Ain Shams University
Faculty of Women for
Arts, Science and Education
Zoology Department

Protective Role of Lycopene and Grape seed extract against Formaldehyde –induced Pulmonary Damage in Rats.

Athesis

Submitted in partial fulfillment of the requirements for the degree of M.Sc. of Science in Zoology

By

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بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا الا ما علمتنا انك انت العليم الحكيم

سوره البقره 32

Dedication

This thesis is dedicated to My husband who have supported me all the way since the beginning of my studies.

Also, this thesis is dedicated to my parents who taught me that even the largest task can be accomplished if it is done one step at a time.

Finally, this thesis is dedicated to all those who believe in the richness of learning.

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جامعه عين شمسكليه البنات للآداب والعلوم والتربية
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الدور الواقي للالا يكوبين ومستخلص بذور العنب ضدالتدهور الرئوي المستحث بفعل الفورمالدهيد في الجرذان

رساله مقدمة توطئه للحصول علي درجة الماجستير في العلوم

(علم الحيوان)

من

نيرمين ماهر فؤاد أحمد

(بكالوريوس في العلوم)

لجنة الأشراف

أ . د \ سميحة محمد عبد الدايمأ . د \ هناء حمدي أحمدأستاذ علم وظائف الأعضاء أستاذ ورئيس قسم الهرمونات قسم علم الحيوان – كليه البنات للآدابشعبة البحوث الطبية
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الحمد لله الذى هدانا لهذا وما كنا لنهتدى لولا أن هدانا الله

أتقدم بخالص الشكر والتقدير الى أساتذتى الذين قاموا بالإشراف على هذه الرساله وهم :

أ.د / سميحه محمد عبد الدايم أستاذ علم وظائف الأعضاء – قسم علم الحيوان – كليه البنات للآداب والعلوم والتربيه – جامعه عين شمس .

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أ.د / فتحيه محمد متولى أستاذ الطب المهنى– قسم الطب البيئى والمهنى –شعبة بحوث البيئة –المركز القومى للبحوث .

كما أتقدم بخالص الشكر لزميلاتى وجميع العاملين بقسم الهرمونات – شعبة البحوث الطبية – المركز القومى للبحوث على معاونتهم ومساعدتهم لى طوال فترة البحث .

وأخيرا وليس بأخر أتقدم بكل الحب والعرفان لزوجى وأسرتى التى لطالما احاطتنى بالرعايه والحب والتشجيع .

ABSTRACT

Objective: The present study was constructed to investigate the protective role of lycopene (lyco.), grape seed extract (GES) either individually or in combination in ameliorating the oxidative damage,inflammatory and apoptotic insults on lung tissue induced by FA inhalation in experimental rat model.**Design:** This study was conducted on 90 adult albino rats divided into 9 groups : Gr. (1):healthy animals served as negative control group, Gr. (2): animals were exposed to 10 ppm FA (FA 10 ppm), Gr.(3): animal were exposed to 20 ppm FA (FA 20 ppm), Gr. (4): animals were orally administered with lycopene prior exposure to 10 ppm FA (FA 10 ppm +lyco.),Gr.(5): animals were orally administered with lycopene prior exposure to 20 ppm FA (FA 20 ppm+ lyco.).Gr.p (6): animals were orally administered with GSE prior exposure to 10 ppm FA (FA 10 ppm+ GSE), Gr.(7): animals were orally administered with GSE prior exposure to 20 ppm FA (FA 20 ppm+ GSE). Gr. (8):rats were orally administered with lycopene and GSE prior exposure to 10ppm FA. Gr. (9): animals were orally administered with lycopene and GSE prior exposure to 20ppm FA.At the end of experimental period, both blood and lung tissue samples were obtained for chemical analyses and histopathologicalinvestigation. Pro-oxidant markers: nitric oxide (NO), hydrogen peroxide (H_2O_2) and malondialdehyde (MDA) , antioxidant enzymes:Superoxide dismutase (SOD), catalase (CAT)and glutathione peroxidase (GSH-PX) , apoptotic markers: B cell lymphoma 2 (Bcl-2) and P^{53} and protein were measured in rat lung homogenate . Serum inflammatory markers:Interleukin-6(IL-6),IL-8and IL-10were determined. Additionally, Histopathological investigation of the lung tissue was a carried out. **Results**: The present results demonstrated that inhalation of formaldehyde either 10pmm or 20ppm cause elevation of lung pro-oxidant markers (NO, H_2O_2 and MDA) , pro-inflammatory (IL-6 and IL-8) and pro- apoptotic markers (p^{53}) levels . However, these induced depletion of lung antioxidant enzymes (SOD, CAT and GSH-PX), anti-inflammatory marker (IL-10) and anti –apoptotic marker (BCL-2) relative to the corresponding control value. Histopathological investigation of lung tissue of rats in groups challenged to formaldehyde 10ppm and 20ppm were also observed. On the other hand, the pre-treatment with lyco , GSE or a combined dose of lycoand GSE of exposed rats showed significant modulation in lung oxidant / antioxidant homeostasis in addition to marked suppression in inflammatory and apoptotic mediators.Theseresults

were well documented by the histopathological finding of lung tissues of rats in the treated groups.**Conclusion:** The present study provided a clear evidence for the Protective role of the lycopene,grape seed extract or their combination in the regression of formaldehyde toxicity. This effect was achieved through the antioxidant, anti-inflammatory and anti-apoptotic effects of the selected treatment play a key role in their therapeutic potential.

Keywords:Rats, Formaldehyde,Lycopene,Grape seed extract, Oxidative stress,Inflammation,Apoptosis.

.List of contents

Material and Methods