuriat suppose l'existence d'individus (E1) potentiellement prêts à s'engager et à s'investir en affaires au service de la cause environnementale. L'action permettant d'y parvenir est du domaine de la sensibilisation entrepreneuriale. Or nous avons souligné que les jeunes libanais étaient plus réceptifs que leurs ainés. Une sensibilisation éco-entrepreneuriale ciblée sur les publics étudiants serait certainement d'un grand rapport coût-retour sur investissement surtout si elle est associée à des dispositifs d'accompagnement des projets. Il s'agirait ici d'orienter les actions naissantes au Liban de sensibilisation entrepreneuriale comme *Bader* (Levy-Tadjine, 2008) vers l'éco-entrepreneuriat en invitant par exemple, des éco-entrepreneurs à témoigner.
En second lieu, le développement réussi de l'écopreneuriat suppose que les entrepreneurs potentiels possèdent les compétences et les ressources nécessaires pour se lancer (E2). La

mise en place de dispositifs d'accompagnement entrepreneurial devrait alors être encouragé e au Liban. Pour autant, l'action d'accompagnement doit souvent être complétée de dispositifs de financement ou de garantie. A cet effet, on peut croire à l'intérêt de la création de Fonds de Garantie pour les éco-projets (en cas d'emprunt bancaire) analogues à ceux existant en France pour les femmes (Fonds de Garantie Initiatives Femmes) ou pour les projets à investissements limités par l'intermédiaire du *Prêt à la Création d'Entreprises* sur le principe du dispositif *Kaffalat* au Liban.
Outre des dispositifs classiques d'exonérations spécifiques pour les projets ciblés, ces initiatives de sensibilisation et d'accompagnement pourraient être complétées par l'instauration de concours médiatisés comme le concours *Talents* en France et au Canada, avec la création d'un concours *Eco-Talents*. On peut également imaginer le concours du meilleur et du plus créatif *Green Business Plan*.
Enfin, pour que les écopreneurs trouvent des débouchés pour leurs projets (E3) les actions des associations écologistes qui contribuent à sensibiliser le public au développement durable devraient être encouragées.
En terminant notre travail par ces recommandations générales, nous considérons que le chantier est immense. Il concerne autant les politiques et acteurs de terrain que les chercheurs. Nous avons, en effet, souligné de manière exploratoire que l'écopreneuriat est un entrepreneuriat singulier. La question de son accompagnement mériterait la conduite de travaux ultérieurs.

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[1] Ivanko et Kivirist (2008) soulignent qu'outre l'éco-tourisme, l'éco-entrepreneuriat recouvre les activités centrées sur l'économie durable (construction écologique ; énergies renouvelables ; management environnemental ; investissements socialement responsables), celles contribuant à produire des modes de vie sains (alimentation bio ; soins naturels ; etc), les médecines alternatives (naturopathie ; homéopathie ; etc.), les activités de développement personnel (yoga ; produits spirituels ; etc), et enfin les activités contribuant à produire des modes de vie écologiques (recyclage ; produits maison…) dont relèvent l'éco-tourisme. La grande diversité des secteurs concernés par l'eco-entrepreneuriat obligeait a un choix et l'éco-tourisme, a la différence d'autres activités répertoriées, est une manifestation éco-entrepreneuriale indiscutable.

[2] Les autres définitions officielles s'inspirent de celle de l'OMT. Ainsi, pour TIES (The International Ecotourism Society, 1991), « *L'écotourisme est une visite responsable dans des environnements naturels ou les ressources et le bien-être des populations sont préservés* ». Pour l'IUCN (The World Conservation Union), « *l'écotourisme est une visite, responsable au plan de l'environnement, dans des milieux naturels relativement peu perturbés, avec le but d'apprécier la nature (et toute autre dimension culturelle du passe et du présent), qui fait la promotion de la conservation, qui a un faible impact négatif et qui permet une implication socio-économique des populations locales* ». enfin, pour John Ivanko et Lisa Kivirist (op. cit.), « *ecotourism is the travel that helps preserve, protect or restore the natural or cultural areas while providing financial and other benefits to local communities* ».

[3] Cas rapporté dans Levy-Tadjine, Kharrouby (2005).

[4] Pour Di Maggio (1988) et Suckman (1995), l'entrepreneur institutionnel désigne l'acteur qui créée un nouveau contexte institutionnel ou manipule un contexte existant de manière à le redéfinir.

[5] Pourtant, si l'on en croit Volery (2002), leur nombre devrait nettement augmenter dans l'avenir. Pour cet auteur, le nombre d'opportunités environnementales ne fera que croitre sous l'effet conjugué de deux facteurs « *push* » et « *pull* ». La première catégorie fait référence à la démultiplication des règlementations environnementales et aux coûts d'élimination des déchets qui vont créer de nouvelles opportunités pour ceux qui sauront proposer des moyens économiques pour la mise en conformité du monde industriel. Le caractère limité des ressources naturelles (eau ; pétrole…) constitue également un facteur « push ». La demande des consommateurs (orientée vers le « *bio* » et le naturel) serait le principal facteur « pull ».

[6] Pour Evrard et al. (2003), *« une étude exploratoire a quatre caractéristiques : la faible taille de l'échantillon, l'interaction observateur-observé, le rôle central de l'interprétation des données et le recueil des données qualitatives».*

[7] Nous avons pu en répertorier une dizaine et en avons interrogé quatre en plus des deux cas analysés précédemment par Levy-Tadjine et Kharrouby (2005).
[8] Pour Wacheux (1996, 89), « *l'étude de cas est appropriée lorsque la question de recherche commence par 'pourquoi' ou 'comment'* ».
[9] J.M. Plane distingue en fait deux phases dans la phase d'entretien : « *la phase d'écoute active de l'acteur interviewé* » qui correspond à notre phase d'entretien proprement dite et *« la phase stratégique finale* ». Pour l'auteur, cette dernière prend tout son sens lorsque l'entretien s'inscrit dans une recherche-intervention en organisation et que les résultats de l'intervention ont une incidence sur la fonction qu'occupe l'interviewé dans l'organisation. L'auteur s'est, en effet, souvent rendu compte que ce n'est qu'après une heure d'entretien que l'interviewé émet des informations importantes et souvent sensibles sur sa fonction. « *Cette fin d'entretien se caractérise donc par une émission d'idées-forces à forte concentration de signification qui souvent synthétisent l'entretien* » (p. 128).
[10] Le détail de la grille d'entretien est présenté dans YOUNES (2009).
[11] Dans cette perspective, une première série de questions qui, faute de place, ne sera pas exploitée dans cet article interrogeait les répondants sur la probabilitéqu'ils créent un éco-projet, sur leurs choix s'ils devaient arbitrer entre la creation d'une éco-entreprise et l'obtention d'un emploi salarié, et sur leur choix s'ils devaient arbitrer entre la creation d'une éco-entreprise et la création d'une enterprise ordinaire.

SE 2.1
PRAGMATIC EXPLORATIONS IN THE PREDICTABILITY OF THE LANGUAGE BEHAVIOUR OF SOCIAL GROUPS

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Scientific discovery in the fields of humanities and social behaviour has been concerned with the identification of patterned sets of predicable elements governing social beings and their modes of behaviour (Wardaugh, 2006; Trudgill, 2000; Thomson *et al*, 2001). Modernist theorists, in their quest for objectifying and categorizing social reality, have exploited the perceived static characteristic of the identified category as the basis for their analysis and the ensuing outcomes (Meyerhoff, 2006; Milroy and Gordon, 2003). Dealing with definite and fixed categories always brings about relieved certainty and eliminates the dangers of unpredictable outcomes.

In social relations, networks and groups have been the subject of sorting and categorization in the quest for identifying features that can facilitate the understanding of sets of habits, beliefs and ultimately cultures, and to avoid discontent, conflict and ultimately wars. Emerging categories of race, gender, age, background, ethnicity, etc, created in modern times, fields of study with the aim of providing more insights into human and social behaviour (Labov, 1972; Dubois and Hovarth, 1998). Macroanalysis focused on the interaction of these groups in data collection in the pursuit of variables that could indicate a specific feature inherent to the studied group. Language was perceived as the research path that can yield information on several social aspects. Sociolinguistics followed language variation amongst social classes, gender categories, age groups, ethnic clusters, etc and were able to identify stable characteristics that featured as inherent in the performance of the group under observation. The general outcome of the macro sociolinguistic perspective was the identification and categorization of different types of language varieties and their correlation with specific social factors in a predictable reflectivist patterning. Again, a smooth and comforting outcome materialized that has a fixed correlational aspect necessitating the presence of one set of conditions with the specific identified element. But is social and human behaviour that predictable?

Reducing the complexity of human interaction into patterned behaviour is, at best, an oversimplistic perception of a complex and dynamic manifestation of a myriad of considerations. Seeking structural patterning is an initial phase where sorting is done on the basis of pre-determined stereotypical features. It should not, however, be the end result. Variation that does not conform to the predefined categories should not be marginalized, in any discipline, or treated as irrelevant or superfluous. Cases of non-conformance may lead to a new area in scientific discovery, including human and social sciences.

In the field of sociolinguistics, traditional perspectives have looked for conformance of the data to predetermined social and linguistic clusters. The macro-context, for example, necessarily influence the selected lexicogrammatical strands used. The formality or informality of the occasion, the interlocutors, the audience and the topic, are all perceived to determine the type of the exchange in the encounter.

Instances of non-conformance to the macro social categories of the context, however, are not less important than the conforming data in determining the significance of influences in a social/linguistic encounter. Probing deeper into the analysis of human behaviour in social situations, as manifested in language data (Potts, 2005; Al-Khatib, 2003), can yield unexpected findings that may present challenges to the simplistic one-to-one pre-established correlation. Notions of ideology, solidarity, power struggle, are but few outcomes of recent pragmatic research on non-conforming language behaviour in static social contexts. Language behaviour in social situations is not only reflective of the macro social components of the situation of the exchange, but also constitutive of new social realities that include new perceptions on power relations, ideology, solidarity, affiliation, status, convergence and divergence, etc.

In paying attention to conforming and non-conforming data, or put in another way, in adhering to the ethos of researching where authentic analysis leads to the results, rather than starting with preconceived theory and searching for conformity and not venturing into areas that may disprove it, wider horizons may become within reach and new areas of research can be attempted.

Progress is the result of new analysis and new perceptions. The above propositions are not intended to destabilize the ordered social system but rather to re-order previously unordered categories. There is a proposal to focus on the social being, the human, as the centre of the analysis not the passive receptor of social influences. Traditional orders based on social categorization are not sufficient in predicting human behaviour. Studies on language performance in static social situations proved the inability of the macro social categories to predict the ensuing language performance. Instants of formal occasions were compromised by informal phrasing that also appealed to audience and brought applause, contrary to the expected pattern of formal context bringing about formal language use! Moreover, ethnic group networks normally associated with ethnic language use featured adolescents using matrix community language to signal disobedience and flout social obligations!

Rather than being content with a fixed reality there is a need to focus on its dynamic aspect and to seek interpretation for the novice encounters that may challenge existing perceptions. Understanding is the first step to encompassing and acting. Human behaviour may not be as predictable as first assumed when organized into social categories. Categorization surely helps in identifying the characteristics of a specific selection, nevertheless, the need to look for non-conforming data, even more than conforming ones, remains the responsibility of researchers in all disciplines.

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SE 2.2
THE MACROECONOMIC IMPACTS OF WORKERS' REMITTANCES IN THE CONTEXT OF GLOBAL FINANCIAL CRISIS: THE CASE OF EGYPT AND LEBANON

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This paper is an attempt to assess the macroeconomic implications of workers remittances for a small open economy after one year of global financial crisis. The impact may depend on the structural characteristics of the recipient country, such as the degree of development of banking system, foreign exchange regime, and the capacity to manage large financial inflows. The paper utilizes monthly data from Egypt and Lebanon to investigate the role of such characteristics on the macroeconomic impacts of workers remittances in the context of global financial crisis. In addition to shortcomings and methodological problems associated with remittances that hinder cross country empirical investigation, Lebanon and Egypt are chosen where the remittances as a share of GDP are among the highest in the Arab world.

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SE 2.3
A contribution to the development of a new approach for tolerancing for CNC machining

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ABSTRACT
This work contributes to the development of new approaches of tolerance analysis and synthesis for machining processes on a CNC machine-tool. This research is conducted according to two directions. The first one consists of an experimental study to determine the manufacturing dispersions and the machine structural errors and their influence on the manufacturing tolerances. The second one presents a method for the compensation of the manufacturing errors due to tool wear and tool path.

Keywords: Modeling; Manufacturing Tolerance; Tool machine

SE 2.4
The Role of Knowledge Management Processes (KMP) in accumulating Intellectual Capital (IC): an empirical Study in Egypt

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Abstract

This paper tests the link between KM and IC through empirical data from software industry in Egypt. The sample consists of 39 software firms in Egypt. The findings indicated that knowledge management processes of acquisition, creation, documentation, transfer, and application have a direct effect on IC components of human capital, organizational capital, and relational capital. . The study tested some hypotheses regarding the relationship between knowledge management processes and intellectual capital components. The results of statistical analysis show that knowledge management processes explained .511 percent of the variance in human capital (the explanatory power of the model). On the other hand, the results indicate that knowledge management processes explained .794 percent of the variance in organizational capital. In addition, the results reveal that knowledge management processes explained .617 percent in the variance of relational capital as an endogenous variable. The research presented in this paper contributes to the understanding of the nature of the relationships between KMP and IC. The managerial implications of the study are that the integration between knowledge management and IC is so important. It helps the manager to understand that KM and IC impact each other. Therefore, organizations should develop their strategies, organizational designs, institutional systems, and human development in a way that facilitates the interaction and synergistic between KMP and IC. Firms should establish knowledge maps to link KMP with IC that help them to build successful knowledge strategies. Such maps also allow organizations to understand how the business works in knowledge era. The systematic KMP approaches are of importance in order to fulfillment of their needs of IC accumulation. If all the KMP components can be managed efficiently and effectively, IC can be easily accumulated, which add value to the competitive advantages of firms. Discussions and implications for knowledge management processes and intellectual capital are drawn. Research findings provide implications for practitioners, policy makers, and researchers. This paper provides a strong foundation to start investigating the relationship between KM and IC.

SE 2.5
ANALYSE DES DISCOURS DES GOUVERNANTS DES BANQUES EN PERIODE DE CRISE: L'EXEMPLE DE LA BSE

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Cette recherche se propose de comparer les discours des gouvernants des banques libanaises cotées en bourse au cours de trois périodes, l'une avant crise (2004), l'autre de crise (2005 et 2006), et *In fine* de sortie de crise (2007). Les prises de positions des dirigeants sont présentées chaque année par les rapports annuels par le biais du « mot du président ». A partir d'un corpus d'un 20 « mot du président » provenant de la population des six banques commerciales cotées à la Bourse de Beyrouth (BSE), les auteurs s'interrogent pour savoir si 1) le contexte de crise et 2) la structure de propriété, façonnent le discours des dirigeants. L'analyse repose sur la statistique textuelle (logiciel ALCESTE) sur trois périodes et quatre années. L'analyse textuelle repère cinq discours-types. En conclusion, les auteurs analysent ces discours-types au regard de la rhétorique de crise et la structure de propriété.

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