

Effect of alcoholic extract of *Peganum harmala* seeds on kidney efficiency, thyroid gland s hormones and thyroid stimulating hormone in local female rabbits.

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Abstract

Peganum harmala belong to the Jigo phalluses family has many compound as alkaloid ,Saponine steroid and lignin which are used as a medicinal plant which serves as a regulator to endocrine activity, in this study, twenty adult female local rabbits with weight of 1500 ± 100 gms with age 8 months \pm 10 days were divided into 2 groups: the control group which fed on diet and water adlibitum and the treatment group which administrated orally 10cc with 13.5% of *peganum harmala* alcoholic extract daily for 14 consecutive days, in the 15th day then collecting the blood samples of the animals, serum level of Triiodothyronin(T3), Thyroxine(T4) and Thyroid-stimulating hormone(TSH)besides the urea, uric acid and creatinine were measured by using radioimmunoassay method, The study revealed that the 90mg/kg dosage of *peganum harmala* alcoholic extract increase significantly ($p<0.05$)the urea and uric acid when compared with control, while the creatinine has not recorded significantly variances when compared with the control group, in the other hand, the effect of *Peganum harmala* seed alcoholic extract on the TSH , T3 , T4 revealed that these hormones decreased significantly ($p<0.05$)when compared with the control group.

Results of this study indicate that the 90mg/kg of alcoholic extract of *Peganum harmala* seeds has increased blood urea and uric acid , decreased blood TSH as well as hormones of thyroid gland

Keyword: *Peganum harmala* seeds, Urea,Creatinin, Thyroid gland, Thyroid stimulating hormone, Rabbits.

تأثير المستخلص الكحولي لبذور نبات الحرمل *Peganum harmala* على كفاءة الكلية وهرمونات الغدة الدرقية والهرمون المحفز للغدة الدرقية في إناث الأرانب المحلية

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الخلاصة

ينتمي نبات الحناء الى عائلة *Jigo phalluses* والذي يحوي عدة مركبات مثل القلويات والصابونين والستيرويدات واللكنين والتي تستعمل كنبات طبي تعمل على تنظيم الفعالية الصماوية ، تم في هذه الدراسة استعمال عشرون انثى بالغة من الأرانب المحلية بوزن 1500 غم \pm 100 غم وبعمر 8 شهور \pm 10 يوم . قسمت الحيوانات الى مجموعتين :مجموعة السيطرة والتي تم تغذيتها وإروائها عند الحاجة ومجموعة المعاملة والتي جرعت بالمستخلص الكحولي بكمية 10 مل وبتركيز 13.5 % يوميا لمدة اربعة عشر يوما متتاليا ، وفي الخامس عشر تم جمع عينات الدم من جميع حيوانات التجربة ، وتم قياس مستوى هرمون Thyroid-stimulating hormone (T3) Triiodothyronin وهرمون (T4) Thyroxine والهرمون المحفز للدرقية Thyroid-stimulating hormone (TSH) بالاضافة الى اليوريا وحامض اليوريك والكرياتين وتم القياس باستخدام طريقة التحليل المناعي الشعاعي radioimmunoassay ، كشفت الدراسة بان جرعة 90 ملغم/كغم من المستخلص الكحولي قد سببت زيادة معنوية في كل من اليوريا وحامض اليوريك عند مقارنتها مع مجموعة السيطرة ، بينما لم يسجل مستوى الكرياتنين أي فرق معنوي عن مجموعة السيطرة ومن ناحية اخرى فان تأثير المستخلص الكحولي لنبات الحرمل على T3 و T4 و TSH بين بان هذه الهرمونات قد ازدادت بشكل معنوي عند مقارنتها مع مجموعة السيطرة . اشارت نتائج هذه الدراسة بان جرعة 90 ملغم /كغم من المستخلص الكحولي لبذور نبات الحناء قد سببت زيادة في كل من مستوى يوريا الدم وحامض اليوريك وسببت انخفاضا في الهرمون المحفز للدرقية بالاضافة الى هرمونات الغدة الدرقية .

الكلمات الافتتاحية: بذور نبات الحناء ، اليوريا ، الكرياتنين ، الغدة الدرقية ، الهرمون المحفز للغدة الدرقية ، الارانب.

Introduction

The Zygophyllaceae plant (*Peganum harmala*) this plant is known as (Espand) in Iran, (Harmel) in North Africa and (African Rue), (Mexican Rue) or (Turkish Rue) in the United States, habitant to arid and Semiarid area distributed mainly in the Mediterranean region, North Africa and Middle east (1,2,3,4). The flowering period is March to April, the fruits are globose capsule have three chambers containing many angular blackish seeds (5), due to its bitter taste, the plant is not usually grazed and repels animals, all species of animals are susceptible to poisoning from the plant, but camels are the most often affected (6). The seeds of *P. harmala* plant contain tens of chemical compounds including amino acids, flavonoids, volatile compounds, polysaccharides & several kinds of alkaloids compounds (7). The extracts of its seeds contain B-carboline alkaloids, small quantity of flavonoid glycosides and anthraquinones (8,9). Several studies have clarified various biological activities and pharmacological characteristics of the seeds such as hypothermia (10), factor hallucinogen (11), antidepressant (12), monoamine oxidase (MAO) inhibitor (13) antibacterial, antifungal and antiviral effects (14,15). It has effect for the treatment of dermatosis disease (16), its leaves used as antinociceptive activity (17). The seeds of this plant are widely used in treatment of several diseases in livestock or domestic antihelminthic and protozoacidal agent and as treatment of asthma, eczema and malaria (18), experiments have showed the insecticidal effects (19,20), The antibacterial effect and antioxidant effects (15).

(21) found that the TSH level also T3 and T4 hormones were reduced by using of *peganum harmala* extract in adult male rats. The study aimed to investigate the physiological changes following repeated administration of alcoholic extract of *peganum harmala* seeds for 14 days on the levels of urea, uric acid and creatine as well as T3, T4 and TSH hormones of rabbits.

Materials and Methods

The seeds of *Peganum harmala* L. (Zygophyllaceae) were collected from local market in AL-Diwaniya Province, powdered seeds were placed in percolator with ethanol 70% in 1:10 w/v, and allowed to stand at room temperature overnight, The percolate was collected and the process of extraction was repeated, The combined extract was dried in 45°C and stored in 4°C (22).

Twenty adult females of local rabbits with approximate weight of 1.500±100 gm were divided into 2 groups. The control group did not take any medicine, The experimental group drinking 90mg/kg of *Peganum harmala* alcoholic extract daily for 14 consecutive days. In the 15th day the blood samples were collected from all animals and then serum obtained to detect level of

Triiodothyronin(T3), Thyroxine(T4) and Thyroid-stimulating hormone(TSH) by using radioimmunoassay method(23).The collected data were analysed by using SPSS software, the statistical significance of differences between means was calculating using one.way ANOVA,($P \leq 0.05$)(24).

The results

The effect of alcoholic extract of *Peganum harmala* seeds on urea, uric acid and Creatinine were shown in table (1), Results presented that there were significant differences ($p < 0.05$) in urea and uric acid alcoholic extract of *Peganum harmala* seeds treated group when compared with control group .

The creatinine of the treated group recorded no significance in comparison with control group. alcoholic extract of *Peganum harmala* seeds causes a significant increment in urea (34.411 ± 0.137)mg/dL as well as the same action in the uric acid when compared with control group (4.391 ± 0.11 and 3.45 ± 0.056)mg/dL respectively while in post-treatment the creatinin did not recored any changes in its level when compared with control group (0.553 ± 0.012 and 0.553 ± 0.021)respectively.

Table (2) refered treatment group of T3,T4 and TSH with alcoholic extract of *Peganum harmala* seeds had registered significant difference ($p < 0.05$)when compared with control groups .

Alcoholic extract of *Peganum harmala* seeds on thyroid gland had registered a significant decrement in T3 and T4 hormones, The T3 hormone level after treatment was (1.134 ± 0.0157) and T4 hormone level become(6.532 ± 0.03) while they were in the control groups (1.583 ± 0.025) , (7.692 ± 0.05) respectively .

The decrement effect of alcoholic extract of *Peganum harmala* seeds involved TSH hormone which was in the control group 0.504 ± 0.294 and became 0.302 ± 0.198 mu/L.

Table (1) The effect of alcoholic extract of *Peganum harmala* seeds(90mg/kg) on rabbit urea, uric acid and creatinine concentrations in serum.

Group	Urea mg/dL M±SE	Uric acid mg/dL M±SE	Creatine mg/dL M±SE
Control	32.634A ±1.774	3.45A ±0.056	0.541A ±0.022
Treatment	34.411B ±1.037	4.391B ±0.11	0.559A ±0.031

Different letters mean significant differences ($p \leq 0.05$)

Table(2) The effect of alcoholic extract of *Peganum harmala* seeds(90mg/kg) on T3, T4,TSH hormones of rabbit in contol and treated groups.

Group	T3 ng/ml M±SE	T4mg/dl M±SE	TSH mv/L M±SE
Control	1.583A ±0.025	7.692A ±0.05	0.504A ±0.294
Treatment	1.134B ±0.0157	6.532B ±0.03	0.302B ±0.198

Different letters mean significant differences($p \leq 0.05$)

Discussion:

The present study stated the changes in the kidney and thyroid gland as well as thyroid stimulating hormone following repeated administration of alcoholic extract of *Peganum harmala* seeds .

In a study was done in chicks fed diets including 10% of *peganum harmala* for a period of 14 days, the histological changes in the kidney noticed the degeneration of epithelial cells of the renal proximal convoluted tubules(23)and this agreed with the recent study which lead to increase the uric acid and urea, whereas this study is not in agreement with a study was done in mice injected subcutaneously with aqueous extract of *peganum harmala* which showed no toxic effect

on kidney.(25) this may be due to differences in the experimental animals, the status of extract and the route of administration. The recent study has similarity with previous studies conducted on large animals (26), furthermore,(21) found that 90mg/kg as well as 270mg/kg dose of the *Peganum harmala* extract reduce the T3 ,T4 and TSH levels in rats and that accord with the present study.

The increase in the levels of urea, uric acid after alcoholic extract of *Peganum harmala* seeds treatment is considered as an indicator of renal function failure.

Results stated that alcoholic extract of *Peganum harmala* seeds has the ability to normalize the creatinine level post treatment, This action may be due to the presence of many active compounds in the alcoholic extracts of *P. harmala* as alkaloids and flavinoids.

In the other hand(27)found that alkaloids impaired the kidney function, in the contrast,(28) stated that alkaloids have been exerted proteic effects on the renal function, in the same way (29) reported that flavonoids compounds may prevent nephrotoxicity and improve the function of kidney and promote kidney primary epithelial tubular cell regeneration,besides that, identically (30)clarified that flavonoid mixture lowered plasma creatinine and urea concentrations and these results contrast with the present study except uncharged level of creatinine where the animals in the other study were rats, whereas the animals of the present study were rabbits with dose 90mg/kg.

A study was done on patient(31)found that adding herbal medicine as alcoholic extract of *Peganum harmala* seeds did not change the level of Creatinine and this accord with the present study . Furthermore(32)clarified that 200 and 400 mg/kg of *P. harmala* extract significantly reduced the levels of TSH, T3 and T4 in rats and this compatible with this study. Similarly, a study was done on rats revealed that this herbal plant reduces the TSH level and levels of T3 and T4(21).

The obtained data revealed that *P. harmala* caused a significant decrement in the level of plasma T3 and this consistent with 14 who found that this plant effect decreasingly on that hormone the conducted results revealed that there is a decrement in the level of uric acid and this donot accord with(33) who found that the *P.harmala* decreased the plasma uric acid level and this may be due to the experimental animals where chickens .

A recent study conducted on male rats(34) represents that *P. harmala* cause decrement of T3,T4 and this due to decrease of thyroid hormones transporter proteins and this is in agreement with the present study, According to the results of this study the effect of *P. harmala* ethanolic extract on pituitary – thyroid axis is examined, it is obtained that the inhibitory action of compounds in *P. harmala* seed extract effect the secretion of thyroid hormones .

The results of this study showed that administration alcoholic extract of *Peganum harmala* seeds caused a significant decrement in thyroid gland hormones and TSH , while caused a significant decrement of urea and uric acid with still unchanged creatinine level in both pre and post treatment groups in local female rabbits.

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