MSA University
October University for Modern Sciences and Arts
جامعة أكتوبر للعلوم الحديثة والآداب

UNIVERSITY of GREENWICH

BIOTECHNOLOGY

كلية التكنولوجيا الحيوية

2016/2017

Graduation Projects Booklet

GRADUATION PROJECTS BOOKLET

2016/2017

Faculty of Biotechnology

INTRODUCTION

Dr. Nawal El Degwi
The President of the
Board of Trustees

A private university does not educate people intended to serve a particular group of society. We should all understand that a private university educates people not for its own purposes but for the benefit of the entire nation. MSA University has taken its place in the Egyptian educational community and the international arena right from the outset. MSA will carry out more great achievments in the upcoming years with its students and academic staff for the education and training of highly qualified and equipped human resources that the country needs.

May I take this opportunity to extend my great perspectives for the Biotechnology family. I hope that the Faculty of Biotechnology within MSA University will achieve even more in the future

WELCOME WORDS

Prof. Khayri Abdel-Hamid
President of MSA University

Education can be likened to a great canvas and this year we would like our students to throw as much paint as they can on the canvas of their education. I appeal to the students, the parents, and the professors at the Faculty of Biotechnology to value and uphold the importance of motivation. I have no doubt that Biotechnology students threw themselves into their education; they made the most of the canvas of opportunity that they were offered and they painted the goals that they were aspired to. I congratulate each one of the students for reaching this point. We are very proud of you. You are, and will always be, an integral part of the MSA family, and we look forward to seeing you finishing up your final steps in a great way.

DEAN'S WORD

Prof. Ayaman Diab
Dean of the Faculty
of Biotechnology

With the ever changing world we live in, over the past decade, biotechnology has advanced much to the advantage of several fields and industries by altering the specifications desired to comply with our society's needs. Recent advances in biotechnology are helping us prepare for and meet society's most pressing challenges. Biotechnology is the science of the next century. It has the ability to solve many of our problems, so the people at the next millennium can relish with enhanced lives. Together, we look forward to discovering exciting new phenomena, unraveling challenging problem in biology and biotechnology, and finding applications in imperative biological matter. Conclusively, we always welcome and encourage your interest in joining our faculty.

At MSA University, the Faculty of Biotechnology grants the students the opportunity to apply what they learnt practically through proposals writing and graduation projects. The Faculty also introduces the students to host places where they can work in and build up their career path. Indeed, it offers the students a variety of host places for carrying out their graduation projects including:

1. AGERI
2. American University in Cairo (AUC)
3. Animal Health Research Institute
4. Beni-Suef University
5. Biotech Lab, Agricultural Research Center
6. Breast Cancer Foundation in Egypt
7. Cairo University Research Park, Biochemistry Lab
8. Cairo University Research Park, Microbiology Lab
9. Cancer Research Institute in Egypt
10. Central Lab of Residue Analysis of Pesticides and Heavy Metals in Food (QCAP)
11. Central Lab, Horticultural Research Center
12. Children's Cancer Hospital in Egypt (57357)
13. Faculty of Medicine, Ain-Shams University
14. Food Technology Lab

15. Genetic Engineering & Agricultural Biotechnology Department, Faculty of Agriculture, Ain-Shams University (Nanotechnology)
16. International Research Institute
17. Metalab Diagnostic Laboratories
18. Microbiology Lab, Cairo University, Research Park
19. Molecular Cancer Lab
20. MSA University
21. Nanotechnology Center
22. Palm Tissue Culture
23. Plant Physiology Department, Faculty of Agriculture, Cairo University.
24. Stem Cells (Cell Safe Bank)
25. Theodor Bilharz Research Institute
26. TOMA Lab
27. University of Greenwich
28. VACSERA
29. Waste treatment Company
30. Zagazig University

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RAGE expression in HCV-related HCC; Comparison between malignant and peri-malignant tissues

Noora Essam Fahmy

Fall 2016

Host Place: Theodor Bilharz Research Institute

Internal Supervisor: Dr. Amr Ageez

External Supervisor: Prof. Tarek Aboushosha

Abstract

The expression of the receptor for advanced glycation end products (RAGE) has an impact on the mechanisms giving rise to characteristic features of various cancer cells. We aimed in this study to correlate the scores of RAGE expression with histopathological features of HCV related hepatocellular carcinoma in malignant and peri-malignant tissue specimens. The expression of RAGE was assessed in paired cancer and peri-malignant tissues of HCC, using immunohistochemistry. The expression of RAGE was less in hepatitis than in dysplasia and HCC. Furthermore, in HCC the expression increased initially with increased grade of malignancy and with increased intra-tumorous inflammatory infiltration, however, the score of RAGE expression decreased in high grades of malignancy. This suggests that during the early stage of tumorigenesis with less blood supply HCC may acquire resistance to stringent hypoxic milieu by hypoxia-induced RAGE expression.

Keywords: *RAGE, HCV, Cancer, HCC*

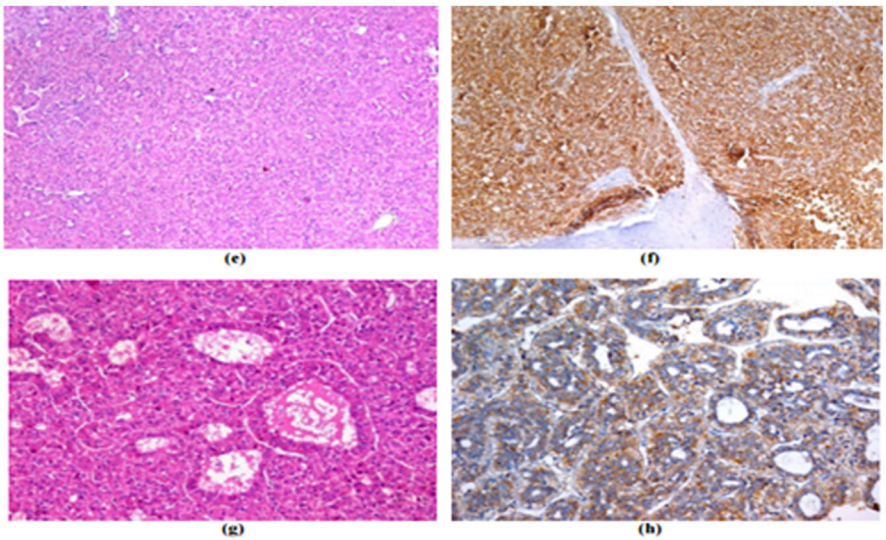

Figure1: (e) Section in a case of HCV hepatitis with small cell dysplasia in perimalignant tissue (H&E stain, X100), (f) Diffuse marked cytoplasmic expression of RAGE in case of HCV hepatitis with small cell dysplasia (IHC, RAG), (g) Section in a case of low grade HCC with focal acinar pattern (H&E stain, X100), (h) Mild cytoplasmic expression of RAGE in case of low grade HCC (IHC, RAGE)

Preparation of a more stable lyophilized BCG-T WITH the same biopotential for bladder cancer immunotherapy

Menatallah Yasser Abdalla El Seoud

Fall 2016

Host Place: VACSERA

Internal Supervisor: Dr. Ashraf Bakar

External Supervisor: Dr. Aly Fahmy

Abstract

BCG-T is a new trend for immunotherapy of bladder cancer as an alternative to chemotherapy. The available product is liquid form of a limited stability profile. The present study aims to prepare a lyophilized form of BCG-T using different stabilizer namely Na glutamate and lactose. Stability of pharmaceutical lyophilized injection dosage form compared with the liquid form was assessed revealing that the Na Glutamate and Lactose stabilized BCG-T were significantly more stable than BCG-T in the liquid formula. Also, the dry weight and relatives humidity and Safety of both Na Glutamate and lactose stabilized BCG-T were insignificantly different from the liquid form (P >0.05).

Keywords: *BCG-T, Bladder Cancer, Immunotherapy*

Table 1: Safety of lyophilized BCG-T formulae during 6 weeks post intramuscular injection of BCG–T in guinea pigs. During the safety test period, weights were checked and deaths were recorded

Time /week Stabilizer	Na. glutamate						Lactose						Liquid					
GNP.No Time/Month	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
1	310	280	304	285	277	257	26	30	26	24	25.	26	29	30	28	30	279	294
2	321	291	313	296	285	260	28	30	28.	26	27.	26	31.	31	30	30	310	305
3	334	305	320	307	310	267	29	31	29.	27.	27.	28	32	32	31	32	322	310
4	342	312	329	310	320	278	30	31	30	28.	28.	29	33.	34	32.	33	331	d
5	360	325	350	315	326	284	31	30	30.	29	28	30	35	35.	33.	34	346	-
6	375	345	361	330	335	289	34	30	31	30	29	31	35	36.	34	35	353	-

Effect of bee venom and other natural products (dates) on lung cancer: *in vitro* trial

Halima Hirzi

Fall 2016

Host Place: VACSERA

Internal Supervisor: Dr. Ahmed Nada

External Supervisor: Dr. Aly Fahmy

Abstract

Bee venom has special pharmacological activity for its enzymes and peptides containment. Melittin is the bee venom's main constituent. The present work aimed to in-vitro estimation of the anti-cancer potentials of bee venom (BV) in addition to the synergetic potential of dates extract to bee venom against lung cancer. BV showed a higher toxicity to A549 cells accompanied with synergetic activity of its toxicity in combination with daters extracts where the IC50 was arranged in the order of BV> Mix> Dates compared with Doxorubicin as a positive control. Data revealed that BV/dates extract has a synergetic potential to BV that was accompanied with Anticancer activity via up/down regulation of pro and anti-apoptotic genes compared with control; caspase-3, Bcl-2 and pro-apoptotic gene (p53).

Keywords: *Bee venom, Melittin, Lung cancer, Cell cycle*

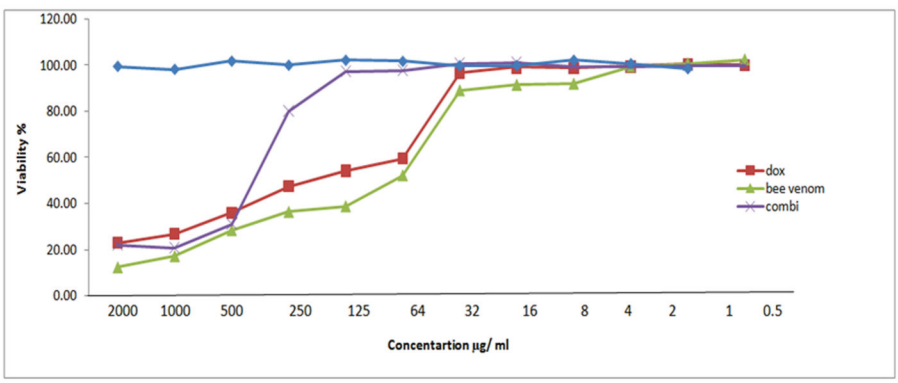

Figure 2: Cytotoxicity of tested products on A549 tissue culture cell

The evaluation of a miRNA (hsa-miR-324-5p) as a potential biomarker for the detection of urothelial carcinoma in urine

Hana Mahmoud Abdelzaher

Fall 2016

Host Place: Department of Medical Biochemistry, Faculty of Medicine, Ain Shams University

Internal Supervisor: Dr. Ashraf Bakar

External Supervisor: Prof. Sanaa Eissa

Abstract

With the rise in incidence rates of bladder cancer both in Egypt and worldwide, accurate and reliable diagnostic methods are needed now more than ever. Due to its high specificity and sensitivity, cystoscopy backed by urine cytology remains the golden standard for bladder cancer detection despite the invasiveness of the procedure. Thus, the use of urine biomarkers for the detection of bladder cancer represents an attractive alternative to detection using cystoscopy. In this study, a microRNA (hsa-miR-324-5p) was evaluated as a potential biomarker for the detection of urothelial carcinoma. A total of 26 urine samples were collected from Egyptian patients, 21 of which were malignant with varying grades and stages and 5 were non-malignant. The target was found to be significantly down-regulated in malignant cases (with $p < 0.05$).

Keywords: *Bladder cancer, Biomarkers, MicroRNA, hsa-miR-324-5p*

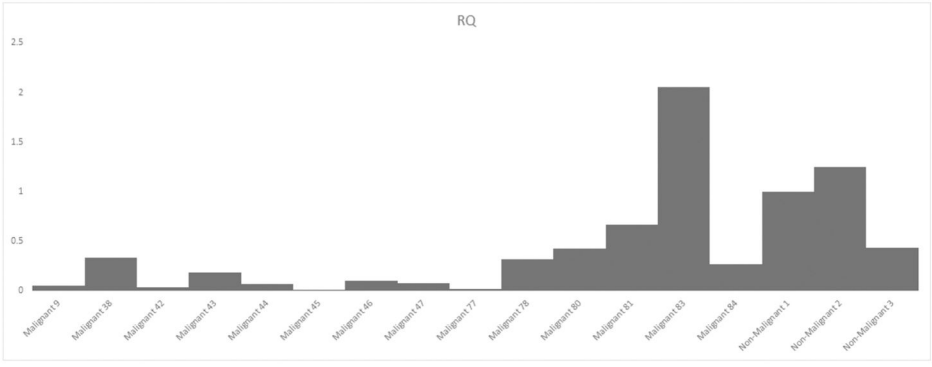

Figure 3: Relative quantification of miR 324-5p expression in malignant and non-malignant samples ($p<0.05$)

The role of miR-143 in the diagnosis of hepatocellular carcinoma patients

Aseel Sultan S. Al Dawish

Fall 2016

Host Place: Theodor Bilharz Research Institute

Internal Supervisor: Dr. Amr Ageez

External Supervisor: Prof. Samah Mamdouh

Abstract

Hepatocellular carcinoma (HCC) is a major subtype of liver cancer representing 90% of all liver cancer case. It has a very low survival rate due to failure in diagnosis of the disease at an early stage. Therefore, the aim of this study is to determine the role of miR-143 in the early diagnosis of HCC patients compared to healthy patients by determining the expression levels of miR-143 in the samples, using the real-time PCR. miR-143 was proved to be an efficient biomarker for the diagnosis of the disease in all the samples (Serum and Tissue). The expression levels of miR-143 were up-regulated in HCC serum samples compared to healthy samples, on the other hand, it was down-regulated in HCC tissue samples compared to control samples.

Keywords: *HCC, miR-143, serum, tissue, real-time PCR*

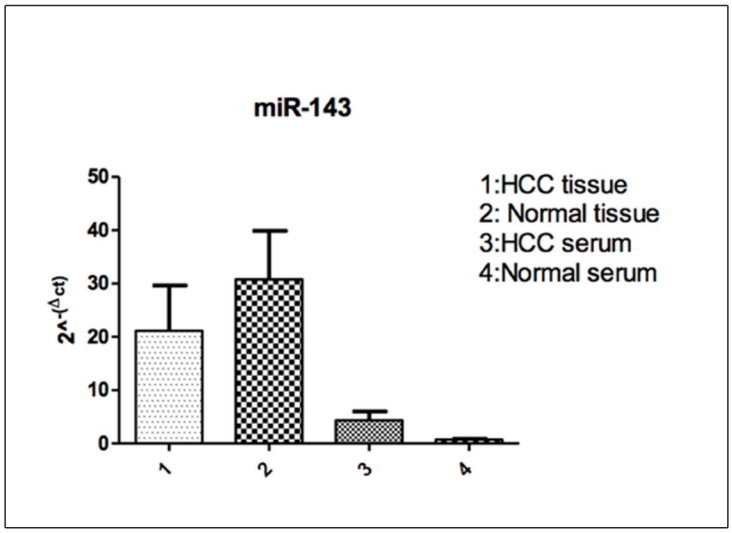

Figure4: Represents a graph of the ANOVA test for miR-143 expression patterns. According to $2^{-(\Delta\Delta CT)}$

Antiviral and virucidal potential of *Androctonus australis* scorpion venom against poliovirus type 1 and coxsackievirus B9 and the associated *MxA* gene profile

Hoda Raafat Attia

Fall 2016

Host Place: VACSERA

Internal Supervisor: Prof. Ayman Diab

External Supervisor: Dr. Aly Fahmy

Abstract

Poliovirus type 1 and coxsackievirus B9 are two viruses which belong to the picornaviridae family of enteroviruses. Currently, there are no specific treatment regimens for either virions. Therefore, animal venom peptides have received a lot of attention as potentially safe and inexpensive therapeutic agents. In this study, the antiviral and virucidal activity of Androctonus australis scorpion venom was tested against both viruses and the expression levels of the MxA gene was evaluated as a caliber for the interferon-induced antiviral response. Eventually, A.australis venom was shown to have poor antiviral activity against PV1 and CVB9 with an inhibitory concentration of 503 µg/ml. On the other hand, the venom was found to effectively impair viral infectivity through a moderate virucidal effect.

Keywords: *Poliovirus, Coxsackievirus B9, Viruses, Androctonus australis.*

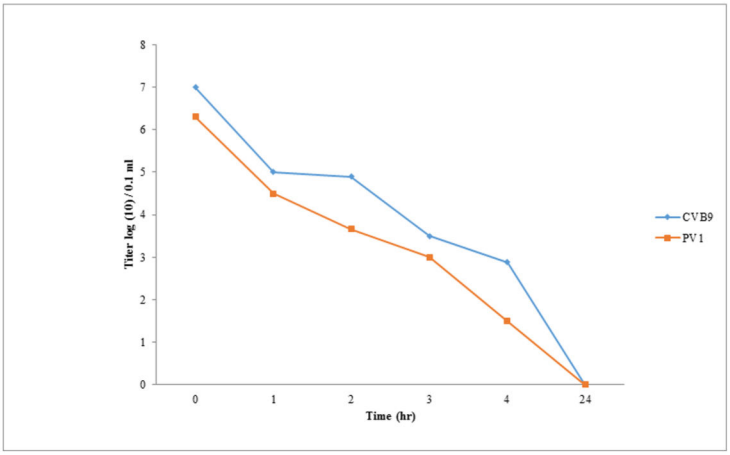

Figure 5: Virucidal activity of scorpion venom against CVB9 and PV1.

The Bacillus Calmette-Guérin Derived Purified Protein [PPD] potentiates in vitro the Anti-Cancer Activity of Cerastes-cerastes Snake Venom in Colon and Prostate Cancer Cells

Mohamed Ayman

Fall 2016

Host Place: VACSERA

Internal Supervisor: Dr. Ayman Diab

External Supervisor: Dr. Aly Fahmy

Abstract

Cancer is mainly characterized by the uncontrolled growth of normal cells. In the present study, we evaluated the anti-cancer properties and cytotoxicity of Cerastes-cerastes (CC) snake venom on colon and prostate cancer cells after their pre-treatment with variable concentrations of Bacillus Calmette-Guérin (BCG) derived purified protein derivative (PPD). The data indicated that the treatment of cancer cells with CC venom induced a concentration-dependent cytotoxicity. Interestingly, addition of BCG/PPD markedly increased the CC venom-induced toxicity towards cancer cells. Up regulation of pro-apoptotic and down regulation of anti-apoptotic genes in PPD pre-treated cells were significantly enhanced as compared to cells treated with CC venom alone, suggesting that PPD -via its synergistic action with the CC venom might be used as an enhancer of anticancer potential in combination with CC venom.

Keywords: *Cancer, Cytotoxicity, Cerastes-cerastes, Venom, Bacillus Calmette-Guérin.*

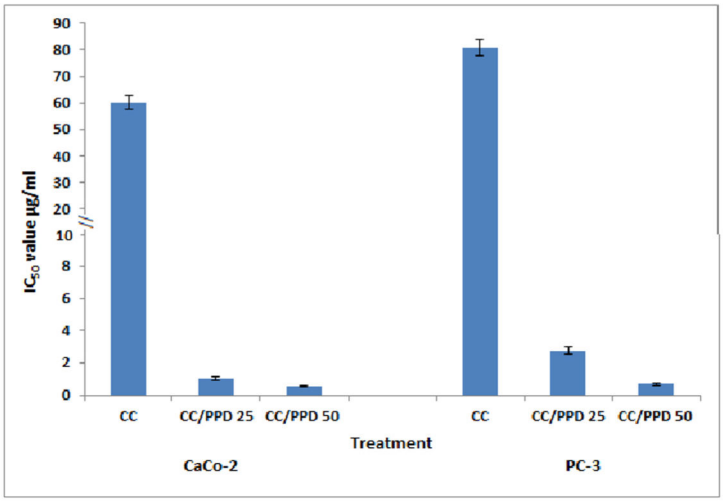

Figure 6: Comparative evaluation of the IC50values of Cerastes-cerastes (CC) snake venom used either alone or post cellular treatment with PPD, as assessed by MTT assay. The data show a marked decrease in CC venomIC50valuein cancer cells pre-treated with PPD at 25 and 50 ⊠g/ml in both colon (Caco-2) and prostate(PC-3) cancer cell lines. The results are presented as mean ± SD of triplicate

Grape Seed Extract Induces G2/M Cell Cycle Arrest and Apoptosis Via Generation of Reactive Oxygen Species in Breast and Colon Cancer Cell lines

Reem Ahmed Yaseen

Fall 2016

Host Place: VACSERA

Internal Supervisor: Dr. Ashraf Bakar

External Supervisor: Dr. Aly Fahmy

Abstract

Grape seed as a fruit waste was found to have medicinal potentials, specially its procyanidine constituent. The present work aimed to investigate the anticancer potential against two of the mostly spreaded cancers worldwide, breast and colon cancers. Data recorded revealed that grape seed extract (GSE) demonstrated a dose dependent cytotoxic potentials. Gene expression pattern of apoptosis related genes revealed that GSE stimulates a p53-independent apoptotic pathway which was associated with G2/M phase arrest. The elevated level of Reactive oxygen species (ROS) suggested that GSE is involved also in initiating the intrinsic pathway of apoptosis. These findings focus on the potential of using GSE as a multi-targeted cancer therapy to overcome the problem of resistance to current treatments.

Keywords: *Grape seed, Procyanidine, p53, apoptosis.*

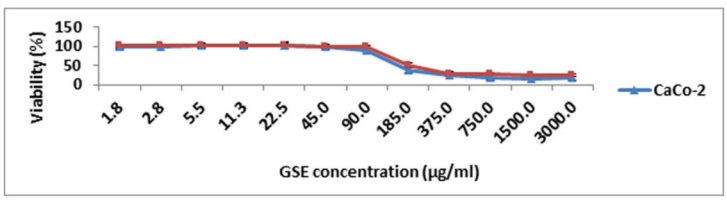

Figure 7: Evaluation of cytotoxic activity of GSE to CaCo-2 and MCF-7 cancer cells using MTT revealing dose dependent increase in cellular viability upon increasing GSE concentration. GSE exhibited slightly greater cytotoxicity to CaCo-2 than that to MCF-7 cells. Results were expressed as mean of three independent test ± SD

Detection of ABL kinase mutations in pediatric imatinib-resistant chronic myeloid leukemia patients using allele-specific oligonucleotide PCR

Hadeer Atallah

Fall 2016

Host Place: 57357 Children's Cancer Hospital

Internal Supervisor: Prof. Ayman Diab

External Supervisor: Dr. Dina Yassin

Abstract

Chronic Myeloid Leukemia (CML) is a clonal, myeloproliferative disease that develops when pluripotential, haemopoetic stem cells acquire the Philadelphia chromosome. That leads to their differentiation into cancerous cells that accumulate in the bone marrow then eventually overflow into the blood stream. Imatinb is the first tyrosine kinase inhibitor approved for the treatment of CML. However, most patients in advanced phase either exhibit primary refractions or relapse after an initial response to imatinib, which was proven to be mainly caused by mutations in the ABL kinase domain. There are a number of mechanisms by which resistance to imatinib occurs. Therefore, this project aims to screen for these point mutations in the ABL kinase domain in pediatric CML patients using allele-specific oligonucleotide polymerase chain reaction (ASO PCR).

Keywords: *Chronic Myeloid Leukemia, Cancer, Philadelphia chromosome, imatinb.*

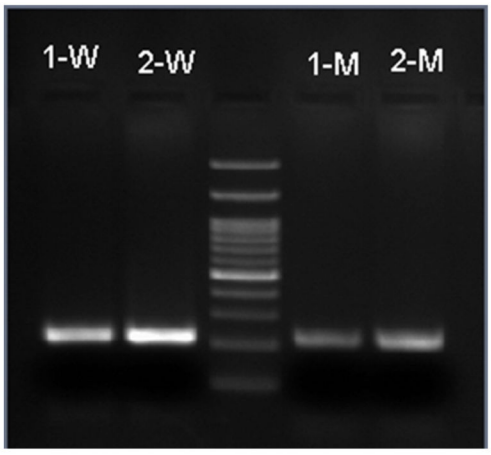

Figure 8: Post PCR products for both wild and mutant types of ABL Kinase domain point mutation M244V in cases 1 and 2. Where, L represents a 100 bp DNA ladder and lane 1 represents the Wild type of ABL kinase domain point mutation M244V in case #1, lane 2, Wild type of ABL kinase domain point mutation M244V in case #2, lane 4, ABL kinase domain point mutation M244V in case #1 (positive result) and lane 5 ABL kinase domain point mutation M244V in case #2 (positive result).

In vitro investigation of anti-oxidant activity of Tilia cordata and Ficus carcia leaf extract on rat liver lysosomal enzymes

Rania Mahmoud

Fall 2016

Host Place: Cairo university research park (CURP)

Internal Supervisor: Dr. Radwa Mekky

External Supervisor: Prof. Amr Mostafa

Abstract

Oxidative stress has been associated to the development and the progression of severe chronic inflammation. Oxidative stress has been described as the improper equilibrium of ROS production and antioxidant defense system. The overproduction of ROS significantly contributes to the dysfunction and the disruption of the various organ membrane stability. Since, Ficus carcia and tilia Cordata leaves exert profound anti oxidative and anti-inflammatory activities, they can be used as external sources of antioxidants to help regulate oxidative homeostasis and reduce ROS. Therefore, this project aims to investigate the effect of the in vitro incubation of rat liver lysosomal suspension with therapeutic doses of the antioxidant plant extracts. The results obtained shows that both plant extracts were able to attenuate oxidative stress and the release of lysosomal.

Keywords: *Oxidative stress, Chronic inflammation, homeostasis, anti-oxidant assay.*

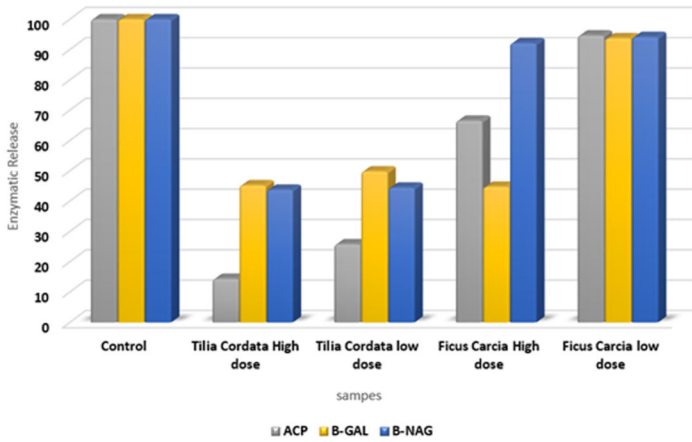

Figure 9: Anti-inflammatory Effect of Tilia cordata and Ficus carcia by two different doses (5.0 and 10.0 mg/ml) in comparison with the Control group (Relative change %) in-vitro on the three marker lysosomal enzymatic activities "ACP, β-GAL, and β-NAG in rat liver lysosomes after 60 minutes of incubation

Assessment of anti-cancer properties of grape seed derived procyanidin and quercetin against lung (A549) and prostate (PC-3) cancer cell lines: an in-vitro study

Marina Fakhry Abdou

Spring 2017

Host Place: VACSERA

Internal Supervisor: Dr. Ashraf Bakar

External Supervisor: Dr. Aly Fahmy

Abstract

The aim of the present study was to verify the anti-cancer potentials of Quercetin and procyanidin derived from grape seed against (PC-3) human prostate cancer cells and (A549) human lung cancer cells. Cytotoxicity potential of test products was assessed using MTT assay. Data recorded revealed that procyanidin and quercetin mix showed a significant antagonistic reactivity in both cell lines compared with the single use of test products. Also, GSE derived procyanidin showed a lower toxicity to test A549 cells and significantly decreased IC50 value to PC3 cell line ($P<0.05$). It was noticed that pro-apoptotic genes (Bax and P53) were up-regulated significantly to the cell control accompanied with down regulation of anti-apoptotic gene (Bcl-2). Procyanidin and quercetin have an anticancer potential against PC3 and A549 cells.

Keywords: *Bcl-2, PC-3, Quercetin*

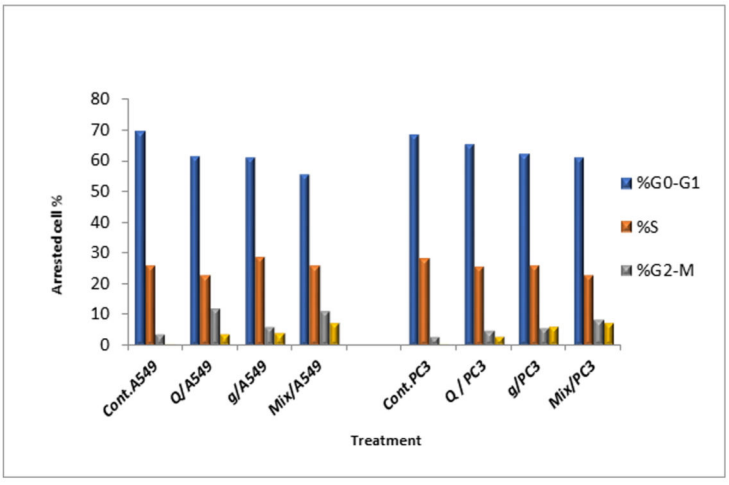

Figure 10: Cell cycle analysis and related % of arrested cells at different cell cycle phases

Assessment of the anti-cancer potential of sinapic acid: In vitro study on its effect on cell cycle and related apoptotic gene profiles

Howida Samir

Spring 2017

Host Place: VACSERA

Internal Supervisor: Dr. Ahmed Nada

External Supervisor: Dr. Aly Fahmy

Abstract

The common cancer treatments; chemotherapy, radiotherapy and surgery are known for their severe side effects. One of the novel treatment systems is the sustained released drugs formulations. In this study, the anti-cancer effects of free and encapsulated sinapic acid (SA) is tested against lung (A549), and colon (Caco-2) cancer cell lines, along with normal fibroblast cells (HFB4) as a control. MTT viability assay was performed for IC50 evaluation. Data recorded revealed that encapsulated SA showed a lower toxicity than the free form to both cell lines and also to the normal cells as well as up regulation of Bax and P53 and a down regulation of Bcl-2 genes in both cell lines. The data suggest a promising anti-cancer and anti-proliferative potential of free and encapsulated sinapic acid.

Keywords: *chemotherapy, sinapic acid and Bax.*

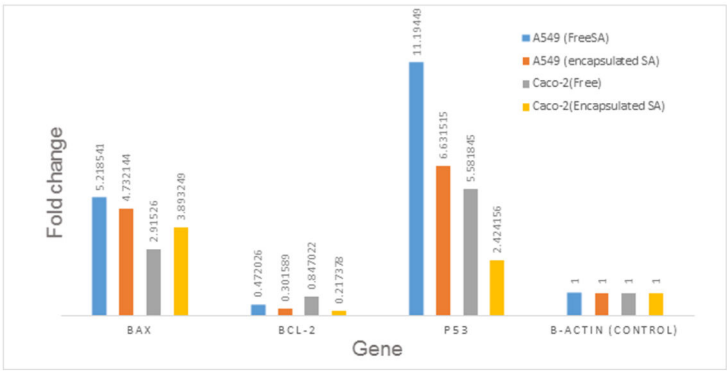

Figure 11: Expression levels of BAX, BCL-2, and P53 genes in A549 and Caco-2 cell lines after the treatment with free and encapsulated sinapic acid

Role of miR-130b as non-invasive biomarker for Hepatocellular Carcinoma

Noora Essam Fahmy

Spring 2017

Host Place: National Cancer Institute

Internal Supervisor: Dr. Ashraf Bakar

External Supervisor: Prof. Amal Fawzy

Abstract

Hepatocellular carcinoma cancer (HCC) is categorized as the malignant tumor of the liver. Therefore, the aim of this study is to determine the role of miR-130b in the early diagnosis of HCC patients. By determining the expression levels of miR-130b in the samples, using the real-time PCR. MiR-130b was proved to be an efficient biomarker for the diagnosis of the disease, by calculating the significance of the expression of miR-130b in all the samples (HCC, HCV and normal samples). The expression levels of miR-130b were up-regulated in HCC serum samples compared to healthy samples, on the other hand. Furthermore, the expression levels of miR-130b in HCC patients are compared with HCV samples also has been found to have augmented.

Keywords: *Hepatocellular Carcinoma, miR-130b and PCR.*

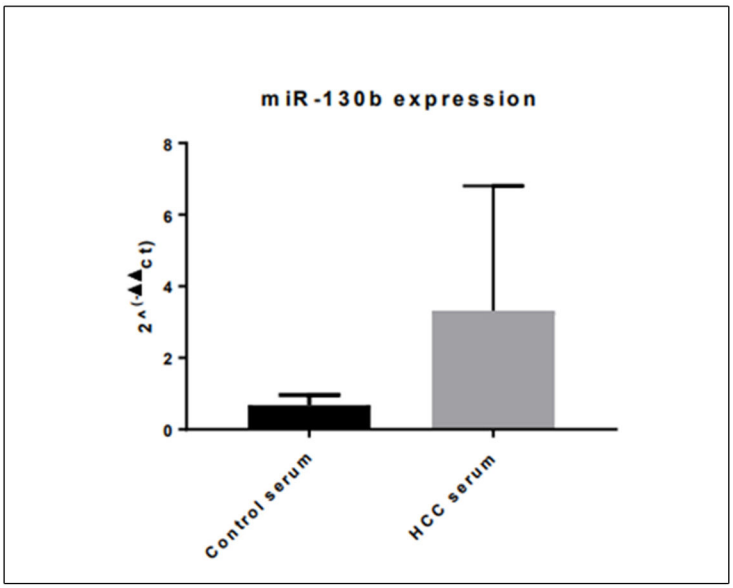

Figure 12: Represents the expression levels of miR-130b in HCC serum samples compared to normal serum samples with significant difference p=0.0039 (P<0.05)

The evaluation of the expression of a miRNA (hsa-miR-324-5p) and a long non-coding RNA (lncRNA MIR-497-HG) in bladder cancer

Hana Mahmoud Abdelzaher

Spring 2017

Host Place: Department of Medical Biochemistry, Faculty of Medicine, Ain Shams University

Internal Supervisor: Dr. Ashraf Bakar

External Supervisor: Prof. Sanaa Eissa

Abstract

Bladder cancer is the 10th most common in Egypt. MiRNAs and long non-coding RNAs have been strongly implicated in tumor development and metastasis. In this study, bioinformatics analysis was performed to retrieve non-coding RNAs relevant to bladder cancer. The expression of the selected miRNA (hsa-miR-324-5p) and lncRNA (lncRNA hsa-miR497-HG) was examined by qPCR in urine samples obtained from 196 individuals. Findings indicated that miR-324-5p was significantly upregulated in BC patients ($p < 0.001$) while lncRNA miR-497-HG was significantly down-regulated ($p < 0.001$) suggesting their oncogenic and tumor suppressor roles. No significant differences were detected in the expression of the RNAs across varying stages and grades of BC suggesting that their aberration may occur early. The clinical utility of miRNA and lncRNA was evaluated; their sensitivities and specificities (87.9%, 88.8% & 92.2%, 83%, respectively).

Keywords: *bladder cancer, qPCR, miRNA and lncRNA.*

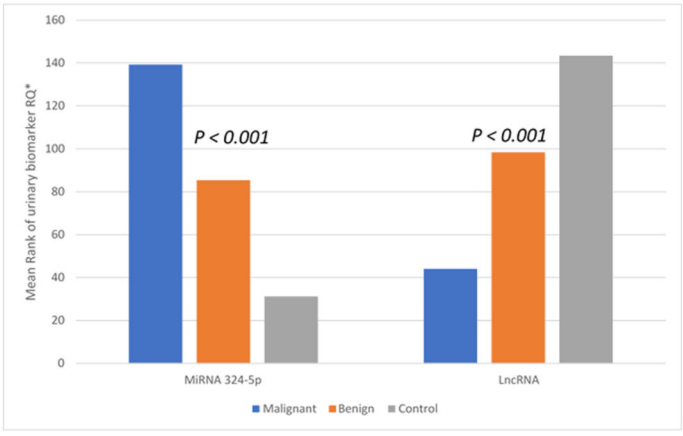

Figure 13: Differential expression of the two investigated non-coding RNAs among the three groups of the study, *Kruskal Wallis test, **Highly significant correlation was detected between investigated groups and expression of miRNA-324-5p and lncRNA (miR-497-HG) at P<0.001 with 2⊠ values of 123.774, 135.168 & 120.431 respectively, RQ: Relative Quantity

Conventional karyotype and FISH: Utilization strategy in the diagnosis of leukemia

Salma Ahmed Effat Mohamed

Spring 2017

Host Place: Metalab Diagnostic Laboratories

Internal Supervisor: Dr. Amgad Rady

External Supervisor: Dr. Mohamed Hussien

Abstract

Leukemia is the cancers of bone marrow or blood that affects the white blood cells (WBCs). Egypt revealed the highest incidence of leukemia. This study aimed for the use of cytogenetic tool in the diagnosis of leukemia at early stages. Fluorescence in-situ hybridization (FISH) can be used to determine the chromosomal abnormality. Karyotyping of cancers affords a global analysis of the chromosomal abnormality in the whole genome of single cell. In total, 110 leukemic patients were included in this study, 79 samples were enrolled in the karyotype diagnosis and their outcome was 58 normal and 21 abnormal patients while 31 samples were used in the FISH technique result in 20 normal and 11 abnormal patients. The specificity and sensitivity of FISH technique was highly significant of approximately 99%.

Keywords: *Leukemia, FISH and karyotype.*

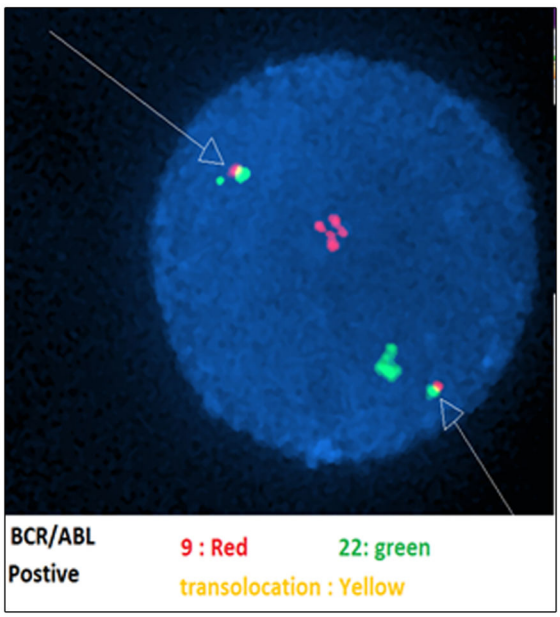

Figure 14: represents translocation between chromosome 9 and 22

In-Vitro assessment of anticancer potential of Lapatinib and Bee venom against breast (MCF-7) and Prostate (PC-3) cancer cell lines: In-Vitro study

Nancy Karem Tawfik

Spring 2017

Host Place: VACSERA

Internal Supervisor: Dr. Ahmed Nada

External Supervisor: Dr. Aly Fahmy

Abstract

Breast and prostate cancers are considered to be the most aggressive cancers. In present study, the anti-cancer properties and cytotoxicity of Lapatinab and bee venom on breast MCF-7 and prostate PC-3 cancer cell lines were evaluated using MTT assay and it was noticed that the cytotoxicity was concentration dependent recording IC50 of 60 µg and 81 µg and 288 µM and 345 µM for MCF-7 and PC-3 respectively. Furthermore, synergetic activity of both bee venom and Lapatinab to the other recording a significant decreased IC50 values in the order of 1.04 µg and 0.59 µg for BV and 178 µM and 234 µM for Lapatinab post MCF-7 and PC-3 respectively.

Keywords: *Bee venom, Lapatinab and apoptosis.*

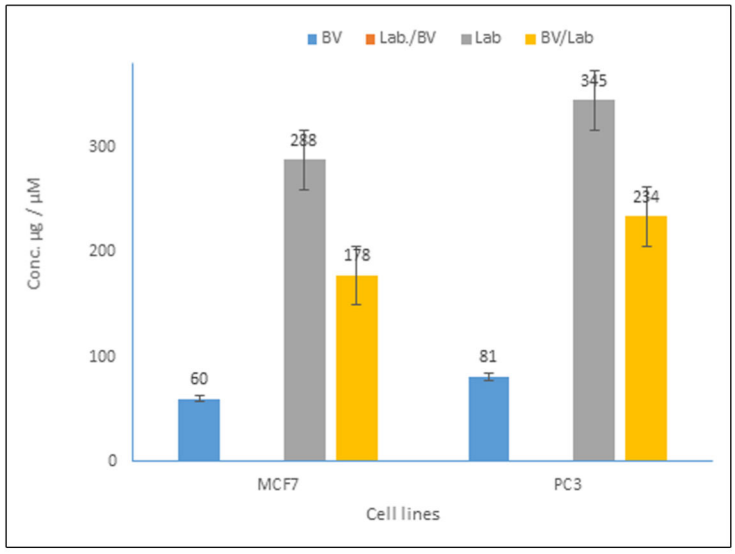

Figure 15: Evaluation of IC50 of sole bee venom and Lapatinab and their synergetic activity

Evaluation of SOX2Expression in HCV-Related Hepatocellular Carcinoma and Perimalignant Tissue

Shorouk Mohamed Mahmoud Mohamed

Spring 2017

Host Place: Theodor Bilharz Research Institute

Internal Supervisor: Dr. Ashraf Bakkar

External Supervisor: Prof. Tarek Aboushousha

Abstract

About 80% of hepatocellular carcinoma (HCC) cases are related to Hepatitis C Virus (HCV) and Hepatitis B Virus (HBV). This study was conducted on 58 biopsy specimens from malignant (24) and peri-malignant (34) hepatic tissues. Immunohistochemical staining of liver sections using anti-SOX2 monoclonal antibody was performed and the expression parameters were scored. HCC showed significantly high percentage of positive SOX2 expression (83.3%) compared to non-malignant hepatic tissue (13.3%), as well as positive SOX2 expression in high grade tumors (100.0%) in comparison to low grade tumors (75.0%). No significant correlations were found between hepatitis activity or the stage of fibrosis with the different parameters of SOX2 expression. In conclusion, low SOX2 expression in fibrotic and non-malignant tissues and high expression in malignant and dysplastic tissues.

Keywords: *HCC, malignant and SOX.*

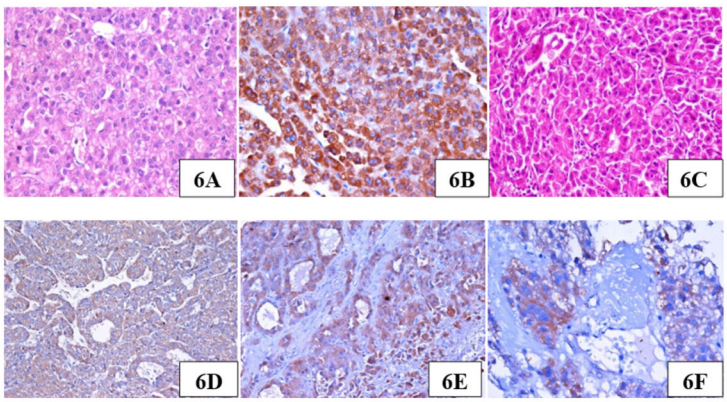

Figure 16: (A) Section in liver biopsy from a case of HCV infection showing liver cell dysplasia (H and E stain, X200). (B) Section in a biopsy from a case of liver cell dysplasia, showing diffuse dense cytoplasmic expression of SOX2 (IHC stain for SOX2, X200). (C) Section in liver biopsy from a case of HCV induced hepatocellular carcinoma of low grade malignancy (H and E stain, X200). (D) Section in liver biopsy from a case of hepatocellular carcinoma (acinar pattern), showing diffuse moderate cytoplasmic expression of SOX2 (IHC stain for SOX2, X200). (E) Section in liver biopsy from a case high grade hepatocellular carcinoma with focal acinar pattern, showing diffuse dense cytoplasmic expression of SOX2 (IHC stain for SOX2, X200). (F) Section in liver biopsy from a case of hepatocellular carcinoma (clear cell pattern), showing scattered focal dense cytoplasmic expression of SOX2 (IHC stain for SOX2, X200)

Expression Pattern of CDX2 in Common Egyptian Colo-Rectal Lesions; Immunohistochemical Study

Hadeer Atallah

Spring 2017

Host Place: Theodor Bilharz Research Institute

Internal Supervisor: Dr. Amr Ageez

External Supervisor: Prof. Tarek Aboushousha

Abstract

Colorectal cancer (CRC) was found to be one of the three most commonly diagnosed cancers. In Egypt, the incidence rates of CRC represent 6.5% of all diagnosed cancer cases. The pattern of CDX2 expression in colo-rectal mucosa was studied in relation to adenocarcinoma, pre-malignant colonic lesions of patients suffering from IBD, colitis, adenoma and for the first time -up to the most of our knowledge-to intestinal bilharziasis using immunohistochemical analysis. A significant difference between levels of CDX2 expression was displayed amongst the groups involved in this study. The immunohistochemical analysis has shown that measuring CDX2 expression patterns is a reliable method to distinguish between adenomas and adenocarcinomas. However, CDX2 expression was not found to have a clear role in premalignant disorders such as bilharzial colitis.

Keywords: *Colorectal cancer, CDX2 and adenocarcinoma.*

Table 2: Difference in means of CDX2 expression parameters between studied groups

diagnosis		CDX2percent	CDX2intensity	CDX2score
control	Mean	70.0000	3.0000	3.3333
	N	6	6	6
	Std. Deviation	8.94427	.00000	.51640
colitis	Mean	62.5000	2.2500	3.0000
	N	4	4	4
	Std. Deviation	14.43376	.28868	1.15470
bilharzial	Mean	60.0000	2.3333	3.0000
	N	6	6	6
	Std. Deviation	17.88854	.51640	.89443
IBD	Mean	41.1667	2.0000	2.0000
	N	12	12	12
	Std. Deviation	29.23520	1.04447	1.34840
adenoma	Mean	92.0000	3.0000	4.0000
	N	10	10	10
	Std. Deviation	7.14920	.00000	.00000
adenocarcinoma	Mean	38.3333	2.1111	1.8889
	N	18	18	18
	Std. Deviation	27.54675	.58298	1.02262
Total	Mean	55.9643	2.3750	2.6429
	N	56	56	56
	Std. Deviation	29.55609	.72143	1.24212
P value (ANOVA)		< 0.001	< 0.01	< 0.001

Y-Chromosome Microdeletions and their association with male factor infertility in Egyptian Patients

Mohamed Shokry Fayez

Spring 2017

Host Place: Genetica Laboratory

Internal Supervisor: Dr. Radwa Mekky

External Supervisor: Prof. Yasser El-Nahas

Abstract

Y chromosome microdeletions of the azoospermia factor regions (AZFa, AZFb, AZFc) are considered among the most important causes of male infertility. This study aims to assess the incidence of Y chromosome microdeletions in azoospermic and oligospermic. Fifty infertile males were included. Y chromosome microdeletions were detected after genomic DNA extraction by a multiplex Polymerase Chain Reaction (PCR) for AZFa, AZFb and AZFc. Among 50 infertile males; 34/50 (68%) patients were azoospermic and 16/50 (32%) were oligospermic. Six/50 patients (12%) had detectable Y microdeletions with a total of 13 deleted STSs; 11/13 (85%) in AZFc versus 2/13 (15%) in AZFb. STSs deletions detected with Y microdeletions were azoospermic vs. 1/6 (17%) oligospermic patient. Screening of Y microdeletions is essential for appropriate genetic diagnosis in infertile males. AZFc microdeletions.

Keywords: *Y-chromosome, microdeletion and infertility.*

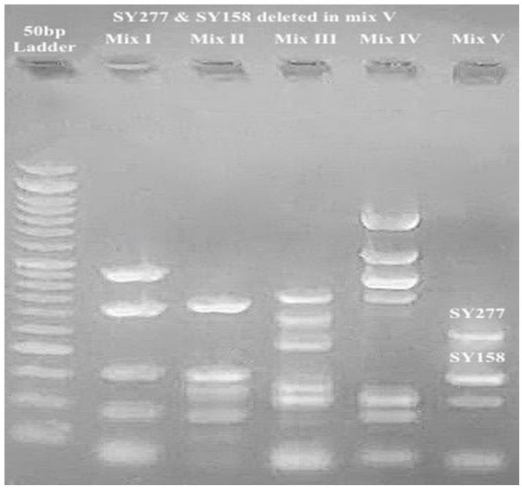

Figure 17: Ethidium bromide gel electrophoresis of patient with SY158 and SY277 deletions

Aberrant Overexpression of Heterogeneous RNA in Urinary Bladder cancer

Rania Mahmoud

Spring 2017

Host Place: Theodore Bilharz Research Institute

Internal Supervisor: Dr. Ashraf Bakar

External Supervisor: Prof. Tarek Aboushousha

Abstract

Early diagnosis of Bladder cancer is critically important. This study was subsequently aimed at evaluating the expression of hnRNPK in bladder cancer, and determining a correlation of this expression on the basis of various histopathological parameters including type, grade and stage, as well as Bilharzial association. Fifty-eight urinary bladder biopsy specimens were obtained and stained with H&E and analyzed using immunohistochemistry. The results showed that hnRNPK expression patterns were differentially expressed in benign, dysplastic and malignant lesions. The results also demonstrated that aberrant overexpression in bladder cancer tissue is correlated with a poor prognosis and thus elucidated the potential role of hnRNPK as a novel diagnostic and prognostic marker for bladder cancer.

Keywords: *bladder cancer, histopathological and hnRNPK.*

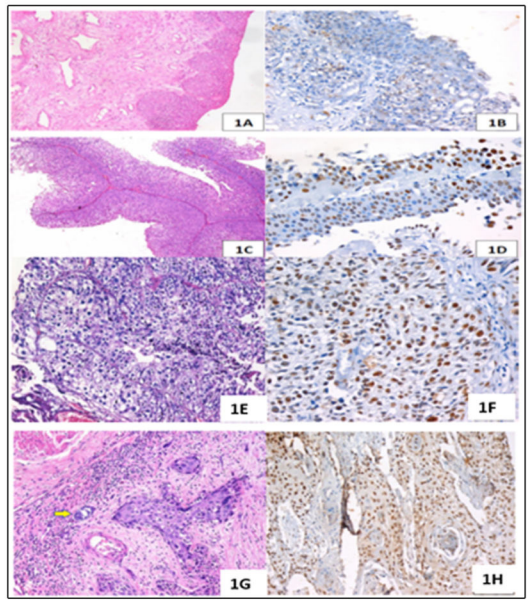

Figure 18: Histology and hnRNPK immunohistochemistry in urinary bladder sections. A, C, E, and G, H&E-stained sections. B, D, F and H are hnRNPK immunohistochemistry section

Environmental Biotechnology

Radwa Mostafa

Quantification of mtl gene in response to drought stress in commercial corn (Zea mays)

Mohamed Shokry

The potential use of saline water and low nitrogen in producing biofuel from the Egyptian isolate *Anabaena ambigua*

Shorouk Mohamed

Assessing Potential Risk of Heavy Metal Exposure from Consumption of herbal tea and true tea

Sumaiyah Ali

Degradation of thiodicarb

Abdulhadi Sami

Biodegradation of n-alkanes during the bioremediation of oil-polluted River Nile water as affected by the addition of biosurfactant

Amir Farouk

Testing the biological activities of essential oils

Omar Gamal

Levels of heavy metals in canned food and their impact on human health.

Reem Ahmed

Risk Assessment of Heavy Metals Exposure in Snacks and Other Candy Products Consumed by Pediatrics

Quantification of mtl gene in response to drought stress in commercial corn (Zea mays)

Radwa Mostafa Mohamed Eskandar

Fall 2016

Host Place: MSA University

Internal Supervisor: Dr. Osama Saad

External Supervisor: Dr. Osama Saad

Abstract

Zea mays is the scientific name of maize (corn). It is commonly used for human food, industrial raw material, animal feed, and bioenergy production worldwide. Drought is an abiotic stress that extremely affect the productivity of maize through equilibrium interruptions. The aim of this project was to quantify the drought regulation gene (Metallothionein) in corn through the extraction of total RNA from corn that treated with PEG followed by real time PCR as a quantitative method for measuring mtl1 gene expression. Finally, determination of root hairs number and dry weight measurements was executed. The results show variable expression folds of the mtl1. The highest expression was detected after 5 days of the treatment compared to one day and 10 days.

Keywords: *Cereals, Zea mays, Stress, germination, Metallothionein*

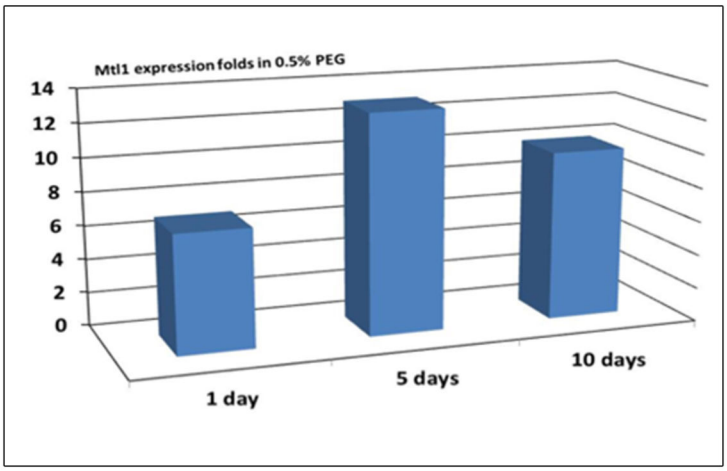

Figure 19: Different expression folds of mtl1 gene in PEG with 0.5% concentration after 1, 5, and 10 days through the real-time PCR.

The potential use of saline water and low nitrogen in producing biofuel from the Egyptian isolate *Anabaena ambigua*

Mohamed Shokry Fayez

Fall 2016

Host Place: Faculty of Agriculture, Cairo University

Internal Supervisor: Dr. Gehan Safwat

External Supervisor: Dr. Shady Abdel Mottaleb

Abstract

With the high rates of fossil fuel depletion, overwhelming climate changes and imminent threats to the environment, it has become evident that new renewable sources of energy are needed to replace fossil fuels. Algal-produced lipids are the prerequisites for biodiesel production, and thus, they are needed in large quantities to enhance productivity. Nutrient starvation, as well as exposure to salinity, have been suggested to induce the production of lipids in high yields. Furthermore, nitrogen starvation has been associated with an increase the levels of pigments such as Chlorophyll and carotenoids. In this study, the Egyptian isolate of the blue-green algae Anabaena ambigua was subjected to different treatments. Lipid content and productivity were found to be the highest in the case of the combined treatment. This suggested that nitrogen starvation, as well as high salinity, may enhance algal growth and lipid yield.

Keywords: *Fossil fuel, Biofuel, blue-green algae, Anabaena ambigua.*

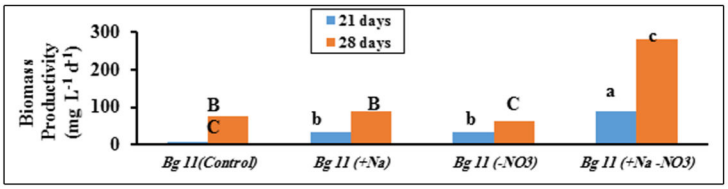

Figure 20: Biomass productivity (mg L-1 d-1) of Anabaena ambigua grown under the four different treatments. Each value represents the mean of 3 replicates. Means with identical letters (small letters for 21 days and capital letters for 28 days)

Assessing Potential Risk of Heavy Metal Exposure from Consumption of herbal tea and true tea

Shorouk Mohamed Mahmoud Mohamed

Fall 2016

Host Place: QCAP

Internal Supervisor: Dr. Amr Ageez

External Supervisor: Prof. Mona Khorshed

Abstract

Tea is one of the most frequently consumed beverages worldwide, apart from water, with an average daily consumption rate of 20 billion cups worldwide. Tea has been reported to be valuable in the treatment and prevention of multiple diseases. For this reason, tea should be free from any contaminants such as heavy metals. In the past decades, heavy metal contamination has exponentially increased. Thus, this study attempted to assess the potential risk of heavy metal exposure from the dietary consumption of herbal and true tea, and its environmental impact. Focus was given to toxic metals which were digested & processed using typical methods, then analyzed using Inductively Coupled Plasma/Optical Emission Spectrophotometer (ICP-OES).

Keywords: *heavy metals, optical emission spectrophotometer*

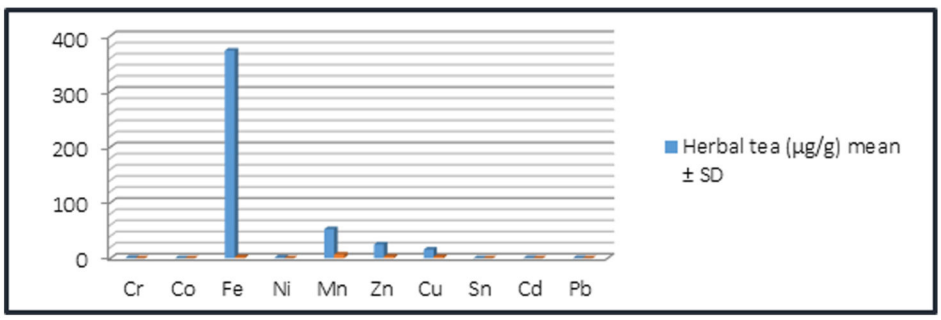

Figure 21: shows that Mn and Cd were the highest (141.0 57.36 ⊠ µg/100 ml) and the lowest (0.004 0.02 ⊠ µg/100 ml) concentrations in both herbal and true tea infused samples, respectively. These results were found to be not significant in terms of potential consumption risks of all tested brands, when compared to the APTWI.

Degradation of thiodicarb

Sumaiyah Ali Sheikhdon

Fall 2016

Host Place: QCAP

Internal Supervisor: Dr. Osama Saad

External Supervisor: Prof. Emad Ramadan

Abstract

Thiodicarb is amongst the most commonly used insecticides in the agricultural field. However, it has been associated with nausea, cancer, neurological impairment, paralysis, spermatogenesis and even death at high concentrations. The health impacts of thiodicarb as well as its degradation product, methomyl, have on human health can be severe and irreversible, thus, the prevention of these residues in food and water is of extreme importance and should be a priority for public health. The aim of this study was to identify the effects of temperature and pH on the degradation of thiodicarb in water with the use of LC-MS/MS technology to quantify the concentration. It was observed that thiodicarb degrades most rapidly at alkaline pH concentrations and requires higher temperatures in order to be efficiently degraded.

Keywords: *thiodicarb, insecticides, LC-MS/MS*

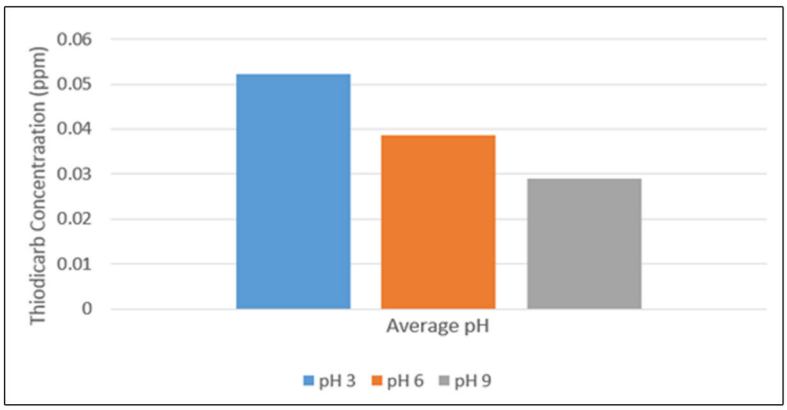

Figure 22: LC-MS/MS readings for each pH value.

Biodegradation of n-alkanes during the bioremediation of oil-polluted River Nile water as affected by the addition of biosurfactant

Abdulhadi Sami Muhammadi Ali

Fall 2016

Host Place: MSA University

Internal Supervisor: Prof. Ali Diab

External Supervisor: Prof. Ali Diab

Abstract

In the first part of this research project (Part I), water samples from the River Nile were collected from four different locations, from depth 0-20 cm. Location (4) – near Petrogas company, was found to contain relatively high percentage of oil-degrading bacteria (3.5%). This sample was polluted in the laboratory with about 200 mg crude oil/100 ml water, and treated with the addition of different amendment products e.g. the addition of a biosurfactant alone (BR), BR + bacterial consortium (BR + Cons.), bacterial consortium alone (Cons.), nitrogen phosphorus fertilizer (NP), NP + Cons. And BR + NP + Cons., this is in order to study the effect of each treatment on enhancing the biodegradation of the oil pollutant and the possibility of finding a suitable cost-effective strategy for using under emergency conditions for the bioremediation of River Nile polluted water in the future. The second part of this research project deals the biodegradation of the different n-alkane individuals found in the saturates fraction. GC analysis was used to quantify the residual different n-alkane individuals, so as to detect and to quantify the biodegradation efficiency of each n-alkane compound under the influence of the application of different treatments such as the addition of biosurfactant (BR), Biosurfactant mixed with the bacterial consortium (BR + Cons.), a combination of BR with nitrogen phosphorus fertilizer (BR + NP), consortium alone, NP alone, NP + Cons. and BR + NP + Cons. This in comparison with the control without additives.

Keywords: *oil-degrading bacteria, biosurfactant, biodegradation*

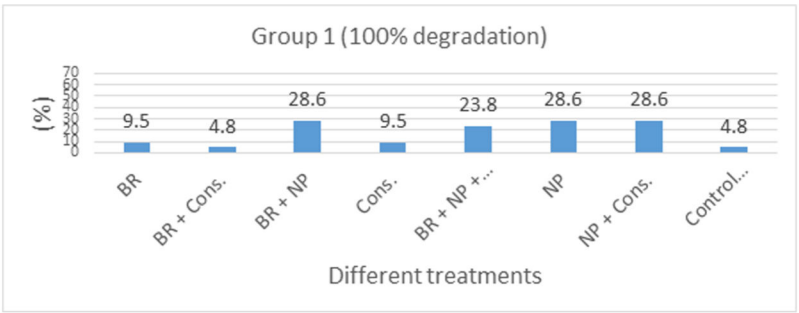

Figure 23: Percentages of n-alkanes of group (1) as affected by the addition of different treatments

Testing the biological activities of essential oils.

Amir Farouk Mohamed

Fall 2016

Host Place: Cairo University Research Park

Internal Supervisor: Prof. Ayman Diab

External Supervisor: Prof. Mohamed Moselhy

Abstract

Food borne illnesses were widely spread in the last few years, and the microbes that make these illnesses know have a resistant against the antibiotics. Therefore, a lot of researches were done to find a new antimicrobial agent from natural sources. Essential oils are extracted from medicinal plants, and showed a lot of biological activities including antimicrobial, antioxidant and anticancer activity. In this study we tested the antimicrobial and antioxidant activity of 4 types of essential oils (Basil, Clove, Geranium and Lavender) against 3 Gram positive bacteria and 3 Gram negative bacteria and 2 fungi strains. This study concluded that the 4 essential oils can give good biological activities and can be used as pharmaceutical product in the future.

Keywords: *food borne illnesses, antioxidant activity, antimicrobial activity, essential oils*

Table 3: shows the results of antimicrobial activity of the tested essential oils.

Microorganisms	Diameter of inhibition zone (mm)				
	Basil	Clove	Geranium	Lavender	Positive control
Staph. aureus ATCC 25923	13	11	14	11	16
Lister. monocytogenes ATCC 7644	NI	NI	13	10	19
B. cereus ATCC 33018	NI	NI	NI	NI	20
E. coli ATCC 8739	11	9	11	10	18
Sal. typhimurium ATCC 14028	10	9	11	9	20
Pseudomonas aeroginosa ATCC 9027	11	14	10	9	15
Asperg. niger nrrl 326	15	9	9	13	18
Cand. albicans ATCC 10231	12	9	19	12	15

Levels of heavy metals in canned food and their impact on human health.

Omar Gamal Sayed Tawfik

Spring 2017

Host Place: QCAP

Internal Supervisor: Dr. Reham Mohsen

External Supervisor: Dr. Mona Khorshid

Abstract

Heavy metal contamination of canned food products can be considered a serious issue. The canning process can make a slight increase of the amount of heavy metals. A total of 46 samples with different batch numbers were collected from different local markets in Giza, Egypt, Helwan, and 6th of October. The samples were subjected to acid digestion then were injected to ICP-OES to test the concentration of Cr, Co, Fe, Ni, Zn, Sn, Mn, Cu, Cd, Sb and Pb. Coupled plasma optical emission spectrometer (ICP-OES) was used to develop analytical method for determination of these heavy metals. The method was confirmed by using certified reference materials from FAPAS. The daily intakes of detected elements for humans were below the recommended tolerable levels.

Keywords: *Heavy metals, canned food and ICP-OES.*

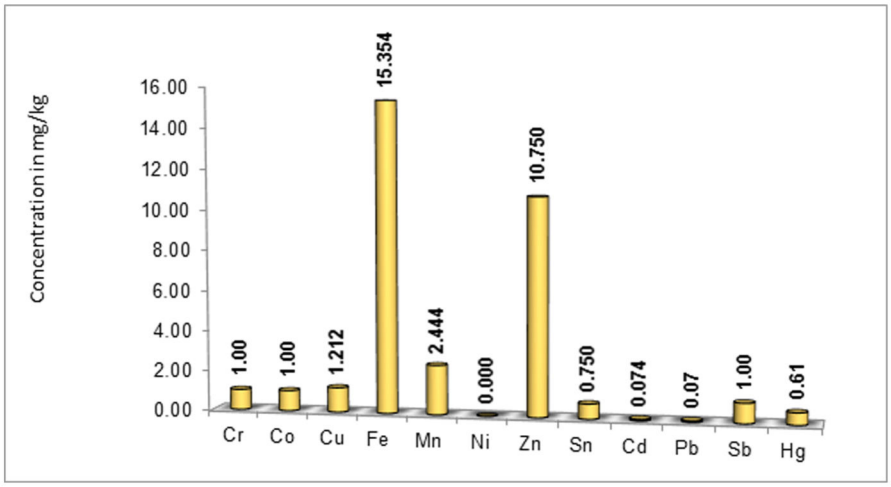

Figure 24: Mean concentration of heavy metals in 23 canned fish samples.

Risk Assessment of Heavy Metals Exposure in Snacks and Other Candy Products Consumed by Pediatrics

Reem Ahmed Yaseen

Spring 2017

Host Place: QCAP

Internal Supervisor: Dr. Radwa Mekky

External Supervisor: Dr. Mona Khorshid

Abstract

Heavy metal contamination of snacks and other candy products can be considered a serious issue. A total of 45 samples were collected from different local markets in Giza, Egypt to be tested. The samples were subjected to acid digestion then were injected to ICP-OES to test the concentration of Cr, Co, Fe, Ni, Zn, Sn, Mn, Cu, Cd, Sb and Pb. It was found that Pb was only present in snacks and chewing gum with mean concentration of 0.21 mg/kg and 8.9 mg/kg respectively. Assessment of dietary exposure showed that frequent consumption of all products, except chewing gum, have no significant concentration. Chewing gum was found to have high risk exposure of Cd, Sb and Pb equals to 21.85%, 76.47% and 1044.49% respectively. Results showed a significant heavy metal contamination that will cause serious health effects for pediatrics.

Keywords: *Heavy metals, ICP-OES and Food safety.*

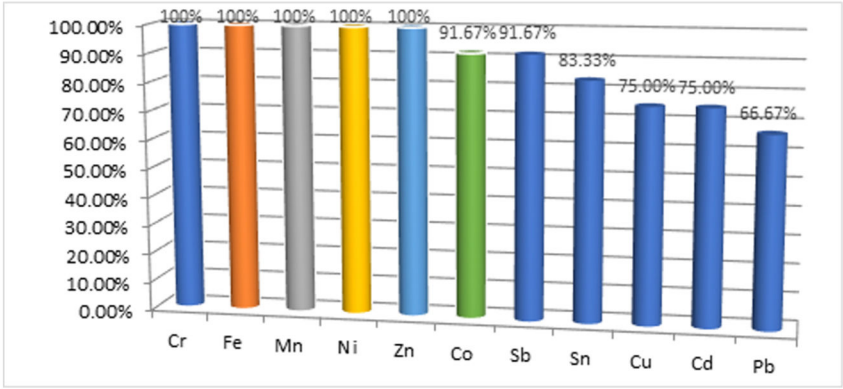

Figure 25: Frequentation of heavy metals in 12 different packages of snacks.

Agricultural Biotechnology

Maha Mohamed

In vitro study on the inflammatory effect of antioxidants from *Spinacia oleracea* (spinach) and *Brassica oleracea var. italic* (broccoli) on lysosomal enzymes of rat's liver

Youssef Sayed

Comparison between aflatoxin recovery in spices using gel permeation chromatography and immunoaffinity chromatography

Sherif Mohsen

The Detection and Quantification of Mycotoxin Patulin in Apple Juice Products using High Performance Liquid Chromatography

In vitro study on the inflammatory effect of antioxidants from *Spinacia oleracea* (spinach) and *Brassica oleracea var. italic* (broccoli) on lysosomal enzymes of rat's liver

Maha Mohamed Esmail

Fall 2016

Host Place: Faculty of Agriculture, Cairo Univeristy

Internal Supervisor: Dr. Radwa Mekky

External Supervisor: Dr. Amr Ahmed Mostafa

Abstract

Reactive oxygen species (ROS) has a significantly beneficial role in various processes such as cell signaling and homeostasis in addition to its participating energy production. The overproduction of ROS can cause oxidative stress. However, to control this overproduction of ROS, the body should have a significant amounts of antioxidants, whether these antioxidants are endogenous or exogenous. Two of the wealthiest sources of antioxidants are Spinacia oleracea (spinach) and Brassica Oleracea (broccoli). The present project is illustrating vital characterizations of the four lysosomal enzymes of the liver under the impact of various antioxidants components that are extracted from Spinacia Oleracea and Brassica Oleracea var. As a fact, the results, using DPPH assay confirmed that Spinacia contains higher antioxidants than Brassica.

Keywords: *ROS, liver, lysosomal enzymes, antioxidants.*

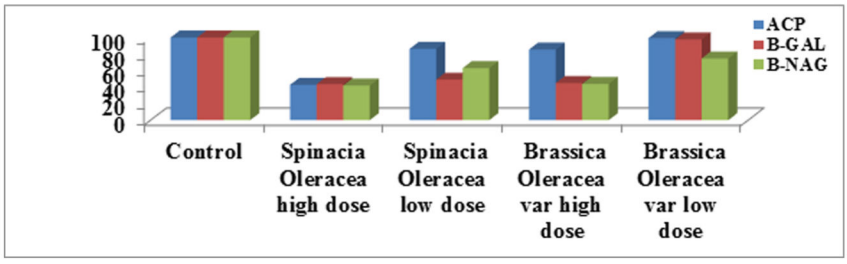

Figure 26: Shows Anti-inflammatory Effect of Spaniach and Brocli by two doses (5.0 and 10.0 mg/ml) after injection of CCl4 (100µl/100g rat) in comparable against Control group (Relative change %) in-vitro on the three markers lysosomal enzymatic activities "ACP, β-GAL, and β-NAG in rat liver lysosomes after 60 minutes of incubation.

Comparison between aflatoxin recovery in spices using gel permeation chromatography and immunoaffinity chromatography

Youssef Sayed Mahmoud

Spring 2017

Host Place: QCAP

Internal Supervisor: Dr. Radwa Mekky

External Supervisor: Dr. Ahmed Mamdouh

Abstract

Aflatoxins (AFT) are the most abundant mycotoxins found in nature, produced as secondary metabolites from multiple Aspergillus fungi strains. The consumption of aflatoxin contaminated food is directly proportional to the prevalence of cancer incidents worldwide. In this study, a comparison between the efficiency of immunoaffinity chromatography (IAC) and gel permeation chromatography (GPC) in the recovery of aflatoxins from hot chili was carried out. The results indicated that GPC is the better technique for the recovery of four types of aflatoxins (B1, B2, G1 and G2) as the mean recovery values were all over 80%, falling within the range of the accepted criteria set by the AOAC (Association of Analytical Communities).

Keywords: *Aflatoxins, GPC and IAC.*

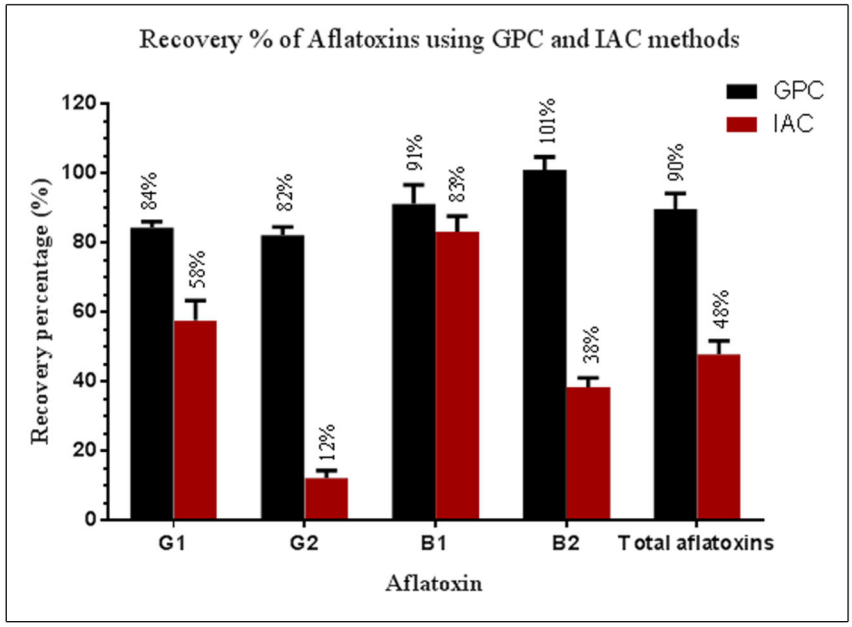

Figure 27: Comparison between rates of aflatoxin recovery from spiked hot chili replicates post purification by gel permeation chromatography (GPC) and immunoaffinity chromatography (IAC).

The Detection and Quantification of Mycotoxin Patulin in Apple Juice Products using High Performance Liquid Chromatography

Sherif Mohsen Mohamed Ali

Spring 2017

Host Place: QCAP

Internal Supervisor: Dr. Reham Mohsen

External Supervisor: Dr. Ahmed Mamdouh

Abstract

Mycotoxins are toxic compounds produced by various types of fungi, able to infect fruits, cereals and other natural products, which forms a major threat to animal and human health. Patulin is one of the major types of mycotoxins prominent in apples. In the current study, thirty samples of apple juice products were obtained, the samples were then purified to separate patulin from other compounds using purification techniques which is reverse phase high performance liquid chromatography system (RP-HPLC). The analysis showed the presence of the mycotoxin in 23.3% of the samples where 16.6% of the samples were within the allowed limit and 6.7% of the samples exceeded the allowed limit of 50 µg/L.

Keywords: *Mycotoxins, RP-HPLC and fungi.*

Table 4: Patulin presence and its ranges in all ten tested batches and the mean patulin amount in each batch in µg/L.tested essential oils.

Sample batch	Total no. of samples	Contaminated samples	Samples containing 1-10 µg/L	Samples containing 10-50 µg/L	Exceeding samples (>50 µg/L)	Mean amount in samples (µg/L)
Batch 1	3	-	-	-	-	-
Batch 2	3	-	-	-	-	-
Batch 3	3	-	-	-	-	-
Batch 4	3	-	-	-	-	-
Batch 5	3	-	-	-	-	-
Batch 6	3	-	-	-	-	-
Batch 7	3	1	-	1	-	-
Batch 8	3	2	-	1	1	34.395
Batch 9	3	1	1	-	-	-
Batch 10	3	3	2	-	1	20.796

Pharmaceutical Biotechnology

Sherif Mohsen

In vivo toxicity assessment of silver nanoparticles (AgNPs) of different shapes in the model organism Drosophila Melanogaster

Omar Gamal

Zinc Oxide Nanorods induced Apoptosis in Human prostatic and Hepatocellular Carcinoma via Mitochondria Dysfunction Mediated though Bax/ Bcl-2 with P53 Activation.

Dalia Nabil

Determination and validation of Sulfonamide Antibiotics in liver tissue of buffalo using QuEChERS method and LC MS/MS analysis

Reem Tarek

Determination of synthetic sweeteners in Some food commodities using Reversed Phase HPLC

In vivo toxicity assessment of silver nanoparticles (AgNPs) of different shapes in the model organism Drosophila Melanogaster

Sherif Mohsen Mohamed Ali

Fall 2016

Host Place: MSA Central Laboratory for Research

Internal Supervisor: Dr. Reham Mohsen

External Supervisor: Dr. Ola El-Borady

Abstract

Exposure of humans to silver nanoparticles has increased over the years and there is little information about the possible toxic effects of the silver. In the current study, two samples of polyvinylpyrrolidone capped silver nanoparticles have been tested on the model organism Drosophila Melanogaster. The larvae showed signs of toxicity where some flies showed developmental abnormalities while other showed signs of necrosis. Real time PCR analysis showed no major changes in expression levels of the heatshock protein HSP70 and the tumor suppressor gene p53. This study proves that silver nanoparticles have significant toxic effects although they are used in several applications.

Keywords: *silver nanoparticles, Drosophila Melanogaster, toxicity*

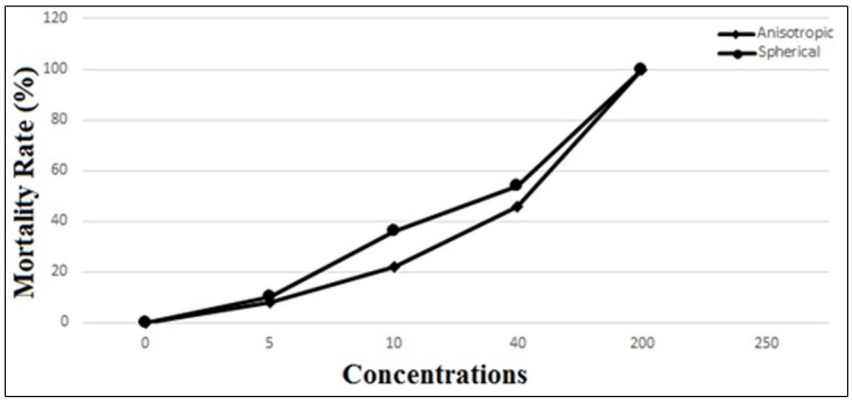

Figure 28: Dose dependent graph representation of the mortality rates of larvae treated by several concentrations of the prepared nanoparticle samples after 8 days of treatment, where the spherical nanoparticles show a minor increase in toxicity.

Zinc Oxide Nanorods induced Apoptosis in Human prostatic and Hepatocellular Carcinoma via Mitochondria Dysfunction Mediated though Bax/ Bcl-2 with P53 Activation.

Omar Gamal Sayed Tawfik

Fall 2016

Host Place: VACSERA

Internal Supervisor: Dr. Ashraf Bakar

External Supervisor: Dr. Ali Fahmy

Abstract

The present study aimed to experimentally synthesis Zinc oxide Nanorods (ZnO NRs) using albumin as bio-template by a So-gel method and to characterize the products using UV-Visible, FTIR, XRD, TGA, and HRTEM. The formation mechanism of ZnO NRs depends on the nucleation of Zn+2 in sites of the Albumin followed by Zn +2 assembly in the cavity of albumin and finally thermal treatment to form ZnO in rod shape then calcination to final form ZnO NRs form. Cytotoxicity of developed ZnO-NRs was conducted using MTT assay on both HepG2 and PC-3 cells. The flowcytometry illustrated that apoptosis of hepatocellular carcinoma (HepG2) depends on the cell growth arrest at G1/S phase indicated that inhibition Cyclin E (CDK 2) while prostatic carcinoma (PC-3) depends Cell growth arrest at G2/M phase indicated that inhibition of Cyclin ACDK1.

Keywords: *Zin oxide nanorods, hepatocellular carcinoma, prostatic carcinoma*

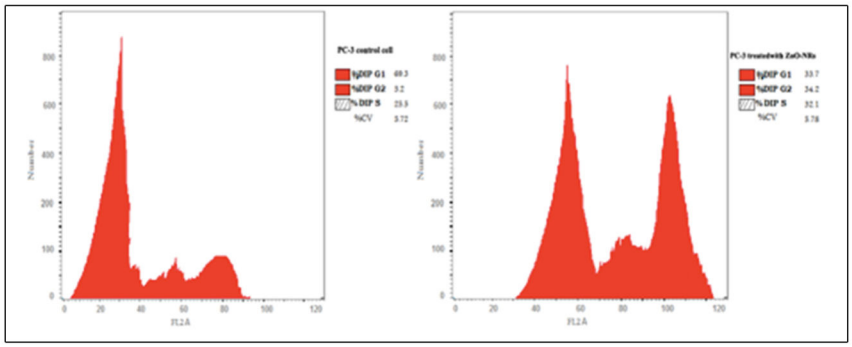

Figure 29: Cell Cycle of PC-3 cell line after treated with IC50of ZnO-NRs. (7 a) control, (7b) treated IC50 of ZnO NRs.

Determination and validation of Sulfonamide Antibiotics in liver tissue of buffalo using QuEChERS method and LC MS/MS analysis

Dalia Nabil Saad

Spring 2017

Host Place: QCAP

Internal Supervisor: Dr. Ahmed Nada

External Supervisor: Dr. Lamia Ryad

Abstract

Sulfonamides (SAs) are a very important class of antibacterial compounds widely used in veterinary practice for therapeutic, prophylactic, and growth promoting purposes. Residues of SAs may remain animal tissues. These residues in food are of concern because of their potential carcinogenic nature and the possible development of antibiotic resistance in humans. Therefore the aim of this study was the determination and validation of seven SAs by using QuEChERS method and LC MS/MS analysis. The result have shown a high recovery ranging from 73.9-80.7%, with relative standard deviations RSD (n=48) <14%. These parameters met the European Union criteria for method validation. This method of extraction and quantification of SAs in liver tissue was validated to be accurate, and sensitive, and precise.

Keywords: *QuEChERS, LC MS/MS analysis and sulfonamides.*

Table 5: Average Recoveries of SAs from liver samples fortified at 25, 50, 100 and 200 µg/kg (n =48) and overall RSD.

Analyts	Average Recoveries %				Overall Relative Standard Deviation (RSD			
	25(µg/kg)	50(µg/kg)	100(µg/kg)	200(µg/kg)	25(µg/kg)	50(µg/kg)	100(µg/kg)	200(µg/
SMR	78.65	77	73.9	74.25	13.2	8.3	4.4	4.1
SPD	78	78.35	74.4	74.25	13.3	7.2	5.1	4.4
SAM	79	78.5	74.332	76.125	12.7	6.4	4.4	3.2
SDZ	77.35	78	73.7	74.75	9	8	5	10
SMTX	79.65	78.2	73.9	74.25	11.1	7.0	4.4	4.1
STZ	78.65	77	73.9	74.25	13.2	8.3	4.3	4.1
SMZ	80.7	77.5	74	74.46	11.1	7.6	4.7	4.3

Determination of synthetic sweeteners in Some food commodities using Reversed Phase HPLC

Reem Tarek Amer

Spring 2017

Host Place: QCAP

Internal Supervisor: Dr. Reham Mohsen

External Supervisor: Dr. Ahmed Mamdouh

Abstract

Surveillance and monitoring of synthetic sweeteners is important for public health and food safety. The aim of this study is to determine levels of aspartame, acesulfame potassium and saccharine in different food commodities and to evaluate the maximum use limits according to Codex Alimentarius Regulations. In this study, Reversed Phase High Performance Liquid Chromatography (RP-HPLC) was used for the quantitative determination of artificial sweeteners in samples. Synthetic sweeteners were extracted from the sample using deionized water methanol 1:1 (v/v). The result showed that synthetic sweeteners were found within the Codex Alimentarius Regulations in 92.8 % of the samples. However, some samples were found not appropriate due to adulteration in label information and violation.

Keywords: *RP-HPLC, synthetic sweeteners and saccharine.*

Table 6: Ranges of aspartame content in different food categories.

Commodity (n)	Detected Samples[a]	Mean (mg kg^{-1})[b]	Positive Mean (mg kg^{-1})[c]	Range (mg kg^{-1})	Violation	Adulteration
1) Beverages (53)	16	134.4	445.2	N/D - 2,785.5	1	5
a) Instant Soft Drinks (34)	13	181.5	474.8	N/D - 2,785.5	1	5
i) Branded (28)	13	220.5	474.8	N/D - 2,785.5	1	5
• Labelled[e] (8)	8	390	390	234.9 - 523.3	N/D	N/D
• Not Labelled[f] (20)	5	152.6	610.7	N/D - 2,785.5	1	5
ii) Traditional (6)	N/D[d]	N/D	N/D	N/D	N/D	N/D
b) Soft Drinks (4)	3	237.4	316.5	N/D - 390.8	N/D	N/D
i) Diet soft drinks (3)	3	316.5	316.5	189.7 - 390.8	N/D	N/D
ii) Normal soft drinks (1)	N/D	N/D	N/D	N/D	N/D	N/D
c) Juices (15)	N/D	N/D	N/D	N/D	N/D	N/D
2) Canned Fruits (3)	N/D	N/D	N/D	N/D	N/D	N/D
3) Sweet Corn (4)	N/D	N/D	N/D	N/D	N/D	N/D
4) Chewing Gum (10)	8	1,631.2	2,039	N/D - 4,841	N/D	2
a) Diet Gum (7)	6	2,085.9	2,433.6	N/D - 4,841	N/D	N/D
b) Normal Gum (3)	2	570.2	855.4	N/D - 1,633.7	N/D	2
5) Toffee (3)	N/D	N/D	N/D	N/D	N/D	N/D
6) Ice Cream Powder (2)	N/D	N/D	N/D	N/D	N/D	N/D
7) Cakes (7)	N/D	N/D	N/D	N/D	N/D	N/D
8) Sauce (1)	N/D	N/D	N/D	N/D	N/D	N/D

DR. GEHAN SAFWAT'S WORD

Dr. Gehan Safwat
Vice Dean of
Faculty of Biotechnology

I am so privileged to have been a part of the students' exciting and insightful graduation projects journey. Watching them expand their creative boundaries, venture into new territories, and prepare for life beyond borders has been the highlight of my year. I am pleased to say that it has been a learning experience not only for these students but also for me. I think that's what I love the most about this whole process. These students have immensely worked and their huge efforts are clear in their wonderful results. I would like to thank our dean, Prof. Ayman Diab, for assigning me the task of supervising and co-coordinating the graduation projects because witnessing young and bright minds push themselves to their full potential is always such an honor.

Biotechnology
Graduation Projects Booklet

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