

## المؤتمر الدولي الثالث للعلوم والتنمية

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## مقدمة

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عميد كلية العلوم/رئيس المؤتمر

أ.د. ناصر إسماعيل فرحات

# العلوم الحياتية

## Life Sciences

## **The therapeutic dose of dexamethasone: Histochemical view.**

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### **Abstract**

The effect of the intramuscular therapeutic dose of dexamethasone (0.75 mg/kg.b.wt.) was evaluated on carbohydrate, protein and DNA inclusions of hepatic cells of male albino rats. Five micron - paraffin sections were prepared and Periodic acid Schiff's technique, bromophenol method and Feulgen's reaction were carried out. Four hours after the treatment of the rats with dexamethasone, the hepatocytes manifested a decrease in their contents of carbohydrates and proteins. Such decrease reached its maximum in the specimens examined at 15<sup>th</sup> day and persisted till the 30<sup>th</sup> day after the administration of the drug. The complete resumption of the normal level was achieved at 50<sup>th</sup> day. Such results were concomitant with the inhibitory effect of dexamethasone on the DNA-containing materials. Large nuclei and few mitotic figures were observed in some hepatocytes and many cells either had pyknotic nuclei or revealed karyolysis. This reflected a decrease in DNA inclusions in the liver cells. DNA inclusions decreased and recovered in the same manner as what detected with proteins. Those findings were extreme in specimens examined from a group of rats injected with a second dose of dexamethasone after being recovered. The significant decrease in carbohydrates and proteins was revealed by the liver cells directly 4 hours after the administration of the drug. The decreasing effect overspread the hepatic lobule including its central area. The pyknotic nuclei and necrotic cells were evident. The maximal depletion was detected in the 7<sup>th</sup> day-examined specimens. By the end of the study the rats manifested partial recovery and failed to gain their normal conditions. From previous findings, it is concluded that, dexamethasone is harmful on the chemical contents of the hepatic cells and the delay of recovery after repeating the dosage reflects the damaging effect of the therapeutic dose of dexamethason. Our recommendation is to weigh up the benefit of repeating the therapy against the possibility of the damaging effect of the drug.

## **Yersinia enterocolitica and Aeromonas hydrophila in Clinical, Food and Environmental Samples in Gaza Strip**

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**Keywords:** *Y. enterocolitica*, *A. hydrophila*, KOH treatment, Gaza

### **EXTENDED ABSTRACT**

#### **INTRODUCTION**

The interest of the occurrence of *Yersinia enterocolitica* and *Aeromonas hydrophila*, their pathogenicity and antimicrobial resistance is increasing worldwide because both were linked to acute and chronic gastroenteritis, septicemia and wound infections. Though reports on the occurrence of both pathogens among human are available all over the world, no published data are available from Gaza strip. Moreover, there is no routine testing for the detection of *Yersinia* and *Aeromonas* in clinical or environmental samples. This study was conducted to investigate the occurrence, sources of both *Y. enterocolitica* and *A. hydrophila* in clinical, food and environmental samples.

#### **MATERIALS AND METHODS**

This study examined 300 diarrheal stools to investigate the presence of *Y. enterocolitica* and *A. hydrophila* in clinical samples. 95 food samples and 84 environmental samples were also tested. Different enrichment and isolation techniques and media were used to determine the most appropriate isolation method. All suspected *Y. enterocolitica* and *A. hydrophila* were identified using conventional microbiological techniques.

#### **RESULTS AND DISCUSSION**

Of the 473 tested samples, 28 (5.9%) were positive for *Y. enterocolitica* and 179 (38.1%) for *A. hydrophila*. The overall incidence of *Y. enterocolitica* and *A. hydrophila* in clinical samples was 4.7% and 34.3% respectively (table 1), with high frequency of both pathogens in AL-Dorrah and AL-Nasser hospitals. KOH treatment method showed superior recovery rate over other enrichment techniques. *Yersinia* species were isolated from all sampled sources except seawater. The highest incidence was from sewage (19.1%) followed by animal excreta (11.5%), while, clinical samples

showed the lowest percentage (4.7%). *A. hydrophila* was also isolated from all sampled sources. Meat and water showed the highest incidence (48.9% and 46.9% respectively). Direct plating on CIN agar after treatment with KOH treatment was more efficient than the widely accepted method of cold enrichment in PBS for the detection of *Y. enterocolitica* and *A. hydrophila* from clinical and food samples.

**Table (1):** Distribution of *Yersinia* and *Aeromonas* isolates according to sample type.

Sample type	No.	<i>Yersinia</i>		<i>Aeromonas</i>	
		No.	%	No.	%
Clinical samples	300	14	4.7	103	34.3
Animal excreta	26	3	11.5	10	38.5
Meat	45	3	6.7	22	48.9
Milk	50	3	6	18	36
Sewage	26	5	19.1	11	42.3
Water	32	2	6.25	15	46.9
<b>Total</b>	<b>473</b>	<b>30</b>	<b>6.3</b>	<b>179</b>	<b>38.1</b>

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- [2] Johnson J., 1998- *Isolation and Identification of Pathogenic Yersinia enterocolitica from Meat and Poultry Products*. USDA/FSIS Microbiology Laboratory Guidebook 3rd Edition, 1-28.

## Physiological Study on the Effect of Sweeteners Saccharin on Albino Rats and the Therapeutic Action of Vitamins C and E

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### Abstract

The present work aimed to study some blood indices of albino rats as affected by the treatment with saccharin and the therapeutic action of vitamins C and E. The used adult female *Rattus norvegicus* albino rats in the present study were weighing 100-120g. Animals were divided into four groups, housed six to a cage representing control, Saccharin, Saccharin + Vit. C and Saccharin + Vit. E. Administration of saccharin at a dose of 35 mg kg<sup>-1</sup> b. wt. day<sup>-1</sup> for 35 days, decreased serum glucose, triglycerides, cholesterol, total protein, albumin and globulin values to 76.76±2.19, 54.0±2.11, 101.95 ±3.13, 5.90±0.30, 2.15±0.22 and 3.75 ±0.13 mg/dl compared to control level and their P values were <0.01, <0.01, <0.01, <0.01, <0.01 and >0.05 respectively. But increased urea, Uric acid and creatinine compared to control level. The effect of saccharin was more pronounced on Creatinine. Activities of serum AST, ALT and ALP were increased significantly (<0.05) following saccharin treatment to rats. Concerning haematological parameters, the more obvious changes were observed in the increment of WBC, MCV & PLT and the decrease in Hematocrit, Hb and RBCs count in response to the administration of saccharin. In general, Vitamin C or vitamin E (150 mg kg<sup>-1</sup> b. wt. day<sup>-1</sup> for 35 days) was able to reduce the effects of saccharin intake. However, vitamin E, generally, was more efficient in reducing the changes in these parameters compared to vitamin C. It could be concluded that since intense sweeteners have adverse effects, it is recommended to use the safe naturally occurring compounds with sweetening properties with the need to extensive food quality monitoring and surveillance programmes to safeguard the health of population at large from the food additives .

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Key words: saccharin, liver and Kidney functions, AST, ALT, ALP, glucose, protein, nonprotein nitrogenous constituents, lipids, albino rats, , blood indices, vitamins C and E



**Impact of socio-economic conditions and parasitic infection on hemoglobin level among children in Um-Unnasser village, Gaza strip.**

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**Abstract**

**Aim:** A cross-sectional study was conducted to examine the impact of socio-economic conditions and intestinal parasitic infection (IPI) on hemoglobin level among children aged between 2-15 years of Um-Unnasser village North Gaza.

**Methods:** The data were collected using structured questionnaire and laboratory analysis of blood and fecal samples.

**Results:** The results showed that of 256 children, 25% were anemic and prevalence was higher in children aged below six years. Overall prevalence of intestinal parasitic infection was 46.9% , *Ascaris lumbricioides* (11.3%), *Giardia lamblia* (8.2%), *Hymenolopis nana* (6.2%) *Entamoeba histolytic* (5.1%), *Strongyloides stercoralis* (2.0%) *Enterobius vermicularis* (2.7%), *Trichuris trichiura* (0.3%) most frequently found, whereas, (10.9%) of children had multiple parasitic infection. There was an association between some socioeconomic conditions and parasitic infection and anemia . These socio-economic factors included age group of the studied children, father education and work.

**Conclusion:** It was found that Children with double parasitic infection had lower hemoglobin level than those who had single parasitic infections except in *Ascaris lumbricioides* and *Giardia lamblia* .

**Key words:** Hemoglobin level, Parasitic, Socio-economic conditions, Children Anemia.

## **Mapping Maternity Services and Community Midwives a cross One of the major City in United Kingdom (UK)**

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### **Abstract**

Pregnancy is a continuous process of growth and development from the time of conception to the birth of the baby. It is a time of tremendous physical, psychological, social and emotional change. The midwife is responsible for Antenatal, Intranatal and Postnatal care. It was therefore appropriate to mapping the efficiency of care being delivered to the pregnant women during this process. The main goal of this study was to understand the efficiency of care being delivered to the pregnant women during antenatal and postnatal care. The sample of the study consisted of "66" midwives across the major city in United Kingdom (UK) selected from the three major local acute trusts and related community clinics. Twenty two midwives were equally selected from each trust. In addition 15 pregnant women were selected randomly from the three local acute trusts to have an idea about the efficiency of care being delivered from pregnant women perspective. Information was obtained through face to face structure interview and direct observation at the clinical settings. Non-experimental descriptive cross-sectional design was used in this study. The results of mapping showed that some midwives have knowledge deficit regarding identifying the risk factors of pregnant women (obesity, diabetes mellitus, hypertension, smoking, teenager primigravida, drug and alcohol abuse, mental health problems and identifying high medical and social risk). In addition many midwives did not know the recommended risk category of BMI, non-fasting blood glucose level and blood pressure. Early booking by 12 weeks, continuity of care, early referral of high risk pregnant women especially (IUGR) and colostrum breast feeding should be encouraged in order to decrease potential complications and any secondary care referral especially more than one third of the midwives do not see the first booking appointment within 12 weeks

**Key words: Antenatal and postnatal care - Risk factors – Mapping-UK.**

## Evaluation of Cactus *Opuntia Cladodes* Extract Medium for Growth of Baker's Yeast: Optimization of pH and Temperature

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### Abstract

**Aim:** This study aims to evaluate using of *Cactus opuntia* cladodes (COC) extract medium for growth of *Saccharomyces cerevisiae* (Baker's yeast), and to optimize pH and temperature values of the growth.

**Methodology:** The study design was a comparative study. The control media were both potatoes dextrose (PD) agar (PDA) and broth (PDB). COC aged 1-2 years were obtained from a farm in a border of Jabalia Refugee camp. The crude COC extract was diluted to 50% before using as experimental medium of the Baker's yeast (BY). The preactivated BY sample was diluted to  $10^{-7}$  before using. Experiment were carried out on both surface and submerged cultures. SPSS system was used to analyze the obtained data.

**Results:** The results showed that the BY can well grow and proliferate in COC extract (50% dilution) where the average specific growth rate ( $\mu$ ) was  $0.21 \text{ h}^{-1}$ . Similar to the growth of the BY on PDB medium, the optimum pH and the optimum temperature values for the yeast growth in the extract medium were 4.0 and  $30^\circ\text{C}$ , respectively. It was also found that 29.0 g of yeast (dry weight)/L was produced in COC extract, while 37.0 g/L was produced in PDB. Moreover, average yeast dry weight that produced in COC extract was about 41.3 g/l, while an equal quantity of PDB produced about 54.1 g/L. Moreover, the results showed that 1000g fresh weight of COC produced 62.0 g of BY.

**Conclusion:** COC extract could be used as alternative media of PD for production of BY at pH 0.4 and  $30^\circ\text{C}$  after adding natural and rich nitrogen source.

**Key words:** Yeast, *Cactus opuntia* cladodes, pH, temperature, specific growth rate.

**Association between the Level of Growth Related Hormones,  
Biochemical Profile and Short Stature among A Group of Young Males  
in Gaza**

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**Abstract**

The growth hormone-insulin like growth factor (GH-IGF) axis plays a crucial role in the regulation of growth. Initially, it was considered to be a mediator of growth hormone actions, IGF axis has been established as an independent endocrine system with wide array of actions. IGF-based investigations (IGF1 and IGF binding protein 3) are now replacing GH-based investigations for evaluation and monitoring of disorders of the GH-IGF axis. This study aimed to examine the utility of GH, IGF-1, and IGFBP-3 for diagnosing short stature.

Cross sectional study was used to collect data from 85 subjects with short stature (case group), and 80 subjects with normal stature (control group).

Blood samples were obtained from both groups. Stat fax in conjunction with a recently available ELISA kit were used for assessment of GH, IGF-1, and IGFBP-3 hormones in addition to chemistry profile (Ca<sup>+2</sup>, P, Mg<sup>+2</sup>, glucose and liver function tests) .

SPSS version 15 was used as the tool for statistical analysis. The results of the present study showed significant relationship between GH, IGF-1 and IGFBP-3 and short stature (P-value= 0.000 for each hormone). Moreover there was high statistical significant correlation between alkaline phosphatase, phosphorus and stature (P-value = 0.001 for both ALP and P).

To the best of our knowledge this is the first study in Gaza, investigating the role of GH, IGF-1 and IGFBP-3 in short stature, taking into consideration the socio-economic factors.

**Key words:** Growth hormone (GH), insulin like growth factor-1 (IGF-1), insulin like growth factor binding protein-3 (IGFBP-3), short stature ,Gaza– Palestine.

## Isolation of *Aspergillus oryzae* and New Aroma Production for Soy Sauce

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### Abstract

The present study is aimed to isolate *Aspergillus oryzae* strain for using in soy sauce production with new aroma of thyme and dill. Samples of rice, soybeans, and wheat assumed to be contaminated with *Aspergillus oryzae* were used in isolation. Pure cultures obtained by culturing and subculturing on Potato Dextrose Agar (PDA) were maintained on PDA slant. All the isolates were inoculated on *Aspergillus Flavus* and *Parasiticus* Agar (AFPA) medium to differentiate them from *Aspergillus Flavus* and *Aspergillus Parasiticus* based on reverse color. These isolates and the reference strain were inoculated on Czapack Yeast Extract Agar (CYA) and the macroscopic characteristics amongst these strains were compared. Slide cultures for these strains were prepared and their microscopic characteristics were compared. The preparation of the soy sauce was carried out by two stages. The first was Koji, which was prepared by mixing isolates and the reference strains separately with steamed soybeans and crushed millet then incubated for three days. The second was the brine, which consisted of koji and salt solution. The results of analysis of soy sauce encourage the using of the isolates especially rice isolate in soy sauce production. The addition of dill and thyme were gave a specific aroma to the final product.

**Key words:** *Aspergillus oryzae*, soy sauce, Aroma, Thyme, Dill

**Nutritional Status Correlated with Sociodemographic and Economical factors Among Preparatory School Aged Children in the Gaza Strip**

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**Abstract**

**Aim:** This study was conducted to investigate anthropometric nutritional indicators that correlated with sociodemographic and economical factors among preparatory schooled aged children (PSC) in the Gaza strip.

**Subjects and Methods:** Study sample were chosen purposively from three different sociodemographic and economical areas in the Gaza strip which were Jabalia refugee camp (JRC), Gaza city (GC), and Al-Garrara village (GV). It was selected randomly from two largest preparatory schools (one for males and one for females) per each area and totally consisted of 680 PSC (350 males and 330 females) aged 12 to 14 yrs. A structural and self administered questionnaire about socio-demographic and socioeconomic factors for each pupil in the sample was recorded. Logistic data were analyzed by SPSS WIN program.

**Results:** The overall prevalence of overweight among the females and the males were 17.0 % and 17.1% ( $p= 0.4$ ) whereas obesity for both sexes were 5.45 % and 7.42 %, respectively ( $p= 0.001$ ). Moreover, there were high statistical significant relationships between age and overweight ( $p= 0.001$ ) or obesity ( $p= 0.002$ ). Highest percentage of overweight and obesity among the males were recorded in GC (24.1 % vs. 9.48 %). On the other hand, obesity was very significantly related to mother education among the females in JRC ( $p= 0.007$ ). Moreover, high significant relationship was observed between overweight and income ( $p= 0.01$ ) among the males in the same camp. There was also a high significant relationship between obesity and father job among the males in GV ( $p= 0.005$ ).

The overall prevalence of thinness for the males was higher than the females (7.42 % vs. 5.75 %,  $p= 0.001$ ). The difference in thinness values between the two sexes according to age was not statistically significant ( $p= 0.3$ ). Highest percentage (11.8%) of thinness was recorded among the

females in GC. There was no significant relationships between thinness and socioeconomical factors among PSC in the Gaza strip ( $p > 0.05$ ). Thinness and socioeconomical relationships in the three different socioeconomical areas among PSC were not observed.

The overall prevalence of stunting among the males was higher than females (8.29 % vs. 6.36 %,  $p = 0.001$ ). Highest percentages (10.8%) of stunting among the males was recorded in GV. It was also found that stunting was significantly related to father job ( $p = 0.02$ ) among the males in JRC. Similar to the thinness, significant relationships between stunting and socioeconomical factors among PSC in the Gaza strip were not observed ( $p > 0.05$ ).

These nutritional indicators showed very significant difference between the males and the females according to region of the residence ( $p = 0.001$ ). No statistical relations were observed between any of the indicators and the socioeconomical factors among the study samples in GC.

**Conclusion:** About 10 % of adolescent pupils in the Gaza strip undergo from malnutrition that significantly associated with region. Moreover, relationships between malnutrition and socioeconomical variables among the PSC were heterogeneous and require further investigations.

**Key words:** Anthropometric measures, nutritional status, preparatory school-aged children, sociodemographic and economic factors.

## Anti-Bacterial and Synergistic Effects of Some Local Plants extracts

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**Key words:** Antibacterial activity, Synergistic effect, plant extraction.

### EXTENDED ABSTRACT

#### 1. Introduction:

Infectious diseases still represent an important cause of morbidity and mortality among humans, especially in developing countries. Even though pharmaceutical industries have produced a number of new antimicrobial drugs in the last years, resistance to these drugs by microorganisms has increased. The use of plant extracts with known antimicrobial properties can be of great significance in therapeutic treatments. In the last few years, a number of studies have been conducted in different countries to prove such efficiency. Many plants have been used because of their antimicrobial traits, which are due to compounds synthesized in the secondary metabolism of the plant. These products are known by their active substances, for example, the phenolic compounds which are part of the essential oils, as well as in tannin (1). The antimicrobial properties of plants have been investigated by a number of researchers worldwide but research on synergism is very limited and few studies have been reported (1, 2).

#### 2. Materials and Methods

The plant materials that used in this study consisted of *Cakile maritima* (roots & shoots), *Cakile maritima* (seeds), *Mesembryanthemum crystallinum* (whole plant), *Atriplex halimus* (leaves), *Withania somnifera* (leaves), *Marrubium vulgare* (stems) and *Marrubium vulgare* (leaves) were collected from different places from the Mediterranean Sea beach (Gaza Strip). The air-dried plant materials were ground into fine powder and extracted by four different methods: water reflux (3), ethanol 8 hours (3), methanol 5 days (4) and ethanol reflux(5).

All extracts were tested for possible antibacterial activity and synergistic effect against *Escherichia coli*, *Staphylococcus aureus* which were isolated by medical technology department; Islamic University of Gaza.



### 3. Result:

There was no antibacterial activity of all the plant extracts against *E. coli* was observed except with *Cakile maritima* (seeds) when extracted with ethanol 8 hrs. (Inhibition zone =13 mm).

But against *S. aureus*, antibacterial potentials were observed for the extracts of *Withania somnifera* (leaves) with inhibition zone =25mm, *Marrubium vulgare* (stems) with inhibition zone=15mm and *Marrubium vulgare* (leaves) with inhibition zone =13mm which extracted by ethanol 8 hrs.

Synergistic effect of antibiotics and plant extracts showed synergistic antibacterial activity against antibiotic-resistant bacteria. The results obtained with *E. coli* was particularly interesting, since it was inhibited by *Cakile maritima* (roots & shoots extracted by) *Mesembryanthemum crystallinum* (whole plant)), *Marrubium vulgare* (stem) and *Marrubium vulgare* (leaves) extracts at least in one extraction method. In case of *S. aureus*, it showed synergistic activity of all antibiotics and plant extracts used except *Atriplex halimus* (leaves) extracted by water reflux and *Cakile maritima* (seeds), *Withania somnifera* (leaves), *Marrubium vulgare* (stem) extracted by methanol 5 days extraction method. This inhibition was observed when they were used with low effective or ineffective antibiotics. The highest synergistic effect was observed by most plant extracts with tetracycline and minocycline.

### 4. Discussion and conclusion

In the present study, the antimicrobial activity of plant extracts on microorganisms strains were confirmed and synergism was possible with most of the tested antimicrobials. Tetracycline and minocycline presented synergism with the most extracts.

The results showed that:

1. Plant extracts have potential as antimicrobial compounds against microorganisms. Thus, they can be used in the treatment of infectious diseases caused by resistant microbes.
2. The synergistic effect from the association of antibiotic with plant extracts against resistant bacteria leads to new choices for the treatment of infectious diseases. This effect enables the use of the respective antibiotic when it is no longer effective by itself during therapeutic treatment.

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**Occurrence of *Salmonella* spp. in Hens Eggs and their Environment in Selected Farms in Gaza Strip**

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**Abstract**

**INTRODUCTION**

Salmonellosis is a leading food-borne disease world-wide. A wide range of foods has been implicated in such disease. However, foods of animal origin, especially poultry and poultry products, including eggs, have been consistently implicated in sporadic cases and outbreaks of human salmonellosis.

Several governmental agencies including the FDA (Food and Drug Administration) have implemented an egg safety action plan to eliminate *S. Enteritidis* illnesses due to eggs. In Gaza strip, however, there are no directives to control the process of egg production. In addition to the absence of control steps, there are no published data on eggs quality in Gaza strip. This study was conducted to determine the occurrence of *Salmonella*

spp. in eggs and environment in selected local egg production farms in Gaza strip, Palestine.

#### MATERIALS AND METHODS

A total of 596 samples (100 egg pools, 88 feed samples, 320 chicken excreta and cloacal swabs and 88 water samples) were collected from 12 poultry farms in Gaza strip. Samples were tested at the Public Health Laboratory of Ministry of Health (MOH) in Gaza using standard laboratory methods - control *Salmonella* serotypes were used as a guide.

#### RESULTS AND DISCUSSION

Samples collected from twenty poultry farms were divided into three groups (A, B, C) according to period of collection as shown in table 1.

The detection limit of the method we used in this current study was 1.7 cfu/ml (1-2 cells/ml), which is considered as a sensitive technique in the detection of *Salmonella* in egg samples.

The study showed that egg pools, feed samples and water samples were negative for *Salmonella* spp., whereas one *Salmonella* spp was isolated from chicken excreta pools from Khan-Younis poultry farm.

This negative result may be due to the high level of cleaning procedures in egg-production farms, good quality of water sources and antibiotics in feed and we recommended that the collection of large numbers of egg pools and environmental samples in future studies should be considered.

**Table (1):** Sample types percentages in group A, B, C

Group	Types of samples				
	Egg pools	Feed	Chicken excreta	Water	%
<b>Group A</b>	24	24	60	24	132 (22.1)
<b>Group B</b>	40	40	200	40	320 (53.7)
<b>Group C</b>	36	24	60	24	144 (24.2)
<b>Grand total</b>	100	88	320	88	<b>596</b>

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### **Polymorphism in *NOS3*, *ACE* and *PAI-1* Genes and Risk of Recurrent Spontaneous Miscarriage in Gaza Strip**

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#### **Abstract**

**Background:** Recurrent miscarriage (RM) has traditionally been defined by 3 or more consecutive pregnancy losses before 20 weeks of gestation. RM has been estimated to occur in approximately 2% to 4% of pregnant women. A series of aetiological factors, including uterine anomalies, maternal/paternal balanced translocations, luteal phase defect, hyperprolactinaemia, and hyperhomocysteinaemia have been identified for this condition. In up to 50% of cases, however, the exact underlying pathophysiological mechanisms remain undetermined. An inherited component for these recurrent miscarriages (RM) has been suggested. Plasminogen activator inhibitor-1 (*PAI-1*), angiotensin converting enzyme (*ACE*), and endothelium-derived nitric oxide synthase (*NOS3*) are thought to be involved in RM. This study is intended to investigate the correlation between RM and common polymorphisms in *ACE*, *NOS3* and *PAI-1* genes among women experiencing RM in Gaza Strip.

**Methods:** The presence of these genetic profiles was determined for 100 women who had at least three constitutive abortions and 100 control without any abortion using molecular biological technique.

**Results:** The *ACE* D/D polymorphism was present in 49% experimental patients and in 54% of the controls ( $p= 0.479$ ). Similarly there was no significant difference detected in the distribution of polymorphisms for the *PAI-1* with the (4G/4G) genotype present in 16 % of 100 experimental patients and same distribution in controls group ( $p= 1.00$ ). The *NOS3* (4a/4a) was present in 4% of experimental patients and in none of 100 controls group ( $p= 0.123$ ). In this study we also discovered a new variant in *NOS3* gene name as 4C allele one in patient and other in control subjects. In this study, also, we find that elevated blood pressure was more frequent in patients who were genotyped as I/D+D/D as compared to patients who were homozygous for the insertion allele although no significant difference was observed ( $p= 0.212$ ). But in patients who was genotyped as 4G/5G+4G/4G compared to 5G/5G and 4a/4b+4a/4a compared to 4b/4b patients in the RM group showed no significant difference ( $p= 0.848$ ), ( $p= 0.844$ ), respectively.

**Conclusion:** There is no significant association between the *ACE* (I/D), *PAI-1* (4G/5G) and *NOS3* (4a/4b) and the occurrence of first trimester RM. The non significant difference in *NOS3* gene may be the result of the small sample size enrolled in this study. So, Depth investigation of the association of *NOS3* gene (4a/4b) is strongly recommended

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## **Keratoconus**

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### **Abstract**

Keratoconus is characterized by progressive thinning and steeping of the central cornea .It presents a challenge to the optometrists because early diagnosis isn't easy , prognosis is unpredictable and progression is variable .

#### **Prevalence of Keratoconus :**

Keratoconus is a rare condition in the united states and the same in Gaza , in U.S.A keratoconic patients represent about 0.015% (40000 cases) of population , here in Gaza after our group made a research in one of the female secondary school ,we find that it present 0.5 % (5 cases of thousand students), however this group of females in puberty age is the more affected group , and this percentage well declines if we include males and other stages of age in population .

Rigid contact lenses fitter is one of the optometrists functions in optical centers and hospitals and it is the most useful method for treatment of keratoconic patients here in Gaza.

#### **Prevalence of using Rigid contact lenses :**

It estimated in the united states there are 40000 keratoconus patients but only 500 become candidates for surgery, here in our research we find 7 cases of 200 cases become candidates for surgery as we made it in optical centers { Musalam clinical center , Al Quds optical center , Ibn El hitham optical center } between the period (2006-2008) .

In this research we will handle

#### **I-Theoretical part :**

- 1.Keratoconus definition ,etiology.
- 2.Diagnosis and treatment.
- 3.Treatment with Rigid contact lenses.
- 4.fitting of Rigid contact lenses.

#### **II-Practical part:**

- 1.The prevalence of keratoconus in Gaza city.

2. The most treatment options that available in Gaza strip.

**Objective:**

To determine the prevalence of keratoconus in Gaza city and the exact ages ,sex have been influenced by keratoconus, if keratoconus occur bilateral or unilateral ,and the best methods of treatment .

**Results:**

From 200 cases which were examined for keratoconus, all cases were analyzed for age, sex, unaided and aided visual acuity, method of treatment .we found that 57.5% females ,42.5% males,70.6% used Rigid contact lenses ,14.6% used spectacles ,6.6% made surgery ,8.00% unaided, 92.5% benefit with Rigid contact lenses ,7.5% don't benefit,86.7% bilateral ,13.3% unilateral, 57.33% (Age 15-25 years), 24% <15 years, 18.6% 15<years.

**Conclusion:**

The females are more infected than males, and ages between(15-25) years are the most infected , rigid contact lenses are more effective and available as treatment and keratoc

## Amblyopia

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## Abstract

Amblyopia is an important socioeconomic problem because the amblyopic patient's risk of becoming blind is markedly higher than that of the general population. Conventional treatment involves appropriate refractive correction, occlusion of the dominant eye, and active vision therapy. The specific occlusion regimen is determined based on the patient's age, binocular status, acuity level, and performance needs. Successful amblyopia treatment is dependent on several factors, of which patient compliance is the most important. There is not evidence that treatment should be withheld on the basis of age. Close follow-up is essential and maintenance therapy is often necessary.

Aims of the study:

Make a comparison between conventional amblyopia treatment 'only occlusion therapy' and amblyopia treatment using vision therapy to know which method is more effective in treating amblyopia.

**Materials and methods:**

Our study divided in to two parts:

1. *study on previous treated and followed up cases got from SANT JOHN OPHTHALMIC CLINIC.*

We got 20 amblyopic cases following up files, The range of there age was between 1 to 7 years.

The whole of 20 patients had been deferred to various treating methods like (patching, optical correction or both) and there vision improvement was variable.

2. *study on previous treated and followed up cases got from INTERNATIOAL EYE CENTER 'vision therapy treatment' .*

The total number of cases is 20 patients of different types of amblyopia, whose got their treatment in the *INTERNATIOAL EYE CENTER* involving (patching, optical correction and a sessions on the synaptophore).

Results:

The results of improvement that produced from *SANT JOHN OPHTHALMIC CLINIC* and the *INTERNATIOAL EYE CENTER* indicate that there more improvement in amblyopia treatment results that involve the synaptophore.

Conclusion:

The results that produced from this comparison indicated that vision therapy treatment is surly more effective than the conventional treatment, which means that the full cycloplegic refraction, the patch regimen, and the synaptophore sessions are the best way for treating amblyopia.



## Wavefront refraction

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### Abstract

#### **Objectives:**

1. Mapping the profile of the refraction of the whole eye through wavefront sensing devices.
2. Reduce the side effect for most of the refractive surgeries.
3. Improvement vision of patients wearing glasses or contact lenses.

#### **Subject & Methods:**

Based on results from US FDA Clinical Trials and over 100,000 surgeries done around the world, the results with Customized Ablation have been outstanding.

More than 94% of subjects maintained or improved from their best-corrected vision with glasses six months post-operatively.

**Method:** wavefront devices ( aberrometer) , corneal topography

#### **Introduction:**

Before the advent of the wavefront aberrometer, many patients' visual symptoms were collectively referred to as a result of "Higher order aberration". Increasingly, more ophthalmologists and optometrists have begun measuring wavefront errors of patients' eye. A wealth of information is now available, that was not heretofore, from auto-refractor or corneal topography measurements. Use of a wavefront map as a diagnosis tool is also gaining popularity, and vision care professionals use it to explain diagnoses to patients having visual complaints.

It is useful to understand the source of a problem. However, patients are most interested in solutions; such as getting rid of visual complaints, and improving their quality of vision. Currently, laser refractive surgery, such as LASIK, is one possible solution. However, laser surgery is invasive and the tissue healing process following surgery can induce its own set of aberrations, often rendering an attempt to correct the pre-operation errors fruitless. It has been proposed to correct high order aberrations (HOA) with non-invasive devices such as spectacles or contact lenses.

(Higher order aberration can be defined as a refractive error which couldn't easily measured or corrected with spectacles or contact lenses).

Wavefront refraction , diagnoses both lower- and higher-order vision errors represented by the way the eye refracts or focuses light. [Higher-order aberrations](#) are more complex vision errors, whereas lower-order aberrations are more common vision errors such as myopia , hypermetropia, and [astigmatism](#).

Wavefront analysis is a technology that can provide detailed information about the overall refractive status of the eye , including the cornea , but also the lens, the shape of the eye and changes that occur with pupil dilation . It provides information about all the aberrations that exist within the eye .

Wavefront analysis is currently the most sophisticated method of identifying the optical aberrations that the surgeon is trying to correct through refractive surgery .

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**Teratology and Toxicology studies of Fumonisin**

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**Abstract**

Mycotoxins are invisible , highly corrosive, deadly poisons which may persist in feed. Mycotoxins are nearly all cytotoxic, disrupting various cellular structures such as membranes , and interfering with vital cellular process such as protein, RNA and DNA synthesis. They destroy organ tissue

by oxidizing protein, impact specific organs, and have immunosuppressive effects .Some of them produce acute toxicity, evidenced by digestive disorders or dermatitis , but many more are carcinogenic ,resulting in genetic mutations, or causing deformities in developing embryos.

Mycotoxins are among the most important food safety problems, as filamentous fungi occur in many types of foods, including cereals, fruits, vegetables, nuts, salted or dried meat products and cheese. Some of the mycotoxins are not

giving rise to serious acute and chronic diseases, but also occasionally impair the immune system paving the way for severe foodborne diseases caused by bacteria. Fumonisin is a mycotoxin produced by the fungus *Fusarium moniliforme*, one of the major species found in corn.

**Our aim from this study** is to investigate the toxic effect of the mycotoxin fumonisin on fetuses driven from treated rats' mothers.

**Our results** showed teratogenic effects in the embryos from mothers treated with fumonisins. The percentage of total malformed embryos was 27% compared with 9.13% in the control one. The most common visceral anomalies recorded in the study were brain hypoplasia, heart and kidney malformation. 60% of the examined fetuses of treated mothers showed failure in the heart compared with 37.5% of the control one, and 70% of the fetuses showed failure in the lung compared with 0% in the control, to develop to the normal size and structure. Also the fetuses showed malformation as dilated renal pelvis in the kidney of about 20% compared with 15.4% in the control one. Intracranial hemorrhage and brain hypoplasia was shown in 60% of the maternally treated fetuses compared with 23% of the control group. Prevention of fungal invasion of food is the most effective method of avoiding mycotoxin problems.

#### **Regulatory T cells: foe to the success of cancer immunotherapy**

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#### **BACKGROUND:**

Regulatory T cells (Treg) are key players in maintaining immune homeostasis, mediating peripheral tolerance and preventing autoimmunity. Treg are identified by expression of CD4 and high level of CD25 as well as the nuclear transcription repressor forkhead box P3 (FOXP3) which distinguishes them from activated T cells. Increased populations of CD4<sup>+</sup>CD25<sup>high</sup> Treg have been reported in the peripheral blood and tumour tissue of patients with several types of cancer; consistent with a role in tumour escape from immunological control. Tumour-induced expansion of immune inhibitory mechanisms, including immunosuppressive cytokines (TGF- $\beta$  and IL-10) and Treg, can be a major obstacle to successful cancer immunotherapy. The recognition of a role for T regulatory cells in limiting antitumour immunity has provided momentum for developing strategies to override these immunoinhibitory mechanisms.

#### **METHODS:**

The frequency in peripheral blood of Treg ( $CD4^+CD25^{high}$ ) cells from 49 previously untreated renal cell carcinoma (RCC) patients and 38 normal donors have been analysed using a flow cytometry. Similar data were obtained for a subset using the FOXP3 marker, which was also used to investigate the presence of Treg in situ by immunofluorescence and by flow cytometry of disaggregated tumour. Correlation of Treg frequency and some important parameters with regard to survival of patients was also analysed. In a phase I clinical trial, six patients with advanced renal cell carcinoma underwent leukapheresis followed by conditioning chemotherapy with cyclophosphamide and fludarabine. The autologous leukapheresis product was depleted of  $CD25^+$  cells using CliniMACS system then re-infused into the patient

#### **RESULTS:**

We have shown a significant increased frequency of  $CD4^+CD25^{high}$  T cells in RCC patients compared to normal donors (2.47% versus 1.50%;  $P < 0.0001$ ). These results were confirmed using the FOXP3 marker of Treg in a subset of these patients and normal donors. The population of Treg identified showed the expected phenotype with  $CD4^+CD25^{high}$  population in both RCC patients and normal donors contained higher proportions of CD45RO and GITR than  $CD4^+CD25^{low}$  populations and exhibiting suppressive activity in an anti-CD3 and anti-CD28 induced proliferation assays.  $CD4^+FOXP3^+$  T cells were detected in the tumour microenvironment by immunofluorescence and the numbers enumerated in lymphocytes recovered following enzymatic disaggregations of biopsies; their frequency was higher in the tumour than the peripheral blood of the same patients. The follow up data show a significant association between higher peripheral blood regulatory T-cell frequency and adverse overall survival.

In the phase I clinical trial of adoptive transfer of Treg-depleted autologous T cells, one patient developed a rapidly progressive neurological syndrome. A transient reduction in  $CD25^+$  subset was detected in the peripheral blood of 5 out of 6 patients. One patient showed increased specific proliferative responses to the tumour associated antigen h5T4 coinciding with the nadir of Treg.

#### **CONCLUSIONS:**

Our data confirm the increase of Treg in RCC patients and provide impetus to further investigate modulation of Treg activity in RCC patients as part of therapy. The results from the phase I trial provide proof of concept in potentiation of tumour antigen-specific T-cell responses when Treg cell levels are depleted. However, given the transient nature of the reduction in  $CD25^+$  subset and the observed toxicity, there is a need to explore further strategies to improve the safety and efficacy of this approach. Finally, suppression of Treg activity or their cytokine production is a promising approach for the development of therapies for cancer.

الرياضيات

**Mathematics**

## **Abuse Using Statistical Methods in Data Analysis**

***Samir K. Safi***

### **Abstract**

Statistical methods have been the object of controversy among researchers. This paper offers a framework for diagnosing and remedying some of the most common statistical problems. We introduce an important statistical problem concerning selecting the most appropriate statistical methods. This paper presents a general overview of the common statistical methods in data analysis. We also show the most common abuse using of the statistical hypotheses testing and misunderstanding and misinterpretation of the statistical results in the applied researches. The long range goal of this paper is the creation of guidelines or rules of thumb which will aid the researchers when deciding which statistical method to use.

**Keywords:** Hypotheses, Statistical methods, Significance, Tests, Decision.

## **PRIMARY IDEALS AND PRIMARY MODULES IN NONCOMMUTATIVE RINGS**

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### **Abstract**

Prime and primary ideals have long been known in commutative algebra for being among the most fundamental objects in the study of the theory of commutative rings.

As early as 1928, W. Krull introduced the definition of prime ideals in a noncommutative ring and a prime ring respectively as follows:

An ideal  $P$  in an arbitrary ring  $R$  is said to be a prime ideal if  $P \neq R$  and, for ideals  $I$  and  $J$  of  $R$  satisfying  $IJ \subseteq P$  implies that either  $I \subseteq P$  or  $J \subseteq P$ .  
An arbitrary ring  $R$  is prime if the zero ideal of  $R$  is prime.

In this paper we introduce the definition of primary ideals in a noncommutative ring and a primary ring respectively as follows:

An ideal  $P$  in an arbitrary ring  $R$  is said to be a primary ideal if  $P \neq R$  and, for ideals  $I$  and  $J$  of  $R$  satisfying  $IJ \subseteq P$  implies that either  $I \subseteq P$  or  $J^n = \{j^n \in R \mid j \in J\} \subseteq P$  for some positive integer  $n$ .

An arbitrary ring  $R$  is primary if the zero ideal of  $R$  is primary.

We also give an equivalent definition of a primary ideal in a noncommutative ring by proving that an ideal  $P$  in an arbitrary ring is primary if and only if the quotient ring  $R/P$  is a primary ring.

The important of these definitions is that they generalize the definition of a primary ideal in commutative rings. So we show that the definition of a primary ideal in a commutative ring implies to the definition of a primary ideal in any arbitrary ring and we give an example to show that the converse is not true.

At the core of the prime and the primary ideals concepts are the notion of the prime and the primary modules. In 1991 prime modules in any arbitrary ring were defined. These are modules all of whose nonzero submodules have the same annihilator.

In this paper we give an equivalent definition of prime modules in any arbitrary ring. We prove that an  $R$ -module  $M$  is prime if and only if for every nonzero submodule  $P$  of  $M$  there exists an injective  $R$ -module homomorphism from  $R/ann(P)$  to  $M$ .

We also introduce the definition of primary modules in a noncommutative ring. Thus we say that an  $R$ -module  $N$  is primary if  $N \neq 0$  and  $rann(N) = rann(S)$  for every nonzero submodule  $S$  of  $N$ , where  $rann(N) = \{r \mid r \in R \text{ and } r^n \in ann(N) \text{ for some positive integer } n\}$ .

We generalize some of the properties that was proved on primary submodules on the commutative rings and prove that these properties are still valid on any arbitrary rings not necessary commutative.

Finally, we find the condition that make the following result true, which also gives another equivalent definition of a primary  $R$ -module, which says that:

An  $R$ -module  $M$  is primary if and only if for every nonzero submodule  $P$  of  $M$  there exists an injective  $R$ -module homomorphism from  $R/rann(P)$  to  $M$ .

**Key Words:** prime ideals in noncommutative rings , primary ideals in noncommutative rings, prime modules in noncommutative rings , primary modules in noncommutative rings.

## Idempotent Generators of Cyclic Codes over Finite Chain Rings

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### Abstract

In this paper, we construct idempotent generators of cyclic codes over the Rings " $F_2 + uF_2$ " and " $F_2 + uF_2 + u^2 F_2$ " and study their properties. Finally we will generalize the results to linear cyclic codes over the commutative chain rings " $F_p + uF_p + \dots + u^{(k-1)} F_p$ " where  $p$  is prime number, these studies are extensions of the results over the rings  $\mathbb{Z}_4$ ,  $\mathbb{Z}_8$ ; and  $\mathbb{Z}_{p^m}$ ; where  $p$  is prime integer.

**AMS: Subject Classification 2000:** Primary 94B05, Secondary 11H71

**Key words:** Finite chain ring, linear codes, cyclic codes, idempotent generators of cyclic codes.



## Mathematical Model for the Unsteady-state Condition on Oxygen Diffusion through Biological Floc Particles

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### Abstract

A model for unsteady-state condition of oxygen diffusion, through biological floc-particles is made here, to explore the mathematical foundation of reaction diffusion system. Here we considered a mass balanced equation on the floc particle in conjunction with Fick's law. The governing partial differential equations are then solved using Matlab 6.0 and obtained the results for oxygen concentration, and observed that the oxygen concentration become less at middle of the floc while it is high at the surface of the floc.

**Keywords:** Reaction diffusion system, Fick's law, Partial differential equations, Matlab

**$b$  – OPEN SETS AND LOCALLY SIERPINSKI SPACES  
ON  $T_0$ –ALEXANDROFF SPACES**

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**ABSTRACT**

*The aim of this paper is to continue the study of  $T_0$ –Alexandroff spaces, a class of topological spaces which lies strictly between classes of Alexandroff spaces and locally finite spaces. We study  $b$ -open sets and prove that  $BO(X)=SO(X)$  in Artinian  $T_0$ –Alexandroff spaces. After that, we investigate locally Sierpinski spaces. Each locally Sierpinski space is submaximal  $T_0$ –Alexandroff space. The converse is not true.*

*In this paper we will introduce a sufficient condition for a submaximal  $T_0$ –Alexandroff space to be locally Sierpinski space.*

**Key words.** Alexandroff spaces, generalized open sets, lower separation axioms, submaximal.

**1. INTRODUCTION**

By the *Alexandroff space*, we mean a topological space  $X$  in which the intersection of any family of open sets is open and the union of any number of closed sets is closed. Equivalently, every point  $x$  in  $X$  has a minimal neighborhood – denoted by  $V(x)$  – being the intersection of all open sets containing  $x$  [1]. So all finite spaces are Alexandroff spaces.

For each Alexandroff space  $X$ , there is a dual space  $X^*$  in which the open sets are the closed sets in  $X$  and vice versa.

We focus on Alexandroff spaces that satisfy the separation axiom  $T_0$ , because there exists a functorial equivalent between the categories of  $T_0$ -Alexandroff spaces and partially ordered sets where each one of them is completely determined by the other.

Given a  $T_0$ -Alexandroff space  $(X, \tau)$ , the partial order  $\leq_\tau$  - called (*Alexandroff*) *specialization order* - is defined by  $a \leq_\tau b$  iff  $a \in \overline{\{b\}}$ .

These spaces are related to the study of digital topology [9]. The interest in Alexandroff spaces is a consequence of the very important role of finite spaces in digital topology.

Many results and identifications related to open sets and generalized open sets were introduced in some of our previous published papers about  $T_0$ -Alexandroff. More precisely, in these papers, we characterized basic concepts of open sets, topological properties, generalized open sets such as preopen sets, semi-open sets and  $\alpha$ -open sets. We proved that  $\tau_\alpha = PO(X)$  and  $\tau_\alpha \subseteq SO(X)$ . We introduced two subclasses of  $T_0$ -Alexandroff spaces called Artinian and Noetherian  $T_0$ -Alexandroff spaces.

Later, lower separation axioms related to open and generalized open sets such as  $T_i$ ,  $i = \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{3}{4}$  and  $semi-T_i$ ,  $\alpha-T_i$   $i = \frac{1}{2}, 1, 2$  where studied and characterized also. For more details, see [5], [6], [7], and [8].

This paper is a continuation of the previous formalist of our studies on  $T_0$ -Alexandroff spaces. We study  $b$ -open sets and prove that  $BO(X) = SO(X)$  in Artinian  $T_0$ -Alexandroff spaces. After that we investigate locally Sierpinski spaces. Each locally Sierpinski space is submaximal  $T_0$ -Alexandroff space. The converse is not true. In this paper we will introduce a sufficient condition for a submaximal  $T_0$ -Alexandroff space to be locally Sierpinski space.

For complete study, the reader should be familiar with our previous studies and intuitive concepts of Alexandroff spaces.

The symbol  $(X, \tau(\leq))$  denotes a  $T_0$ -Alexandroff space equipped with its (Alexandroff) specialization order  $\leq$ . For each element  $x \in X$ ,  $\uparrow x$  or  $V(x)$  denotes the minimal neighborhood of  $x$ . For a subset  $A$  of  $X$  the interior (resp. the closure, the derive, the boundary, the semi-interior, the semi-closure, the preinterior, the preclosure, the  $\alpha$ -interior, the  $\alpha$ -closure,  $b$ -interior, the  $b$ -closure) will be denoted by  $A^\circ$  (resp. ,  $\bar{A}$ ,  $A'$ ,  $bd(A)$ ,  $sInt(A)$ ,  $sCl(A)$ ,  $pInt(A)$ ,  $pCl(A)$ ,  $int_\alpha(A)$ ,  $Cl_\alpha(A)$ ,  $bInt(A)$ ,  $bCl(A)$ ).

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## MULTIVARIATE CONDITIONAL QUANTILES ESTIMATOR

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### Abstract

De Gooijer, et al (2004) have used the Nadaraya-Watson (NW) estimator of the conditional distribution function to estimate the multivariate conditional quantiles. In this paper, we extend on their work to study a Multivariate Re-weighted Nadaraya-Watson (M-RNW) estimator. The interest to study such estimators lies to their improved bias performance compared to the ordinary NW estimator, while in the mean time they rely on a distribution function estimator that preserves non-negativity and the monotonicity property. We

prove in this paper the consistency of our estimator, and the good performance is verified empirically by two real life data applications.

## INTRODUCTION

For a univariate random variable  $X$  with  $E|X| < \infty$ , the  $\alpha$ -quantile,  $\theta_\alpha$  ( $0 < \alpha < 1$ ), may be defined by minimizing a proper check function

$$\theta_\alpha = \arg \min E \{ |X - \theta| + (2\alpha - 1)(X - \theta) \},$$

see Yu, et al. (2003). Abdous and Theodorescu (1992) discusses an approach to formulate quantile for  $\mathbf{X} \in \mathbb{R}^d$ , ( $d \geq 2$ ). They defined for  $1 \leq p \leq \infty$  and  $0 < \alpha < 1$ , the norm like function

$$\|\mathbf{x}\|_{p,\alpha} = \|(x_1, x_2, \dots, x_d)\|_{p,\alpha} = \left\| \frac{|x_1| + (2\alpha - 1)x_1}{2}, \dots, \frac{|x_d| + (2\alpha - 1)x_d}{2} \right\|_{p,\alpha},$$

where  $\|\cdot\|$  denotes the usual  $l^p$ -norm on  $\mathbb{R}^d$ .

Let  $(\mathbf{X}, \mathbf{Y})$  be a random variable from  $\mathbb{R}^s \times \mathbb{R}^d$ , ( $s \geq 1$ ). For fixed  $\mathbf{x} \in \mathbb{R}^s$ , Abdous and Theodorescu (1992) defined a multivariate conditional  $\alpha$ -quantile as the point  $\theta_\alpha(\mathbf{x})$ , where

$$\theta_\alpha(\mathbf{x}) = \arg \min_{\theta \in \mathbb{R}^d} E(\|\mathbf{Y} - \theta\|_{2,\alpha} - \|\mathbf{Y}\|_{2,\alpha} | \mathbf{X} = \mathbf{x}) = \int_{\mathbb{R}^d} \|\mathbf{y} - \theta\|_{2,\alpha} - \|\mathbf{y}\|_{2,\alpha} \mathbf{Q}(d\mathbf{y} | \mathbf{x}),$$

where  $Q(\cdot | \mathbf{x})$  is the conditional probability function of  $\mathbf{Y}$  given  $\mathbf{X} = \mathbf{x}$ .

De Gooijer, et al (2004) extended this definition by considering a NW estimator of the conditional probability function  $Q(\cdot | \mathbf{x})$ . In our paper we extend on their work to study a Multivariate Re-weighted Nadaraya-Watson (M-RNW). The interest to study such estimators lies to their improved bias performance compared to the ordinary NW estimator, while in the mean time they rely on a distribution function estimator that preserves non-negativity and the monotonicity property. The estimator is of use to calculate prediction intervals for future values, and also as method to calculate lower quantiles for financial series, known as Value at Risk, (VaR).

## RESULTS AND DISCUSSION

In this paper, we proposed a Re-weighted Nadaraya-Watson estimator for multivariate for multivariate quantile and we proved the consistency of this

estimator. Also, the good performance is verified empirically, by applying it to some real life data.

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### Analytical solution of time-fractional advection dispersion equation with reaction

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#### Abstract

In this paper, we get exact solution of the time-fractional advection-dispersion equation with reaction term, where the Caputo fractional derivative is considered of order  $\alpha \in (0,2]$ . The solution is achieved by using a function transform, Fourier and Laplace transforms to get the formulas of the fundamental solution, which are expressed explicitly in terms of Fox's H-function by making use of the relationship between Fourier and Mellin transforms. As special cases the exact solutions of time-fractional diffusion and wave equations are also obtained, and the solutions of the integer order equations are mentioned.

**Keywords:** Fractional derivatives, Laplace transform, Fourier transform, Mellin transform, Fox's H-function.

### Introduction:

Time fractional partial differential equations, obtained by replacing the first order time derivative by a fractional derivative (of order  $0 < \alpha \leq 2$ , in Caputo sense) have been treated in different contexts by a number of researchers. Mainardi and Pagnini [3,4] studied the time fractional diffusion equation and the fundamental solutions (Green functions) by using Fourier-Laplace transforms. Liu et al. [2] considered the time fractional advection dispersion equation by replacing the first order derivative in time by a fractional derivative of order  $\alpha$  ( $0 < \alpha \leq 1$ ) and they have used variable transformation, Mellin and Laplace transforms to achieve a complete solution. Other research articles handling time fractional partial differential equations by using integral transforms can be found in the literature by a number of authors.

In this paper we study the time fractional advection dispersion equation with reaction

$$\frac{\partial^\alpha C(x,t)}{\partial t^\alpha} = D \frac{\partial^2 C(x,t)}{\partial x^2} - b \frac{\partial C(x,t)}{\partial x} + \lambda C(x,t)$$

which describes the transient transport of solutes through a homogeneous soil

and  $\alpha$  ( $0 < \alpha \leq 2$ ) is the order of the time fractional derivative which is intended in the Caputo sense. Now using the relation [5]

$$J^\alpha \left( \frac{\partial^\alpha C(x,t)}{\partial t^\alpha} \right) = C(x,t) - C(x,0^+) - t C_t(x,0^+)$$

where  $J^\alpha f(t)$  is the Riemann-Liouville fractional integral, then we can eliminate the time fractional derivative and obtain the integro-differential equation

$$C(x,t) = C(x,0^+) + \frac{1}{\Gamma(\alpha)} \int_0^t (t-\tau)^{\alpha-1} \left[ D \frac{\partial^2 C(x,\tau)}{\partial x^2} - b \frac{\partial C(x,\tau)}{\partial x} + \lambda C(x,\tau) \right] d\tau$$

if  $0 < \alpha \leq 1$ , and

$$C(x,t) = C(x,0^+) + t C_t(x,0^+)$$

$$+ \frac{1}{\Gamma(\alpha)} \int_0^t (t-\tau)^{\alpha-1} \left[ D \frac{\partial^2 C(x,\tau)}{\partial x^2} - b \frac{\partial C(x,\tau)}{\partial x} + \lambda C(x,\tau) \right] d\tau$$

if  $1 < \alpha \leq 2$ . We could achieve exact solutions by making use of Laplace, Mellin and Fourier integral transforms, where the solutions are written in terms of Fox's H-function as

$$C(x,t) = \frac{e^{-\frac{xb}{D}t^{-\alpha/2}}}{4\pi} \sum_{m=0}^{\infty} \frac{(-\theta^2 t^\alpha)^m}{m!} \times \int_{-\infty}^{\infty} H_{3,3}^{2,2} \left[ y t^{-\alpha/2} \middle| \begin{matrix} (1/2, 1/2), (0, 1/2), \left(1 + \alpha m - \frac{\alpha}{2}, \alpha/2\right) \\ \left(\frac{1}{2} + m, 1/2\right), (0, 1/2), (0, 1) \end{matrix} \right] \cdot \phi(x - \sqrt{D}y) e^{\frac{b}{2\sqrt{D}}y} dy$$

for  $0 < \alpha \leq 1$ , and

$$C(x,t) = \frac{e^{-\frac{xb}{D}t^{-\alpha/2}}}{4\pi} \sum_{m=0}^{\infty} \frac{(-\theta^2 t^\alpha)^m}{m!} \times \int_{-\infty}^{\infty} \left\{ \begin{matrix} H_{3,3}^{2,2} \left[ y t^{-\alpha/2} \middle| \begin{matrix} (1/2, 1/2), (0, 1/2), \left(1 + \alpha m - \frac{\alpha}{2}, \alpha/2\right) \\ \left(\frac{1}{2} + m, 1/2\right), (0, 1/2), (0, 1) \end{matrix} \right] \cdot \phi(x - \sqrt{D}y) \\ + t H_{3,3}^{2,2} \left[ y t^{-\alpha/2} \middle| \begin{matrix} (1/2, 1/2), (0, 1/2), \left(2 + \alpha m - \frac{\alpha}{2}, \alpha/2\right) \\ \left(\frac{1}{2} + m, 1/2\right), (0, 1/2), (0, 1) \end{matrix} \right] \cdot \psi(x - \sqrt{D}y) \end{matrix} \right\} e^{\frac{b}{2\sqrt{D}}y} dy$$

for  $1 < \alpha \leq 2$  and  $\theta^2 = \frac{b^2}{4D} + \lambda$ , where  $C(x, 0^+) = \phi(x)$  and  $C_t(x, 0^+) = \psi(x)$ .

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$(1 - u^{k-1})$  Constacyclic codes over  $\sum_{n=0}^{k-1} u^n F_2$

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### Abstract

A new Gray map between codes over  $\sum_{n=0}^{k-1} u^n F_2$  and codes over  $F_2^{2(k-1)}$  is defined where  $u^n = 0$ . We prove that the Gray image of a linear  $(1 - u^{k-1})$  Constacyclic codes over  $\sum_{n=0}^{k-1} u^n F_2$  of length  $n$  is a binary distance invariant linear quasi-cyclic code of order  $k-1$ . We also prove that, if  $n$  is odd, then every binary code which is the Gray image of a linear cyclic code over  $\sum_{n=0}^{k-1} u^n F_2$  of length  $n$  is equivalent to a quasi-cyclic code.

**Keywords:** cyclic code, constacyclic code, quasi-cyclic code, Gray map.

**AMS: Subject classification 2000:** primary 94B05, secondary 11T71.

### On special solutions of second and fourth Painlevé hierarchies

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### Abstract

In this article, we give special solutions of second and fourth Painlevé hierarchies derived by Gerdjikov, Joshi, and Pickering. We show that for certain choice of the parameters each  $n$ -th member of these hierarchies has a special solution in terms of a linearizable  $n$ -th order differential equation.

Moreover we show that each  $n$ -th member of the considered fourth Painleve hierarchy is related to the  $(n-1)$ -st member of the considered second Painleve hierarchy

**Keywords:** Painleve hierarchies, Special solutions. **PACS number :** 02.30 hq, 02.30.Gp  
**Peristaltic Viscoelastic Fluid Motion In Asymmetric Channel**

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### **Abstract**

The peristaltic flow of Oldroyd fluid is studied theoretically in an asymmetric channel. Asymmetry in the flow is induced by taking peristaltic wave train of different amplitudes and phase on the walls of the channel. Using perturbation series on the wave number as a parameter, analytic solution for the stream function and the longitudinal pressure gradient is obtained. Furthermore, Numerical computations have been performed for the pressure rise per wavelength and the results have been discussed for various values of parameters of interest.

**Keywords:** Asymmetric channel; Viscoelastic fluid; Peristalsis.

الفيزياء

Physics

## Coupling Efficiency of Metamaterial Magneto-optical Integrated Isolator

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### Abstract

Nonreciprocal devices such as isolators are well known in light wave communication systems. The integrated optical isolator is presented where the magnetic field modes propagate perpendicular to the in-plane magnetization of a planar magneto-optical waveguide. The cladding and film of optical isolator are made of magnetic materials with magnetization adjusted to be parallel to their plan. The substrate is filled with new artificial metamaterials (MTMs). The dispersion equation of the TM fields is derived. The difference  $\Delta\beta$  between the phase constant for forward and backward propagation is calculated numerically for different values of MTMs permittivity ( $\epsilon_s$ ) and permeability ( $\mu_s$ ). Results show that the cut-off thickness is different for forward and backward propagation and varies with the MTMs parameters. Coupling efficiency is calculated in order to estimate the forward and backward loss. The cut-off thickness of the isolator is selected such that the coupling coefficients of the isolator are obviously different for forward and backward propagation.

## TE MAGNETOSTATIC SURFACE WAVES IN SYMMETRIC FERRITE NEGATIVE PERMITTIVITY MATERIAL WAVEGUIDE

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### Abstract

In this paper, nonlinear Magnetostatic surface wave in a three layer structure has been investigated. The design consists of: ferrite (YIG) layer sandwiched between two thick nonlinear nonmagnetic negative permittivity material (NPM) layers. We derived a dispersion relation for TE nonlinear Magnetostatic surface waves (NMSSW) in the proposed structure and numerically investigated. We found the effective refractive index decreases with thickness and frequency increase. Also it was found the effective refractive index increases with optical nonlinearity increase and switch to negative values of effective refractive index at a certain value, which means the structure behaves like a left-handed-material. We found also the power flow is changing by changing the operating frequency, the ferrite thickness, and the optical nonlinearity.

**Keywords:** Magnetostatic surface waves MSW; dispersion relation; negative permittivity material NPM; power flow.  
PACS numbers: 78.20.Ci, 72.80.Tm, 42.25.Lc

## SENSING CHARACTERISTICS OF OPTICAL NONLINEAR WAVEGUIDE SENSORS

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**Keywords:** *Nonlinear planar waveguides, sensors, sensitivity.*

### Abstract

This article provides a comprehensive theoretical analysis for TE and TM polarized waves guided by a linear film surrounded by two asymmetrical nonlinear media for sensing applications. The dispersion relation for guided modes is presented. The sensitivity of the effective refractive index to variations in the clad index is derived. The conditions required for the sensor to exhibit its maximum sensitivity are presented to provide the designer with the optimum thickness of the guiding layer. This analysis concerns with the case when the analyte is homogeneously distributed in the covering medium. The variation of the sensitivity of the proposed sensor with different parameters of the structure is studied. We show that the nonlinear sensors have sensitivities higher than those of linear sensors. The authors believe that optical sensing can be improved by introducing nonlinear waveguides.

### INTRODUCTION

Optical evanescent wave sensors have been widely used for various purposes such as humidity sensing, chemical sensing, biochemical sensing and biosensing. The sensors are based on the detection of changes in refractive index occurring close to the guiding layer surface. Optical sensors have shown many attractive features such as the immunity to electromagnetic interference, the use in aggressive environment and, in general, a high sensitivity. The technology of optical waveguides sensors has progressed very rapidly in recent years because of their unique features

and their applications in several areas such as environmental pollutant control, biotechnology, drug screening, and food safety.

A normalized analysis for the design of linear evanescent wave sensors was carried out [1] and the condition for maximum achievable sensitivity was also studied. Recently, attention has been paid to the reversed symmetry (i.e. refractive index of cladding higher than that of substrate) [2]. It was reported that reversed symmetry sensors are not only capable of light guiding, but they have also larger penetration depths in the cover region. All previous studies were carried out on linear waveguide sensors. Recently, we have shifted these studies to nonlinear waveguide sensors [3,4]. The waveguide sensor under consideration consists of a linear film bounded by two nonlinear materials with an intensity dependent refractive index of kerr type.

### RESULTS AND DISCUSSION

The figure shows that the sensitivity goes to zero at cut-off thickness and has its maximum at waveguide thickness somewhat higher than the cutoff thickness of the guided mode considered. For thick waveguides, the sensitivity decreases to zero because the power of the guided mode flows mainly in the guiding layer itself. Moreover, the figure shows a comparison between linear and nonlinear sensors. We see that nonlinear sensors have higher sensitivities than linear sensors. We believe that optical sensing can be improved by using nonlinear sensors.

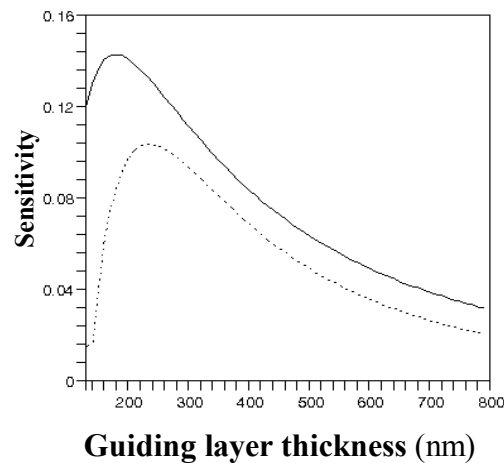


Fig. 1. Sensitivity versus the waveguide thickness  $h$  for the proposed nonlinear sensor (solid line) and a linear sensor (dotted line).

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## Model to study the biological effect of electromagnetic waves produced by mobile phone base station On life tissue

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**Keywords :**( *electromagnetic waves, mobile phone, biological tissue, absorption rate*)

## Abstract

The theory is presented for determining the biological effect of Mobil phone base station on It has been studied theoretically that electromagnetic waves produced from mobile phone base station propagation and absorption by life tissue, the model is a plane homogeneous slab of tissue under the irradiance of normal incidence plane wave. It has



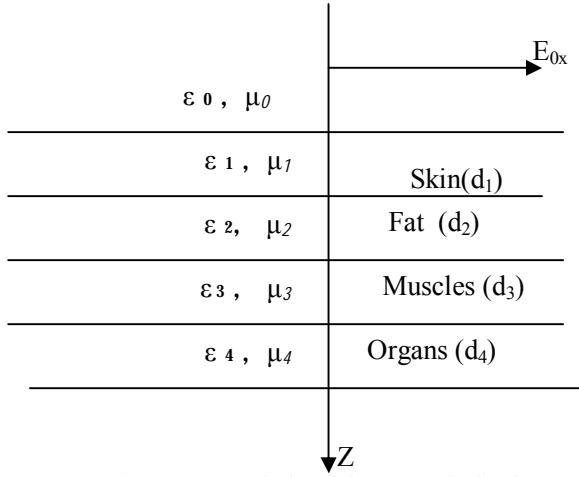
been discussed by obtaining the electromagnetic field, absorbent power specific absorption rate in the model

### **Introduction**

With the advent of mobile communication technologies in the last 10-15 years, many people have been exposed to a different form of electromagnetic energy by mobile phone and base transceiver stations. The effects of electromagnetic energy depend on frequency, amplitude and modulation of the electromagnetic energy source. Many investigation of biological effect of electromagnetic fields at mobile telecommunication frequency have been studied theoretically and experimentally.

Computation of electromagnetic field inside a tissue at mobile communication has been study, which presents a new approach to calculate the electromagnetic field inside a tissue, composed of electrically excitable cell by means of the FDTD (finite difference time domain method), The theoretical that millimeter waves propagation and absorption in human body has been studied , the model is a plane straticulate homogeneous slab of tissue under the irradiance of normal incidence plane wave. It has been discussed by obtaining the electromagnetic field, absorbent power, specific absorption rate, temperature field and their distributions in the human trunk model . Mathematical analysis of microwave heating equations in one dimensional multi-layer has been discussed.

In this study we investigate the behavior of mobile phone base station in model of life tissue which can be assumed as a plane layered medium consists of skin, fat, muscles, and organs. It is assumed that a plane wave is obliquely incident upon the interface as shown in fig(1)



Fig(1) model of layered dielectric

a plane electromagnetic wave is incident vertically upon the plane-layered slabs of medium in Z direction, which electric field is in X-direction .

The field of incident wave can be given as

$$E_{0x} = A_0 e^{-\gamma_0 z}$$

$$H_{0y} = \frac{A_0}{\eta_0} e^{-\gamma_0 z},$$

$$\eta_0 = \sqrt{\frac{\mu_0}{\epsilon_0}} \quad \text{where}$$

Is the impedance in free space

In every layered of medium, the electric field and the magnetic field are found to satisfy the equations :

$$(\nabla^2 - \gamma_k^2) E_k = 0, \quad k = 1, 2, 3, 4,$$

and

$$(\nabla^2 - \gamma_k^2) H_k = 0, \quad k = 1, 2, 3, 4$$

We solve the above equations , the interaction between the waves and plane layer are derived, electric field in each layer is plotted as function of layers' thicknesses

Electromagnetic field and depth skin has been computed, simulated by software program. With the numerical calculation of the field equation of the plane layer medium with the boundary conditions, the distributions of electric field and the power of absorption have been made in life tissue. From the curves, the distribution of electric field with base station frequency shows the absorbent power in human body.

The general solutions of equation above are

$$E_k = A_k e^{-\gamma_k z} + B_k e^{\gamma_k z}, k = 1, 2, 3, 4$$

$$H_k = \frac{A_k}{\eta_k} e^{-\gamma_k z} - \frac{B_k}{\eta_k} e^{\gamma_k z}$$

We solve and plot the relation between the electric field and thickness, a Z direction for each layer as

$$E_1 = A_1 e^{-\gamma_1 z} + B_1 e^{\gamma_1 z}$$

$$E_2 = A_2 e^{-\gamma_2 z} + B_2 e^{\gamma_2 z}$$

$$E_3 = A_3 e^{-\gamma_3 z} + B_3 e^{\gamma_3 z}$$

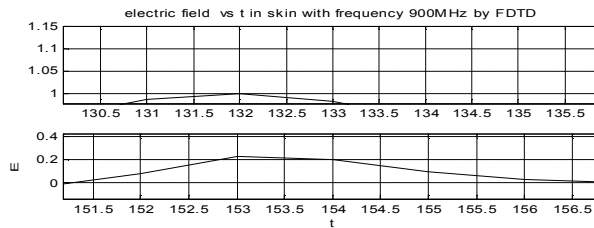
$$E_4 = A_4 e^{-\gamma_4 z}$$

According the above equations,  $E_1$  represent the first layer skin and the second layer represent by  $E_2$ ,  $E_3$  is in the third layer which is fat, and the last layer is kidney represent by  $E_4$ .

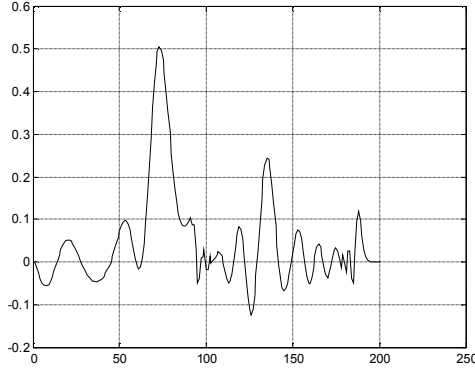
### Results and discussion

In this theoretical work, the numerical calculation of the field equation of the plane layer medium has been discussed, the distributions of electric field and power of absorption have been made in life tissue with frequency 900 MHz

The curve  $E_1$  vs. z is plotted, E on y-axis and z in x-axis



electric field vs. d in four layer tissue by frequency 900 MHz



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## Characteristic Time Analysis for Transmission and Reflection in Rectangular Potential Barriers

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### Abstract

In this paper, we compare the concept of the tunneling time with those of the phase and dwell times. As is shown, the dwell time concept is a consistent one in the framework of the separate description of the transmission and reflection, in the stationary scattering problem. Here we calculate the dwell times for transmission and reflection in the case of rectangular potential barrier. Under barrier tunneling, the dwell times increase exponentially with increasing the barrier's width. Besides, the concept of exact reflection time is also discussed.

## Electromagnetic waves in a left-handed/magnetic waveguide structure

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### Abstract

Recently, there has been great interest in new type of electromagnetic materials called left-handed media [4]. Over fifty years ago, Veselago was the first to consider the left-handed metamaterial (LHM) which he defined as media with simultaneously negative and almost real electric permittivity and magnetic permeability in some frequency range [5]. The electric and magnetic fields form a left-handed set of vectors with the wave vector [6]. These materials have been shown to exhibit unique properties, such as Snell law and Doppler shift. In the year 2000, Smith, et. al.[7] have built these materials by using two dimensional arrays of splitting resonators and wires and are operating the microwave range. In the year 2006, Kim and Cho investigated the guided dispersion characteristics of grounded slab structures which have been widely used in the antennas[8].

In this work, we have demonstrated theoretically the existence and behavior of the TE guided waves in a ferromagnetic/Left-handed materials /Antiferromagnetic waveguide structure. The dispersion characteristics are performed for different kind of metamaterials. The existence and the type of the solutions to the guided waves with respect to different physical parameters are also investigated and discussed. It has been shown that the Left-handed materials(metamaterials) can lead to different , new unusual properties.

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## ON THE LAGRANGIAN FORMALISM OF LANDAU-GINZBURG THEORY

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keywords : Lagrangian and Hamiltonian approach, Field theory.  
PACS NOS.: 11.10.Ef, 11.10-z, 03.65w.

### Abstract

The Landau-Ginzburg theory is treated as a constrained system using the Euler-Lagrange equation for field system. It is shown that a singular lagrangian as a field system for Landau-Ginzburg theory is in agreement with the general Lagrangian approach and the canonical Hamiltonian approach of constrained systems.

### Introduction

Singular Lagrangian systems represent a special case of a more general dynamics called constrained systems. A general feature of constrained systems is the existence of constraints in its classical configurations.

The basic ideas of the classical treatment and quantization of such systems were initiated and developed by Dirac. He distinguished between

two types of constraints; first and second-classes. In the case of unconstrained systems, the Hamilton-Jacobi theory provides a bridge between classical and quantum mechanics. The first study of Hamilton-Jacobi equations for arbitrary first-order actions was carried out by Santilli. Gitman and Tyutin discussed the canonical quantization of singular theories as well as the Hamiltonian formalism of gauge theories in an arbitrary gauge. Recently, the canonical method based on Hamilton-Jacobi formulation was developed to investigate singular systems. In this formalism there is no need to distinguish between first and second constraints as in the Dirac theory. Also, in the canonical method which has been developed by G\{u\}ler's , the equations of motion were written as total differential equations. The discrete singular system was treated as a continuous system. Hamiltonian and Lagrangian formulations are used together. My aim in this work is to use the later treatment to study the system of the Landau-Ginzburg theory.

The lagrangian of Landau-Ginzburg theory that gives an effective description of phenomenon precisely coincides with scalar quantum electrodynamics is studied as a singular lagrangian using the Euler-Lagrange equation. The system is treated as a continuous field system with constraints. It is shown that this treatment is in exact agreement with the general approach. My formalism is a mixture of the Hamiltonian and Lagrangian formulations. Then I arrived to these equations of motion

$$\left(\overset{\mathbf{r}}{D} \cdot \overset{\mathbf{r}}{D}\varphi\right)^* - ie\left(2A^\mu \partial_\mu \varphi^* + \varphi^* \partial_\mu A^\mu\right) - K\varphi^* - \frac{1}{2}\lambda \varphi \varphi^{*2} = 0,$$

and

$$\left(\overset{\mathbf{r}}{D} \cdot \overset{\mathbf{r}}{D}\varphi\right) + ie\left(2A^\mu \partial_\mu \varphi + \varphi \partial_\mu A^\mu\right) - K\varphi - \frac{1}{2}\lambda \varphi^* \varphi = 0.$$

The equations of motion are partial differential equations, which are equivalent to those equations obtained from the canonical Hamiltonian approach. t

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### ***Investigation of a plasma into the magnetically uniform Confined plasma***

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#### **Abstract**

One of the most important purpose of magnetic confinement is to keep the hot plasma away from the wall of the vacuum vessel . The temperature required to sustain fusion reaction is of the order of 10 key. The interaction between charged particles and magnetic field , are used to keep hot plasma from coming contact with the wall the vacuum vessel . some of the ions escape from the hot plasma reaches a layer , and interact with the impurity atoms of high atomic mass into the vacuum area . The machine is been modified to provide high density of plasma . The plasma is produced externally from source , and confined in a cylindrical geometry at low magnetic 1 KG . The calculation has been made and suggested that the ion beam in the solenoid will have a maximum radius of twice the larmor radius , while the density a complex function of the ratio  $B(Z)/B_m$  . The low density obtained , suggesting that losses due to mirroring may be occurring that is the plasma source should be closer to solenoid to provide good plasma injection .



## Thermalpower of Cu- Zn ferrites

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**Keywords:** Seebeck coefficient, Fermi energy

### Abstract

A series of Cu-Zn mixed ferrites with composition formula  $Cu_{1-x}Zn_xFe_2O_4$  is prepared by the double sintering ceramic technique. Thermo- power studies are undertaken over a temperature range of 300 to 800k by a deferential method. In the present work, the Seebeck coefficient S was negative for all samples, and all compositions behave as n- type semiconductors in the measured range of temperature. The values of charge carrier concentration n and the Fermi energy were compound. The values of n are found to decrease as temperature increased, while Fermi energy directed to more negative values when Zn content is increased. On the basis of these results a mechanism of the conduction in Cu- Zn ferrites is suggested.

### INTRODUCTION

Spinel ferrites have high electrical resistivity and law eddy current losses at high frequencies and they are widely used for cores of high frequency electromagnetic devices [1,2]. Because Zinc is non-magnetic divalent ions that occupy essentially tetrahedral A sites, when substituted in ferrites [3]. Various investigations [4-8] studied the electrical and thermal power of the spinel ferrites and found that they have semi- conducting properties of n or p-type. With a view to understand the conduction mechanism in mixed Cu-Zn ferrites, the electrical and thermoelectric power as a function of composition and temperature, the results for such a study are presented in this paper.

### Experimental technique

The polycrystalline Zinc-substituted Copper ferrites having compositional formula  $Cu_{1-x}Zn_xFe_2O_4$  where x stopped  $0 \leq x \leq 1$ , were prepared by the double sintering ceramic technique [9], the final sintering was done at  $1150^\circ$  for 5 hr.

The electrical measurements were performed by two-probe method; silver past was applied on both sides of the samples to make good ohmic contact.

Thermoelectric power studies were carried out as a function of composition and temperature by differential method [10].

### Results and Discussion

The variation values of Seebeck coefficient with temperature for each sample of copper zinc ferrite having a compositional formula  $Cu_{1-x}Zn_xFe_2O_4$  where  $x$  stopped  $0 \leq x \leq 1$ , have been calculated from the experimental values of thermo - electric motive force , and depicted against the temperature as shown in the fig . It is noticed that the sign of the Seebeck coefficient for all samples is negative, indicating that the Cu-Zn ferrite behave as n- type semiconductor. The conduction mechanism in these ferrites are electrons [11], and many authors obtained similar results [12] .

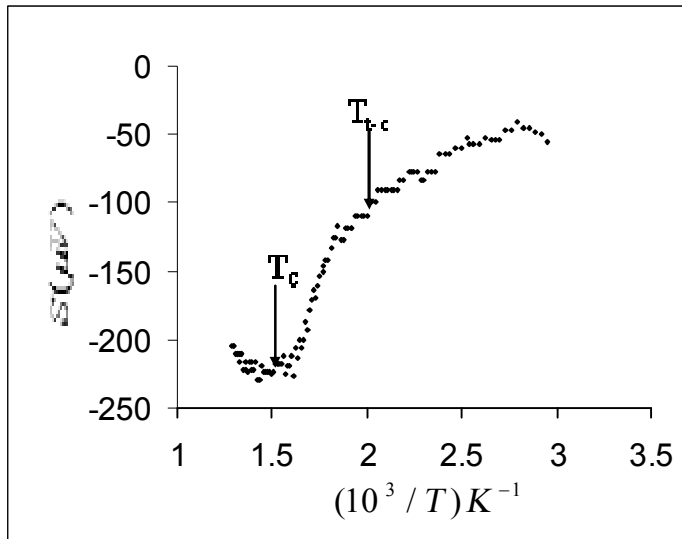


Fig.(1):The variation of Seebeck coefficient (S) with  $10^3/T$  (for sample of  $x=0.0$ )

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### **The Gain and Noise Figure Calculations of Yb-Er-Codoped Fiber Amplifiers Based on the Temperature-Dependent Model**

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### **Abstract**

A novel temperature-dependent model for Yb<sup>3+</sup>-Er<sup>3+</sup>-codoped fiber amplifier (EYDFA) based on the energy transfer from Yb<sup>3+</sup> to Er<sup>3+</sup> is established. Using appropriate fiber and energy transfer parameters, the coupled rate equations is numerically solved at the temperatures of 25 °C and 40 °C. The pumping powers are selected as 100 mW and 200 mW at the pump wavelength of 1060 nm. The signal gain and noise characteristics of a 0.3 m erbium/ytterbium co-doped fiber (EYDF) in a single-pass configuration are investigated by using 1 μW, 10 μW and 100 μW signal powers at the signal wavelength of 1535 nm. A maximum signal gain of 40.5 dB and a corresponding noise figure of 3.65 dB at the temperature of 25 °C are achieved.

*Key words: Erbium, ytterbium, Gain, Noise Figure, and Rate equations*

### **Quantization of The Relativistic Local Free Field With Linear**

## Velocity of Dimension D

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### Abstract

The relativistic local free field with linear Velocity of Dimension D containing second-class constraints is quantized by using Hamilton-Jacobi path integral quantization. The set of Hamilton-Jacobi partial differential equations are obtained and the integrability conditions are examined. A comparison between Senjanovic method and Hamilton-Jacobi method is done.

### Propagation of Electromagnetic Surface Waves through a Ferrite Slab Bounded by Metamaterials

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### Abstract

Recently there has been growing interest in a new type of electromagnetic materials called left-handed materials (LHMs), or metamaterials. Over thirty years ago Veselago [1] predicted that electromagnetic wave propagation in a medium having simultaneously negative permittivity  $\epsilon$  and permeability  $\mu$  should give rise to several peculiar characteristics. Veselago predicted that in LHM the energy flow (Pointing vector) is anti-parallel to the phase velocity (or wave vector) while in regular materials termed right-handed materials (RHMs), having simultaneously positive  $\epsilon$  and  $\mu$  the Pointing vector (energy flow) gives the direction of the phase velocity.

In this communication, the dispersion relationship describing the propagation of electromagnetic surface modes supported by a finite thickness ferrite slab bounded by LHMs media is investigated and discussed.

Several characteristics of the propagation are also obtained showing interesting results especially the non-reciprocal behaviors.

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## A PROPOSED FRAMEWORK FOR MEASURING AND MODELLING OF BTEX IN VARIOUS DEVELOPING CITIES

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**Keywords:** (BTEX, Emissions, Vehicles, VOC)

### Abstract

The development and urbanization process are believed to contribute to the deterioration of air quality. Transportation is one of the main sources of air pollution in the developing cities. Benzene, Toluene, Ethylbenzene and Xylene (BTEX) form an important group of aromatic Volatile Organic Compounds (VOCs), emitted mainly from cars, where BTEX is a known carcinogenic. The initial results of a pilot study that was carried out at the engineering campus, USM, to monitor BTEX come out of the motor vehicles, motor bikes and engines, show high concentrations of BTEX (7.5, 6.1, 12.3 and 3.9 ppm respectively). This study aims to propose an a framework to measurer and model BTEX concentrations in three developing cities (Penang, Cairo and Gaza). The results of this research clarify the

current status of BTEX concentrations in the three cities and pave the way for a suitable action to be taken to reduce BTEX concentrations.

## **INTRODUCTION**

Benzene, toluene, ethylbenzene and xylene (BTEX) are elements of an important group of aromatic Volatile Organic Compounds (VOCs), they are emitted from many sources notably from vehicles. BTEX play a vital role in the troposphere chemistry and poses health risk to human [3]. Benzene is known as a carcinogenic compound, which is emitted mainly from petrol-fuelled cars and thus it is found in all urban areas [4].

## **RESEARCH BACKGROUND**

The estimated world-wide average emissions of VOCs are about 1347 million tons (Mt)/year from biogenic sources and 462 Mt/year from anthropogenic sources. Ambient total concentration of airborne VOCs (155 species) in urban and suburban areas have been reported to be in the range 16.2–1033  $\mu\text{g}/\text{m}^3$ . Some VOCs have toxic health effects depending on duration and levels of exposure, even at  $\mu\text{g}/\text{m}^3$  concentrations (e.g., exposure to BTEX at high levels can cause respiratory, neurological, and genetic system damage) [1].

## **METHODS**

Measurements will be carried out by using Direct Sense Indoor Air Quality (IAQ) Meter, the instrument capable of measuring TVOC, CO, CO<sub>2</sub>, Temperature and Relative Humidity simultaneously. It can identify potential IAQ issues before they become problems and respond immediately to complaints with the high accuracy, extremely advanced and the most intuitive portable IAQ meters and test instrumentation available today [2].

## **INITIAL RESULTS**

A pilot study to measure BTEX concentration was carried out in the engineering campus of Universiti Sains Malaysia (USM) on May, 2008. BTEX concentrations were measured by using Multi Gas PID Meter. The measurements were carried out in indoor environment and emissions from motorbike were monitored. The results show high concentrations of BTEX as shown in figure 1.

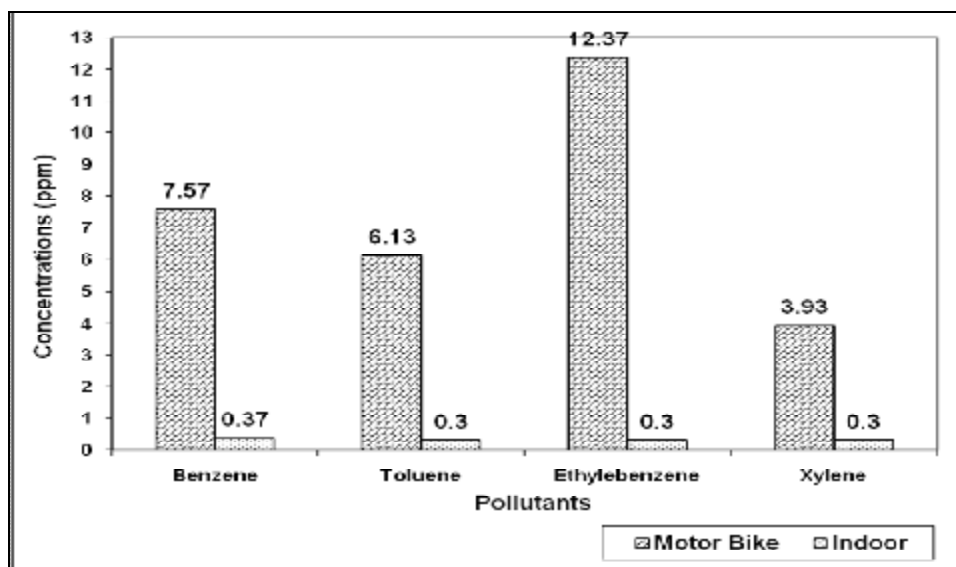


FIGURE 1: Comparison of BTEX Concentrations

## CONCLUSION

The high BTEX concentrations (7.5, 6.1, 12.3 and 3.9 ppm respectively), that were revealed by the pilot study proved the importance of carrying out a large scale study to measure and model the BTEX trends in the busy places, where the prediction model will act as alert tool to the public and the decision makers.

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## Stability of magnetostatic surface waves in a Semiconductor-Ferrite-Left-Handed Material waveguide Structure

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### Abstract

A great deal of important development has been made in the studies of magnetic and magneto static solitons in gyro-magnetic materials. This was stimulated by the great achievement in the theoretical research and practical application of optical solitons in fibers. Recently increasing works have been devoted to study and fabricate new artificial materials called metamaterials or left handed materials. These materials have unusual behavior as they have simultaneously both negative permittivity and permeability.

In this paper, we investigate the effect of left handed materials and the conductivity of semiconductor material on the dispersion characteristics of left-handed-ferrite-semiconductor waveguide structure, and then we discuss the stability of magnetostatic surface waves in the mentioned three waveguide structures by perturbation method.

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الكيمياء

**Chemistry**

## **Extraction and Preconcentration Capacity of Bi-functionalized Diamine-thiol Polysiloxane Immobilized Ligand System towards Some Divalent Cations**

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**Key Words:** Extraction of metal ions, polysiloxanes, thermodynamic parameters.

### **Abstract**

Porous solid bi-organofunctionalized diamine-thiol polysiloxane immobilized ligand system of the general formula P-(CH<sub>2</sub>)<sub>3</sub>-X, (Where P represents [Si-O]<sub>n</sub> siloxane network and X represents a mixture of diamine; -NH(CH<sub>2</sub>)<sub>2</sub>NH<sub>2</sub> and thiol; -SH functional groups) has been prepared by sol-gel method. Both batch and dynamic methods were used to examine maximum sorption capacity of some metal ions (Co<sup>2+</sup>, Ni<sup>2+</sup>, Cu<sup>2+</sup>, Zn<sup>2+</sup>, Cd<sup>2+</sup> and Pb<sup>2+</sup>). The maximum binding capacity followed the sequence; Cu<sup>2+</sup> > Pb<sup>2+</sup> > Cd<sup>2+</sup> > Ni<sup>2+</sup> > Zn<sup>2+</sup> > Co<sup>2+</sup> at pH 5.5.

## INTRODUCTION

Many technological methods have been developed over the years for removing of toxic/heavy metal contaminants from different media.<sup>1-2</sup> Modified inorganic solid supports are gaining importance due to their excellent thermal, mechanical and chemical stability.<sup>3-4</sup> Polysiloxanes functionalized by chelating ligands have been widely exploited for extraction and preconcentration of trace metal ions from different media by batch and dynamic methods.<sup>5</sup> The aim of the present work is to investigate the ability of a diamine-thiol bi-functionalized polysiloxane immobilized ligand system to extract and preconcentrate different divalent metal ions under optimal analytical conditions.

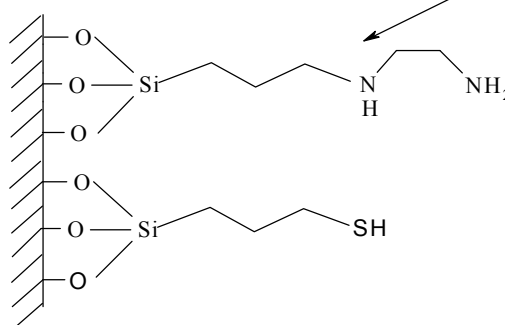
## EXPERIMENTAL

### *Preparation of diamine-thiol polysiloxane bi-ligand system (P-DTh)*

The diamine-thiol bi-ligand system was prepared by hydrolytic polycondensation between amixture of 3-(2-aminoethylimino)propyltrimethoxysilane (11.12 g, 0.05 mol) and 3-mercaptopropyltrimethoxysilane (9.82 g, 0.05 mol), with tetraethylorthosilicate (20.8 g, 0.1 mol) in ethanol. After gelation and drying the product was a solid material.

## RESULTS AND DISCUSSION

Reaction: Preparation of the bi-functionalized ligand is summarized by the sol gel process (Scheme 1).



**Scheme 1**

The extraction capacity of P-DTh for  $\text{Co}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Cd}^{2+}$  and  $\text{Pb}^{2+}$  metal ions, was determined by batch method. Maximum metal uptake by P-DTh is summarized in Table 1.

**Table 1:** Maximum metal uptake by P-DTh

Maximum Uptake	$\text{Co}^{2+}$	$\text{Ni}^{2+}$	$\text{Cu}^{2+}$	$\text{Zn}^{2+}$	$\text{Cd}^{2+}$	$\text{Pb}^{2+}$
mg $\text{M}^{2+}$ /g Ligand	91.9	107.4	140.4	113.1	225.6	437.2
mmol $\text{M}^{2+}$ /g Ligand	1.56	1.83	2.21	1.73	1.98	2.11

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#### Behavior of immobilized Alizarin Red S into sol-gel matrix as pH sensor

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#### Abstract

The preparation of transparent monolithic silica doping with Alizarin Red S was carried out by acid catalyzed sol-gel reaction of tetraethylorthosilicate (TEOS) in the presence of Alizarin Red S. The immobilized Alizarin Red S pH indicator shows similar behavior as its solution counterpart. The UV/VIS spectra indicate that the Alizarin Red S retains its structure during the sol-gel reactions in terms of response to pH. Therefore, the Alizarin Red S can be regarded as uniformly distributed in the sol-gel matrix. Also, addition of the dye plus SDS into the sol-gel matrix modifies the structure of the net work and makes it more homogeneous and increases the surface

area. These characteristics were justified by using polarized microscope technique.

**Keywords:** Alizarin red s; pH-indicator; Immobilization of indicators; Sol-gel entrapment

### Synthesis and Crystal structures of Some New Metal(II) Complexes with NNO Functionalized Ligands.

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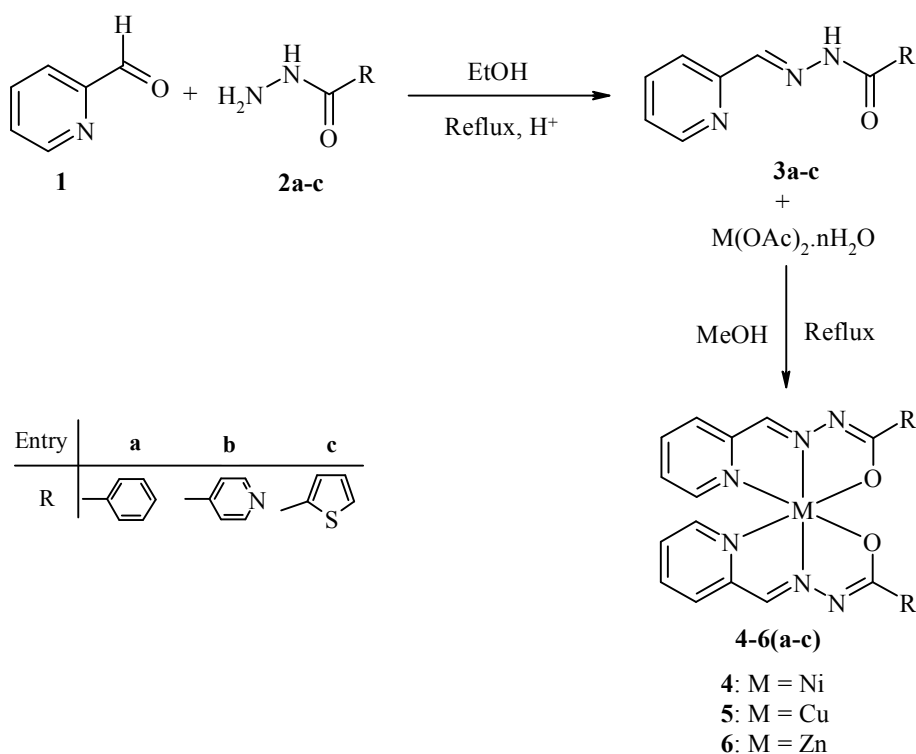
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#### Abstract

Complexes of the general formula  $[M(II)L_2]$  [ $M = Ni, Zn, Cu$ ;  $L = (3a = \text{Benzoic acid pyridine-2-ylmethylene-hydrazide}, 3b = \text{Isonicotinic acid pyridine-2-ylmethylene-hydrazide}, 3c = \text{thiophene-2-carboxylic acid pyridine-2-ylmethylene-hydrazid})]$  were synthesized by reaction of metal-acetate in boiling ethanol with the ligands **3a-c** in 2:1 ligand to metal mole ratio and fully characterized. Additionally x-ray crystallographic

investigation of the three yielded complexes (PyrBH)<sub>2</sub>Ni (**4a**), (PyrIH)<sub>2</sub>Ni (**4b**) and (PyrIH)<sub>2</sub>Zn (**6b**) is reported. Crystal data: All three compounds crystallizes in the triclinic space group  $P\bar{1}$  and  $Z = 2$  at 173 K with  $a = 11.374(9)\text{\AA}$ ,  $b = 11.596(7)\text{\AA}$ ,  $c = 11.727(7)\text{\AA}$ ,  $\alpha = 105.60(4)^\circ$ ,  $\beta = 104.30(5)^\circ$ ,  $\gamma = 104.98(6)^\circ$  for (PyrBH)<sub>2</sub>Ni (**4a**); for (PyrIH)<sub>2</sub>Ni (**4b**)  $a = 11.188(9)\text{\AA}$ ,  $b = 11.445(7)\text{\AA}$ ,  $c = 12.004(7)\text{\AA}$ ,  $\alpha = 107.04(4)^\circ$ ,  $\beta = 103.44(5)^\circ$ ,  $\gamma = 105.11(6)^\circ$  and for (PyrIH)<sub>2</sub>Zn (**6b**)  $a = 11.222(9)\text{\AA}$ ,  $b = 11.501(7)\text{\AA}$ ,  $c = 12.045(7)\text{\AA}$ ,  $\alpha = 106.63(4)^\circ$ ,  $\beta = 102.92(5)^\circ$ ,  $\gamma = 106.09(6)^\circ$ . The metal centers in these complexes are surrounded by two ligand molecules in a meridional, slightly distorted octahedral manner.

**Key Words:** investigation of Metal(II) complexes, Schiff bases, N, N, O tridentate Ligands.



## Heterocyclic Synthesis Using Nitrilimines. Synthesis of New 1,2,4-Triazin-6-one and 1,3,4-Thiadiazin-5-one Derivatives

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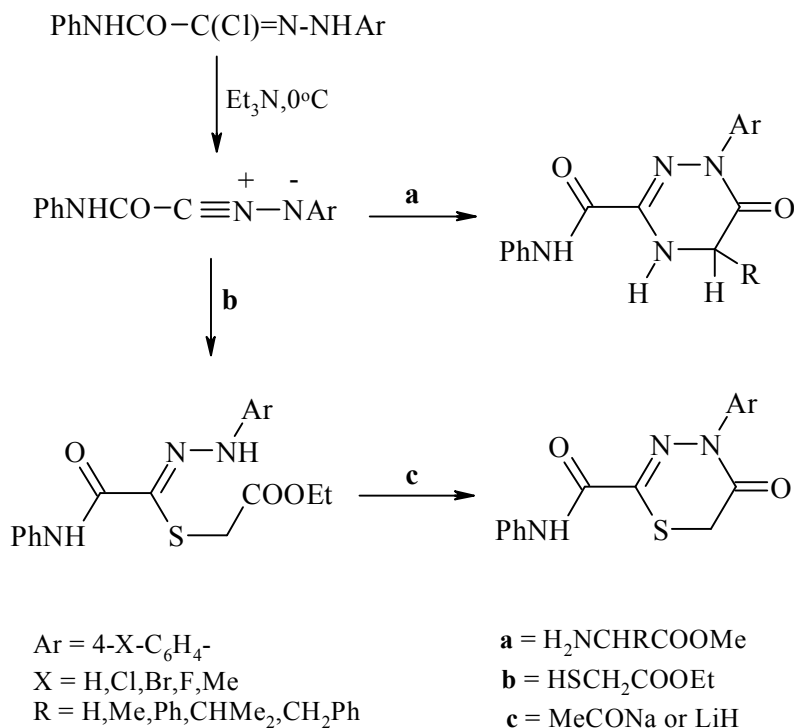
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### Abstract

Recently, we reported an efficient one-pot synthesis of substituted 1,2,4-triazin-6-ones utilizing available  $\alpha$ -aminoesters and hydrazonoyl chlorides in presence of triethylamine as a base. The reaction of hydrazonoyl chlorides -nitrilimines precursors- with ethyl mercaptoacetate afforded corresponding 3,5,6-thiadiazin-4-hexenoates. These compounds underwent intramolecular cyclization to 1,3,4-thiadiazin-5-one derivatives in presence of MeONa or LiH. The structures of the synthesized compounds were confirmed by their elemental analysis and spectral data.

**Scheme:** Synthesis of 1,2,4-triazin-6-ones and 1,3,4-thiadiazin-5-ones.



**An efficient solid phase synthesis concept for the preparation of various novel biologically active peptide mimetics**

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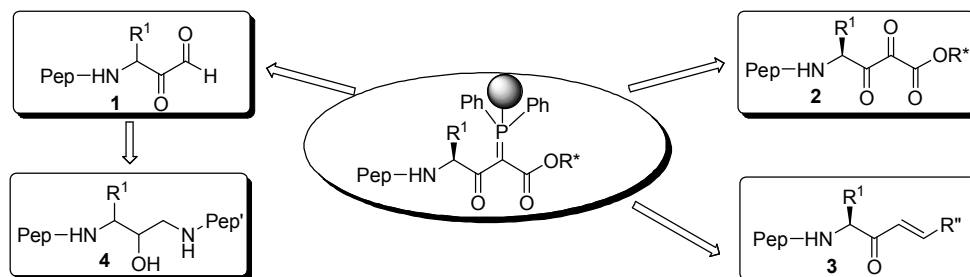
**Abstract**

**Introduction**

Whereas *N*, *O*, and *S*-acylations are well established in solution. On solid support, *C*-acylation have not been utilized for diversity generation to a larger extent. We developed an effective method based on the mild *C*-acylation of polymer-supported 2-phosphoranylidene acetates to synthesize potent Protease inhibitors against SARS, caspase III, and sortase. Using this solid phase concept we synthesized peptidyl- $\alpha$ -ketoaldehydes **1**, peptidyl-2,3-diketoesters **2**, and peptidyl vinyl ketones **3**, which are known as excellent inhibitors of serine-, and cysteine protease. Furthermore these compounds are intermediates for the synthesis of pharmaceutically



important compounds such as 1,3-diamino-2-hydroxy-propane (1,3-diamino propanol).



**Scheme 1:**Chemical diversity through the C-acylation of phosphoranes

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#### **Analysis of phenylurea and propanil herbicides by Solid-phase microextraction and liquid chromatography combined with post-column photochemically induced fluorimetry derivatization and fluorescence detection**

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#### **Abstract**

Solid-phase microextraction (SPME) is considered to be a very simple and rapid method for the extraction of pesticides from aqueous samples without making use of any solvent. The same fiber can be used repeatedly for several times. Moreover, sample volume as small as 3 mL can be used with proper sensitivity. This study examines the application of Solid-phase microextraction coupled with high performance liquid chromatography-photochemically induced fluorimetry-fluorescence detection (SPME-HPLC-PIF-FD) for the determination of four phenylurea herbicides (monolinuron, diuron, linuron and neburon) and propanil in groundwater. Direct immersion (DI) SPME was applied using a 60  $\mu\text{m}$  polydimethylsiloxane/divinylbenzene (PDMS/DVB) fiber for the extraction of the pesticides from groundwater samples. An AQUASIL C<sub>18</sub> 150 x 4.6 mm i.d column was used for separation and determination in HPLC. The method was evaluated with respect to the limits of detection (LODs) and limits of quantification (LOQs) according to IUPAC. The limits of detection varied between 0.019  $\mu\text{g L}^{-1}$  and 0.034  $\mu\text{g L}^{-1}$ . Limits of quantification ranged between 0.051  $\mu\text{g L}^{-1}$  and 0.088  $\mu\text{g L}^{-1}$ . These values meet the recommended limits for individual pesticide in ground water (0.1  $\mu\text{g L}^{-1}$ ) established by EU. Recoveries ranged between 86% and 105 % and RSD% values between 2 and 8 %.

البيئة وعلوم الأرض

Environment and Earthsciences

**Analysis and evaluation of the current status of health care waste management (HCWM) of Shifa Hospital**

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**Keywords:** ( health care waste, collection, transportation, disposal and treatment)

**Abstract**

The search to identify the quantities and varieties resulting from Shifa Hospital and the results of the questionnaire showed that the containers for the collection of limited HCW, also noted that about 70% of the sample, confirm that the availability of equipment for storage of HCW, especially containers and baskets that are in special sections (sections of patients as noted That 37.5% of the funds available for acute waste, and 72.5% do not have the coding system of the funds of different colors to suit waste resulting from sections. HCW is the transfer to the private sector,

particularly within the hospital and called transport within the hospital. Sample also confirmed that all the cleaning and laundry Vehicles and vehicles carrying waste and the rate of 100%, 97.5% confirmed the absence of labeling or education (reference) to transport containers, the 70% of the respondents to the disposal method of hazardous waste to be incinerated in the be Shifa Hospital incineration, also emphasized that the study sample of 95% Liquid waste resulting from the hospital to be disposed of through sewage to the city hall. The study's recommendations is the establishment of the system of centralized management control and comprehensive working plan for health care, waste management and create a framework to track activities for the optimal use of available resources and opportunities to improve the situation in the Department of HCW Shifa Hospital. Also, the study solutions is d alternative solutions must be adopted in dealing with medical waste resulting from Shifa hospital must adopt a plan of action, which contains the options HCW in the management of medical waste and reduction.

## **INTRODUCTION**

Shifa Hospital is a major hospitals in the Gaza Strip, was established Shifa Hospital in 1946 and was working at the beginning of their work, Egyptian doctors and the hospital located in the west of Gaza City, an area of about 50 acres, containing 590 beds, and we have family occupancy rate of approximately 80% ( 4).

### **2. Why choose problem research:**

- waste generated in Shifa Hospital pose a major threat to the health and welfare of staff, patients and visitors and the general public.
- improper management of wastes health care has a negative effect on the environment through lack of a system to properly dispose of them.
- hospitals and health facilities have the responsibility to protect people and the environment.
- Lack of policies, strategies and enforcement of legislation for the treatment and disposal of health-care waste (HCW) led to poor management of this waste.

### **3. Research objectives:**

The purpose of this research is to provide the analysis of the current status of Shifa Hospital for health care, waste management to generate different types of HCW.

**Therefore, the search achieve the following:**

1. Identifying the current status of the system of medical waste HCW.
2. The presentation and analysis of the collection and storage, transportation and treatment and disposal methods. HCW.
3. Development of appropriate solutions for the management of health-care waste HCW.

## MATERIALS AND METHODS

The next section shows the methodology used to collect sufficient data on the current status of health care and management in Shifa Hospital in Gaza. The researcher conducting the questionnaire addressed to answer questions axes search for a collection system, the storage, transport and finally treatment methods for waste disposal and medical care HCW, and the researcher conducting interviews for Administrators HCW.

## RESULTS AND DISCUSSION

### 3 How are stored medical waste?

It has been observed that about 70% of the sample emphasizes the lack of necessary equipment for the storage of HCW and special containers and baskets are in special sections. In addition, there is no special bags or bags of wastes resulting from sections and the ratio of non-availability of 55%, there is no special bags for sorting and color in sections from the source and the proportion of non-availability 80%, as it was observed that 37.5% of the funds available for waste sharp, 72.5% do not have the coding system of the funds of different colors that fit waste resulting from the sections, as shown in the table (4).

**Table 4: clarify options for storage methods Shifa Hospital**

HCW Storage	Options	Number	Percentage
Special bags in Each Department	Yes	12	30%
	No	22	55%
	Do not know	6	15%
Color Coding for Special bags	Yes	2	5%
	No	32	80%
	Do not know	6	15%
HCW Sharp boxes in each department	Yes	15	37.5%
	No	25	62.5%

Color Coded for Sharp boxes	Yes	5	12.5%
	No	29	72.5%
	Do not know	6	15%
Enough HCW baskets in each department	Yes	12	30%
	No	22	55%
	Do not know	6	15%

The process of separation and the use of the bags and containers of medical waste is not required format, which guarantees the safety of workers in government institutions (hospitals, clinics and health Bannadr) and this was confirmed by the study conducted in 1997 (6), as the study says that the process of combining within hospitals twice daily by Jamawa garbage and once daily from inside the clinic, which was the study also indicated that there is a negligence among cleaners, the study also showed that the process of disposal of medical waste in containers emptied twice a week and often when these containers are filled, whereupon the hospital administration liaison to the municipal process unloading these containers are containers in places open and unsafe, leading to easy entry abusers in these wastes (6), especially children who Tasthuehm search for needles and rubber belts for some games Isnawa of these tools and be a source of illness and Abhm and thereby facilitate the access of domestic animals ( household) of the access and entry to the containers in search of food mixed with medical waste.

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### **Using GIS (Geographic Information System) in mapping & analysis of air pollution (Gaza City as case study)**

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#### **Abstract**

Geographical Information System (GIS) is a computer based information system that enables capturing, modeling, manipulation, retrieval, analysis, and presentation of geographic phenomenon on Earth.

Like many other regions of the world, air pollution from motor vehicles is one of the most serious and rapidly growing problem of urban areas of Arab countries. Gaza as another cities of Arab countries suffers from air pollution like CO, CO<sub>2</sub>, HC, NO<sub>x</sub>, SPM and other air toxins are emitted from motor vehicles in the atmosphere, causing serious environmental and health impacts.

This paper present a case study of mapping and analysis of air pollution by using data measurement of CO, CO<sub>2</sub>, HC, NO<sub>x</sub>, SPM and various inputs traffic (traffic volume, composition, etc.) at Gaza city .

The integration of these data in one framework by using GIS highlight the impact of various inputs traffic (traffic volume, composition, etc.) in terms of emission factors and meteorological parameters. In addition to provide information about the current and future trends, and can help to prepare an assessments regarding the extent and type of the air pollution control management strategies to be followed.

*Keywords: GIS, Air pollution, Road Traffic, mapping and analysis,.*

### **Microbial contamination of drinking water distribution system and its impact on human health in Khanyounis Governorate, Gaza Strip: 7 years of monitoring (2000 – 2006)**

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#### **Abstract**

**Objective:** To assess total and faecal coliform contamination in water wells and distribution networks over the past 7 years, and their association with human health in Khan Yunis Governorate, Gaza Strip.

**Study design:** Historical data and interview questionnaire

**Methods:** Data were obtained from the Palestinian Ministry of Health on total and faecal coliform contamination in water wells and distribution



networks, and on the incidence of water-related diseases in Khan Yunis Governorate. An interview questionnaire was conducted with 210 residents of Khan Yunis Governorate.

**Results:** Total and faecal coliform contamination exceeded the World Health Organization's limit for water wells and networks. However, the contamination percentages were higher in networks than in wells. Diarrhoeal diseases were strongly correlated with faecal coliform contamination in water networks ( $r = 0.98$ ). This is consistent with the finding that diarrhoeal diseases were the most common self-reported diseases among the interviewees. Such diseases were more prevalent among subjects who drank municipal water than subjects who drank desalinated or home-filtered water (odds ratio = 2.03). Intermittent water supply, insufficient chlorination and sewage flooding seem to be associated with self-reported diseases. Residents in the Gaza Strip have a good level of knowledge about drinking water contamination, and this is reflected in good practice.

**Conclusions:** Water quality has deteriorated in the Gaza Strip, and this may contribute to the prevalence of water-related diseases. Self-reported diseases among interviewees in Khan Yunis Governorate were associated with source of drinking water, intermittent water supply, insufficient chlorination, sewage flooding and age of water networks.

### **Evaluation of technical performance of Gaza Wastewater Treatment Plant**

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### **Abstract**

The existing Gaza Wastewater Treatment Plant (GWWTP) was constructed in 1977 by the Israeli administration authority. As the level of treatment continued to deteriorate due to the population increase, upgrading of the system has been carried in the last two decades. In 1997 the USAID appointed Metcalf and Eddy as its consultant in Gaza to conduct the necessary studies, assessments and design an upgrading of GWWTP. The proposed design criteria for the upgrading of GWWTP were to achieve a level of treatment of 35/30 mg/l for BOD<sub>5</sub> and TSS and some nitrogen

removal. The plant was designed for an average flow of 32,000m<sup>3</sup> and peak flow of 48,000 m<sup>3</sup> and proposed six schemes for the treatment process. The GWWTP regularly received over 50,000m<sup>3</sup>/day up to summer2004, after this time the flow meter was out of order. Based on site visit and discussions with plant operators and engineers, the plant was already over loaded since it started operation in 1998 and today the plant receives more than 55,000m<sup>3</sup>/day.

This work was oriented to evaluate the technical performance of the plant. The analysis of previous historical records of GWWTP was used to evaluate the technical and environmental performance of the system in the period from year 2000 to 2004. The data collected from GWWTP lab were used to review and analyze the treatment system from quality point of view, specifically Biochemical Oxygen Demand (BOD<sub>5</sub>), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Fecal Coli form (FC) and Total Keldahl Nitrogen (TKN).

In addition, an assessment of the behavior of the flow and the removal efficiency of the plant during the five years was highlighted. Propose solutions to increase the hydraulic capacity of GWWTP and in the same time improve the quality of effluent was given.

The research came with the following conclusions:

1. The TSS is higher than usual in both influent and effluent. For influent the reason behind this high value is the malfunctioning of the sand traps and grit removal in the sewage pumping stations and this value continues to be high throughout the plant treatment stages leading to high maintenance cost and bad effluent quality for reuse purposes especially for infiltration.
2. The removal efficiency of GWWTP has decreased throughout the years from 2000 to 2004 from 95% to 91% for the BOD and from 96% to 88% for the TSS and from 91% to 87% for COD. The main components of the plant which is the bio-tower and the anaerobic lagoons are performing with less than there design removal efficiency, which reflected in general as deterioration in the treatment process for GWWTP.
3. The removal efficiency of the Faecal Coli form is very minor limited only to two logs and the effluent content of the coli form is considered to be high putting in mind that this effluent will be discharged to the sea or sometimes used for agriculture which will cause bad environmental

impact on man. In addition, the plant is not designed for nutrient removal.

4. The system is in need to modifications includes hydraulic capacity modification, modification for TSS removal efficiency, proposed flow scheme and plant management system.

### **Urban segregation with cheap and expensive residences**

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#### **Keywords**

*Opinion Dynamics, Sociophysics, Random Field Ising Model, Schelling Model.*

#### **Abstract**

In this paper we study urban segregation of two different communities A and B, poor and rich, distributed randomly on a finite samples, to check cheap and expensive residences. For this purpose we avoid the complications of the Schelling model which are not necessary and instead we use the Ising model on  $500 \times 500$  square lattice, which give similar

results, with random magnetic field at lower and higher temperatures ( $k_B T / J = 2.0, 99.0$ ) in finite times equal 40, 400, 4000 and 40,000. This random-field Ising magnet is a suitable model, where each site of the square lattice carries a magnetic field  $\pm h$  which is randomly up (expensive) or down (cheap). The resulting addition to the energy prefers up spins on the expensive and down spins on the cheap sites. Our simulations were carried out using a 50 lines FORTRAN program. We present at lower temperatures (2.0) a time series of pictures, separating growing from non-growing domains. A small random field ( $h = \pm 0.1$ ) allows for large domains, while a large random field ( $h = \pm 0.9$ ) allows only small clusters. At higher temperature (99.0) we could not obtain growing domains.

We assumed that residences are either cheap or expensive, randomly distributed over the square lattice, and that two groups of people, rich and poor, make up the population. We found that for small fields after a long time the domains are larger than for large fields, in this random-field Ising model of urban segregation. Housing price differences do not prevent segregation if they are not very large.

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### **Simulation of Demographic Change in Palestinian Territories According to the Final Results of the Actual Count Process in year 2007**

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#### **Key words**

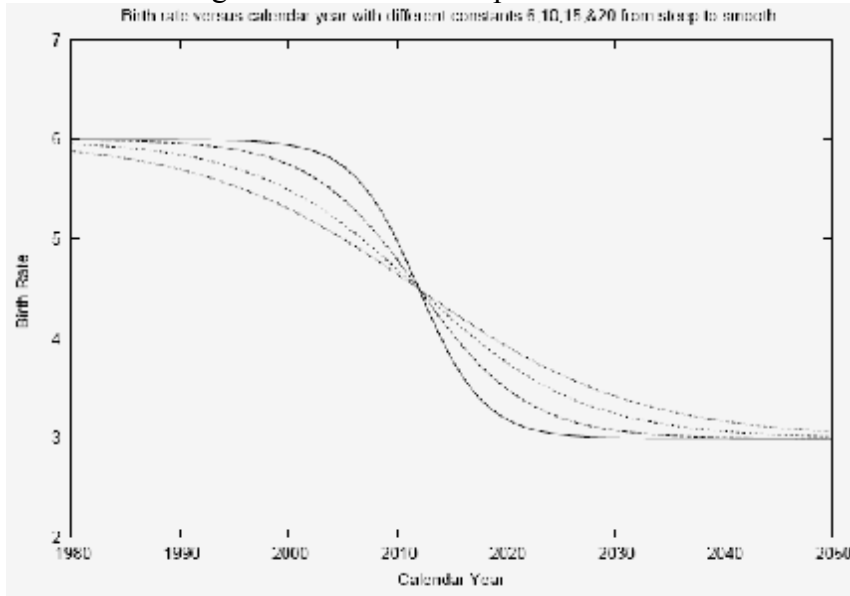
*Demographic change, birth rate, Fertility rate, retirement age, and Palestinian Territories*

### Abstract

Mortality, birth rates and retirement play a major role in demographic changes. In most cases, mortality rates decreased in the past century without noticeable decrease in fertility rates, this leads to a significant increase in population growth. In many poor countries like Palestinian territories the number of births has fallen and the life expectancy increased.

In this article we concentrate on measuring, analyzing and extrapolating the age structure in Palestine few decades ago going into future.

Compared with the census in 1997, it's noted that the past ten years have witnessed a decrease in the proportion of children aged between 0-14, where the proportion declined from 45.1% in 1997 to 41.3% in 2007, decreased by 3.8% during the period between the two censuses. By contrast the percentage of working age population aged 15-64 years have remarkably increased during the period, the proportion rose from 51.1% in 1997 to 55.3% from the overall population, which is mean an increase by 4.2% between the two censuses. This means that, despite the fact that Palestinian society is still young compared with other communities, however, the proportion of young people and youth goes down with time, due to low fertility rates, where the total fertility rate in 2007 in Palestinian Territories shows decreasing in the birth rate compared with birth rate in 1997.



**FIGURE 1:** Different birth rate versus calendar year for different constants 6, 10, 15, 20. The figure shows the birth rate will be about 3 after year 2020.

### Conclusion

This study of demographic change in Palestine has showed that Palestinians will have in future problems as the strongest age cohort are above 60-year olds and we therefore recommend the increase of both the retirement age and women employment.

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### **Prospects of Private Sector Participation for Sustainable Water and Sanitation services in the Gaza Strip**

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### Abstract

Quality of the groundwater is a major problem in Gaza strip. The aquifer is highly vulnerable to pollution. The domestic water is becoming more saline every year and average chloride concentrations of 500 mg/L or more is no longer an exception (PWA, 2004f). The permissible limits for nitrate are exceeded by a factor of eight for a number of public wells. Most of the public water supply wells don't comply with the drinking water quality

standards and concentrations of chloride and nitrate of the water exceed the World Health Organization (WHO) standards in most drinking water wells of the area and represent the main problem of groundwater quality. Over pumping of groundwater and salt water intrusion are the main reasons behind high chloride concentration (CAMP, 2000). The uncontrolled discharge of untreated sewage to the ground surface and excessive use of fertilizers led to high nitrate levels in certain areas.

In the last years, municipalities in Gaza Strip suffered from several financial and managerial problems, which include lack of resources, deficiency in operation and maintenance, bad level of service in terms of quantity and quality, customer dissatisfaction, and high level of water losses. These lead to deficiencies in providing this vital service to the public. Tens of Millions US\$ have been invested in the water sector by different donations, which aimed at improving the service in terms of water resources and distribution systems in addition to wastewater collection, treatment and disposal. Between the years 1997 and 2003 the total donations was estimated at 6.55 billion US\$, 14% in the form of loans. The portion of infrastructure was about 30% (1.965 billion US\$) including all types of infrastructure sectors: energy, housing, transportation and communications, water and wastewater (Abu Shaaban, 2006).

In order to solve these critical problems, various organizational forms have been developed, all based on a structure in the public domain. One of the important tools for water sector development and reform is the private sector participation (PSP) and become an international trend. Generally, there are four main branches into which water sector are divided:

1. water resources assessment and planning
2. Basic water supply and sanitation services
3. Municipal water and wastewater services
4. Agricultural water use and management.

Any water service provider is supposed to undertake all measures and means to achieve protection of public health, uninterrupted supply of good quality water, sustainable and efficient water and waste water services. Figure 1.1 shows the triangle of sustainable water service management (Burgger, Fritz.2003).

In the Gaza Strip, water and sanitation services are provided and managed by public institutions. In 1996 PWA signed a management contract – financed by the World Bank. This project aimed at improving water and

sanitation services in the Gaza Strip. An international specialized operator was selected to perform a wide range of management and operations tasks. The project succeeded in improving the level of service and was a prominent exercise for private sector participation in water and sanitation services on the course of sustainability. One of the main objectives of the Management contract was to pave the way for the creation of water utility called "Coastal Municipalities water utility" which will introduce wide involvement of private and international PSP.

The term private sector participation (PSP) is used as a general term covering a range of options for involving the private sector in water service provision. These options differ in their allocation of risks and responsibilities between public and private sectors, in their duration, and in where they assign asset ownership. But all of them involve a partnership between the government and the private sector. In Palestine, application of PSP shall be restricted by certain constraints: PNA water policy, legal framework, enforcement of law, socio-economic situation, political and security instability. This study will focus on the prospects of PSP in the Gaza Strip; recommend the best model and opportunities of success.

## LANDFILL LEACHATE TREATMENT BY USING GRAPHITE CARBONE ELECTRODE

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### **Abstract**

In this study, the electrochemical oxidation by using graphite carbone electrode of stabilized leachate from Pulau Burung Semi-aerobic sanitary landfill was investigated by conducting laboratory experiments with sodium sulfate  $\text{Na}_2\text{SO}_4$  (as electrolyte). The study factors were influent COD, current density and reaction time, whereas the responses were biological oxygen demand BOD, chemical oxygen demand COD, BOD:COD ratio, pH and colour.  $\text{Na}_2\text{SO}_4$  concentration was 1 g/L. design of experiment software (DOE) was used to design and to analyse the experiments. The optimum conditions were obtained as 1414 mg/L influent COD concentration, 79.8



mA/cm<sup>2</sup> current density and 4 hr reaction time. This resulted in 70 % BOD removal, 68 % COD removal, 0.04 BOD/COD ratio, 9.1 pH and 84 % color removal. According to these results, electrochemical treatment using graphite carbon electrode was effective in BOD, COD and color removal but was not effective in increasing the BOD/COD ratio and enhancing the biodegradability of stabilized leachate.

Keywords: Electrochemical treatment, stabilized leachate, electrolyte, RSM.

#### INTRODUCTION:

**BACKGROUND:** Day by day municipal solid waste is increasing because of the increase in population and increase in material consumption and human activities related to development. Thus landfilling becomes very necessary to deal with the solid wastes generated. Landfill has three kinds of output, i.e. gas, liquid (leachate), and inert solid waste [1]. Landfill leachate is a complicated wastewater that contains high concentration of pollutants which can have adverse effects on the environment [2]. In general, pollutants can be destroyed electro-chemically by conducting a direct anodic oxidation or an indirect oxidation process [2], [3].

**MATERIALS AND METHODS:** Leachate samples were collected from the old leachate detention pond at PBLs. Tables 1 shows Characteristics of stabilized landfill leachate. Graphite carbon electrodes were used for the study; each one with contact surface area of 29 cm<sup>2</sup>. The electrodes were placed vertically and parallel to each other in the electrolytic reactor containing 500mL of sample. Electrolyte, 1 g/L of sodium sulfate Na<sub>2</sub>SO<sub>4</sub>, was added to the samples before each experiment.

Table1: Characteristics of stabilized landfill leachate from PBLs

Parameter	Value
pH	8.9
BOD <sub>5</sub> , mg/L	80.2
COD, mg/L	1870
BOD <sub>5</sub> /COD ratio	0.043
Colour, Pt-Co	2970.0

**RESULTS AND DISCUSSION:** The results were optimized by Design Expert software 6.0.7. Flag in the plot Figure 1 shows the predicted optimized experimental conditions. As seen from the flag at the top of the yellow region optimized conditions occurred at influent COD 1414 mg/L, current density 79.8 mA/cm<sup>2</sup> and 4 hr reaction time. This condition resulted

in BOD removal of 73.2 %, COD removal of 69.5 %, BOD/COD ratio of 0.037, pH of 9.17 and colour removal of 80.1.

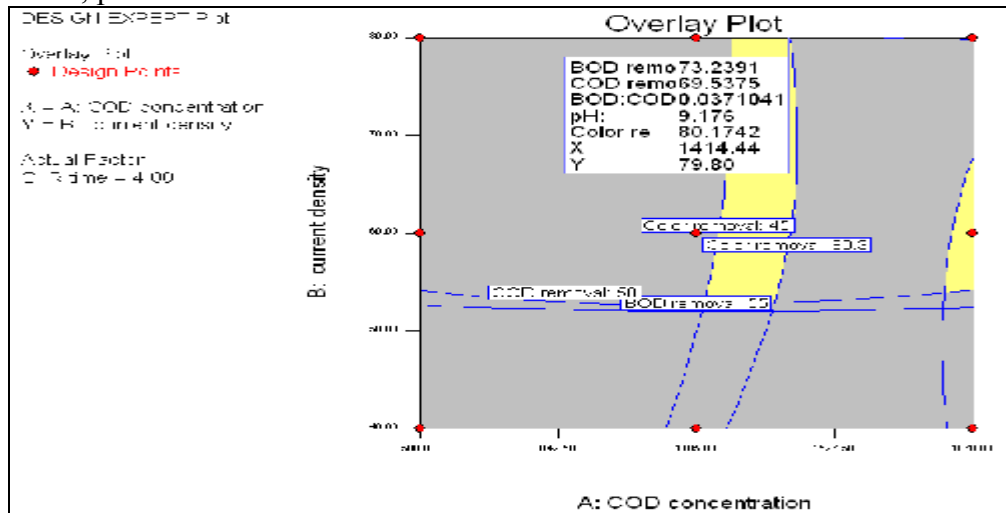


Figure1. Overlay Plot for optimum conditions.

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## APPLICATION OF ION EXCHANGE PROCESS FOR LANDFILL LEACHATE TREATMENT

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### Abstract

This study examined the capability of ion exchange process for removing color, COD, and NH<sub>3</sub>-N from stabilized landfill leachate samples which

were collected from Pulau Burung semi-aerobic landfill site in Penang, Malaysia between February and September This stabilized leachate contains high concentration of color, COD and NH<sub>3</sub>-N which need to be treated to meet the environmental regulations. Therefore two available commercial resin INDION 225 Na cationic exchanger in H<sup>+</sup> form and INDION FFIP MB anionic exchanger in Cl<sup>-</sup> form were used as in this study. The results indicated better removal of color, COD and NH<sub>3</sub>-N by applying cationic resin followed by anionic resin 97, 88 and 94, percent of color, COD and NH<sub>3</sub>-N were removed from initial concentration of 5250, 2430 and 1870, mg/L, respectively.

**Keywords:** cationic exchanger, anion exchanger, commercial resin.

### INTRODUCTION:

**BACKGROUND:** Landfill leachate is a complicated wastewater that contains high concentration of COD or BOD, ammonia, suspended solids, heavy metals and inorganic salts etc [1]. Several treatment processes have been applied to treat leachate such as; Biological treatment, Coagulation and flocculation, Activated carbon adsorption, Air stripping, Electrochemical oxidation, advanced oxidation processes, Chemical precipitation, ion exchange...etc [2]. The highest amount of commercial ion exchange materials used in domestic water-treatment technologies [3]. Whereas the applications of ion exchange techniques are not usual for the treatment of landfill leachate.

**MATERIALS AND METHODS:** Commercially available two exchanger resins were used in this study INDION 225 Na - as cationic exchanger and INDION FFIP MB - as anionic exchanger. The initial concentration of color, pH, chemical oxygen demand (COD) and NH<sub>3</sub>-N were measured before each experiment run. The samples were analyzed and the characteristics of the samples presented in Table 2. The batch experiments were carried out through shaking of 100ml leachate sample in 250 ml size volumetric flask by using an orbital shaker. The experimental conditions were the contact time, dosage and shaking speed at 20 min, 30cm<sup>3</sup> and 150rpm respectively for cationic exchanger, while the conditions for anionic exchanger were 90 min, 30cm<sup>3</sup> and 150 rpm respectively. Five stages were used to treat leachate as explained in figures 1.

Table 1: Characteristics of stabilized landfill leachate from PBLs

Parameters	Units	Values
COD	mg/L	2060-2700
NH <sub>3</sub> -N	mg/L	1700-2050
Color	Pt-Co	4800 - 5700

pH	---	8.67 – 9.17
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RESULTS AND DISCUSSION: by applying cationic followed by anionic resin achieved 97, 88 and 94 percent of color, COD and NH<sub>3</sub>-N removal respectively from initial concentration of 5250, 2430 and 1870 mg/L as presented in figure 1. Therefore, the experimental procedure indicated a good removal performance were resulted when applied resin treatment in series.

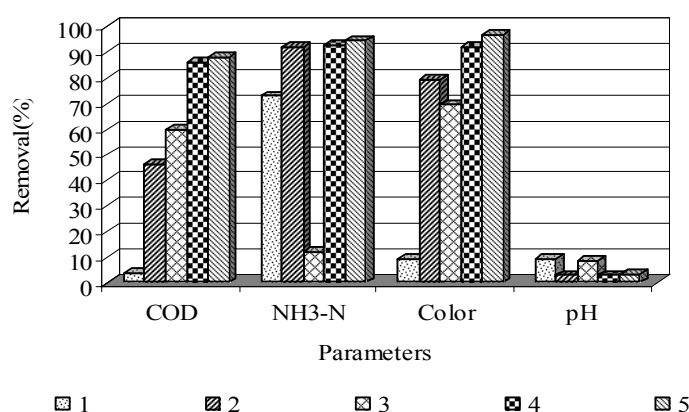


Figure 1: The affectivity of applying anionic, cationic resin or both on COD, Color and NH<sub>3</sub>-N removal.

Leachate treated by using: <sup>1</sup>Cationic resin in Na<sup>+</sup> form, <sup>2</sup>Cationic resin in H<sup>+</sup> form, <sup>3</sup>Anionic resin in Cl<sup>-</sup> form, <sup>4</sup>Anionic resin in Cl<sup>-</sup> form followed by cationic resin in H<sup>+</sup> form, <sup>5</sup>Cationic resin in H<sup>+</sup> form followed anionic resin in Cl<sup>-</sup> form.

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## **Use of Indicators in ICZM- Case Study Gaza Coastal Strip**

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***Keywords:*** *ICZM, Gaza coastal zone, DPSIR, Sustainability indicators*

### **Abstract**

Integrated coastal zone management requires robust indicators of sustainability that gauge 'health' of coast in relation to both environmental, economic and social activity. Driver-Pressure-State-Impact-Response framework approach is formulated for Gaza coastal zone. The result of this assessment indicates the most potential pressures are increase of untreated and partially treated wastewater effluents, increase of solid waste and dumping of construction debris and uncontrolled coastal development. In addition, overexploitation of natural resources fisheries and sand dunes. An overview of international previous initiatives on development of

sustainability indicators is carried out, looking at theoretical frameworks and criteria which have been developed to select suitable indicators. Possible different pressure, state, response indicators for Gaza coastal themes are suggested and evaluated. The statement in possible indicators has found lack of available data, gaps in data available. In addition, selected set of indicators is a useful tool for monitoring and reporting on state of Gaza coastal, help communities to develop in more sustainable directions and improving awareness about coastal and marine environment.

## **INTRODUCTION**

Gaza coastal and marine environments face tremendous threats due to the small surface area of Gaza Strip. Also, Gaza Strip is physically isolated and lacks efficient management tools. Consequently, serious problems of overpopulation, pollution from wastewater and solid waste disposal, beach erosion, land use conflict and lack of awareness have led to marine and coastal pollution as well as deterioration of natural resources. These problems caused the dwindling of fish and recession of fishing and tourism sectors. As a result, the national economy and the household sector have been directly affected due to the rising of such problems.

### **Methodology and Approach**

The objectives of study will be achieved by the following approaches: Study deeply and extensively literature related to ICZM, discuss available data on historical changes, analyse socio-economic data, assess causes and impacts of recently environmental changes of Gaza coastal zone and their trends in future, and establish a set of environmental indicators. These approaches will be carried out through several methodologies, including the review of previous studies as following: collect and formulate coastal and marine themes, apply a conceptual model for integrated assessment, which is so-called DPSIR, and overview of past work which has been carried out on development of sustainability indicators for coastal area.

## **RESULTS AND DISCUSSION**

Most sets of indicators follow Pressure-State-Response (PSR) technical framework. The report for possible indicators shows that there is not enough data for coastline erosion, overfishing and eutrophication. Where the data is not available for Gaza, the indicator is still noted as this information may be available in the future. State indicators illustrate lack of data and regular monitoring. There is no data for coastal erosion rate or beach profile. There are no guidelines for nutrient and bathing water quality. The microbial indicators concentrations of total faecal coliform, faecal coliform and faecal streptococci have been found above the international accepted limit.

Pressure indicators show rapid increase in coastal population, population density, untreated wastewater discharge, poverty, and sand mining. It is hard to assess the overfishing without knowing the maximum sustainable yield which need collecting data from the tran-boundary countries. Governance indicators confirm weakness of low enforcement and institutional capacity building, lack of public awareness and no coordinating mechanisms for coastal and marine affairs . The selected set of indicators is useful tool for monitoring and reporting on the state of Gaza coastal zone also can used to comparison the performance with other countries. Coastal and marine monitoring system is essential for Gaza's coastal to setting baseline information and quantification of selected indicators. The final selection should be review and comment from stakeholder.

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