Study the effect of *Thymus vulgaris* on the weight of Liver and Kidneys in Albino male rats

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Abstract

The increase in the outbreak of the use of thyme in Iraq and in neighboring countries, especially in recent times of medical and nutritional point of view and may be caused by excessive use of thyme from side damage and which may reach the critical stage, Therefore, this study aim to assess the effect (500 , 750 ,1000) mg / kg of body weight of thyme extraction given to rats by injection and feeding by grinding dried thyme leaves adding to pellet (50 ,100 , 150) g / kg of pellet in the difference duration (10 , 20 , 30) days for injection and feeding per 2 times in week on the weight of each of the liver and kidneys in male rats, The statistical analysis shows that thyme cause significant decrease ($P\leq0.05$) in weight of liver and kidney in rats that treated with thyme extraction by 1000 mg /kg of body weight and 150 g / kg of pellet in duration 10 days , in 20 days thyme cause high significant decrease ($P\leq0.01$) in weight of liver and kidney in rats that treated with thyme by 750 - 1000 mg /kg of body weight and 100 - 150 g / kg of pellet and in 30 days thyme cause very high significant decrease ($P\leq0.001$) in weight of liver and kidney in rats that treated with thyme extraction by 500 - 750 - 1000 mg /kg of body weight comparing with the negative and positive controls and 50 - 100 - 150 g /kg of pellet comparing with the negative control for feeding .

Introduction :

Medicinal plants are used in many countries as replacement to synthetic drugs . Scientists are now paying attention towards herbal extracts to do as microbial agent due to increase in bacterial resistance to antibiotics which to an increasing extent led to world health issue . diverse spices and herbal extracts are used for preservation of food , as well some are used as appetizers and many of them are utilized medicinally in old times (Mousavi *et al* ., 2011) .

Medicinal herbs are high natural source of medicinal products used in traditional medicine and chemical entities for modern drugs. Medicinal

plants are broadly used either directly (home remedies) or indirectly (modern medicines) by all sectors of inhabitants (Srinivasan *et al* ., 2001).

Many pharmacological *in vitro* experiments carried out during the last decades revealed well defined pharmacological activities of both, the thyme essential oil and the plant extracts (Grigore *et al* ., 2010) . The non-medicinal use of thyme is worthy of attention, because thyme is used in the food and aroma industries; it is widely used as culinary ingredient and it serves as a preservative for foods especially because of its antioxidant effect. Thyme essential oil constitutes raw material in perfumery and cosmetics due to a special and characteristic aroma (Takeuchi *et al* ., 2004)

Essential oil quality and yield depend on many factors and choosing a suitable extraction method is very important. For example, steam distillation procedure is widely used for essential oil separation; beyond its efficiency, this method gives a greater or lesser compounds instability under the influence of high temperature. Extraction with organic solvents has many deficiencies – residual solvent in the extracts, insufficient solvent selectivity so that, in addition to the active substances, other compounds are dissolved (Bazylko and Strzelecka ., 2000 ; Jiminez-Arellanes *et al* ., 2006)

Thymus vulgaris are recurrent flavonoids , these metabolites are a group of pigments contained in plants and they are responsible for flower and fruit coloration . Flavonoids are present in dietary fruit and vegetables and responsible for many biological properties included antioxidant activities (Tripoli *et al* ., 2007).

T. vulgaris is an important medicinal plant (Al-Bayati ., 2008; Golmakani and Rezaei ., 2008) which belongs to the Lamiaceae family , it has been used for centuries as spice, home remedy, drug, perfume and insecticide. In medicine, it is used as antispasmolytic, antibacterial, antifungal, secrotolytic , expectorant, antiseptic, antlelmintic and antitusive as reported by other authors (Özgüven and Tansi ., 1998).

Materials and Methods

Laboratory Animals

All experiments were performed on 120 albino Rats (male), their ages ranged between 2-3 months with a body weight ranged between 225-250 g. Rats were obtained from animal house of National center for drug control and researches and housed in the animal house of the College of Medicine /Bagdad University. They were kept in a room supplied with air conditioner to keep the temperature between18-24 ˚C, the air of the room was changed continuously by using ventilating fan and light was controlled with range of 12 hours of light and 12 hours of darkness.

The animals were housed in plastic cages (4 rats\cage) with a wire grid covers, supported on ventilated racks (Mitrruka *et al* ., 1976) . The bedding material used was fine sawdust and wood shaving which was changed every other day to prevent accumulation of urinary pheromones (Grasso *et al* ., 1997) . The cages was washed regularly once a week with hot water, then 70% alcohol as disinfectant , rats were fed with standard balanced pellet that contains special dietary supplement to keep normal activity and growth , before experimentation , all rats were left for at least two weeks for adaptation , during this period , abnormal and sick rats were excluded from the experiment .

The plant

The Thyme used in this study were purchased from the Shorja market in the Baghdad , dried thyme leaves have been prepared in two ways , depending on how the dosage :

Injection

Dry leaves of *Thymus vulgaris* where put about 50g , in containers extraction thimbles located in soxhlet extractor then added 500 ml of ethyl alcohol (70%) to the powder and continued recovery for (24) hours and then took the extraction and put in the electric oven with degree of (40) ºC (Harborne ., 1973 ; Twaij *et al* ., 1983 ; Park *et al*., 2012 ; Sharoba *et al* ., 2015) . and this extract examine by I. R. Spectrophotometer Show of screening effective groups in thyme by peaks , and every peak refer to Certain effective group , figure (1) .

Was conducted extraction and examination of the extract in the Ibn Al-Bitar Centre to the board of industrial research and development one of the formations and the Ministry of Industry and Minerals . The stock solution was prepared by taking 15g . of dry extract and dissolved in100ml of Alcohol , therefore the concentration of the stock solution (150 mg / ml) , and It was prepared concentrations of (500 ، 750 , 1000) mg / kg of body weight .

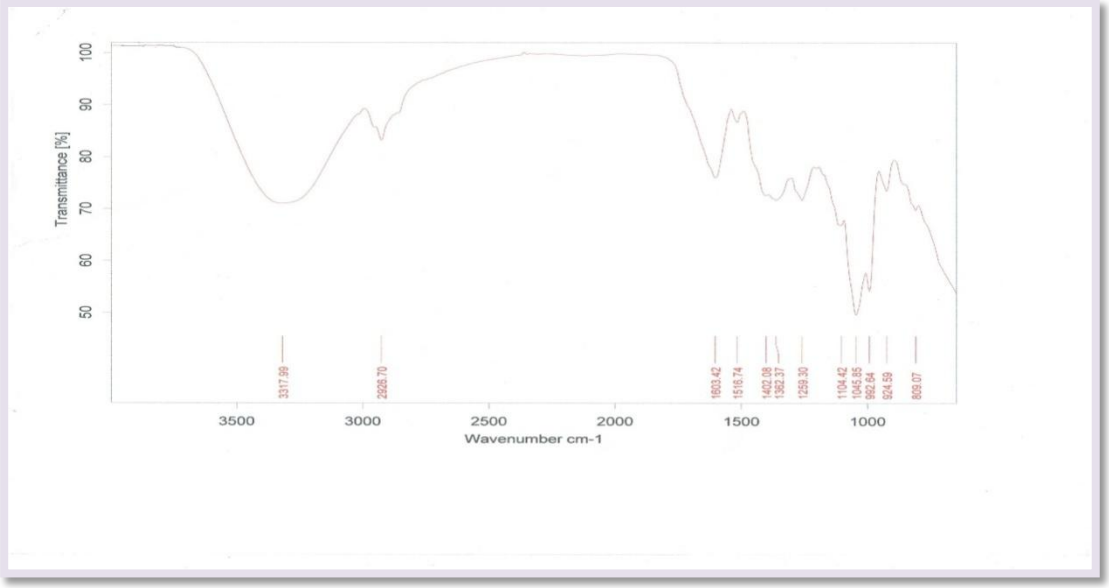


Figure (1) Show Effective groups in extraction of Thyme

Feeding

The grinding dried thyme leaves were divided into three different groups (50. 100.150) g/kg of pellet according to weights. every group was mixed with a diet (grinding pellet) (950,900,850) g. respectively , kneaded, cut into small pieces, sun-dried and giving to the rats

Animals Groups

The experiment was achieved as following:

- ***1st experiment***: included 75 rats randomly distribution into five groups as follows:
- ***1st group***

This group included 15 rats were given only water and pellet was considered as negative control animals , this group also considered control to the second experiment .

- ***2nd group***

This group included 15 rats were injected with alcohol subcutaneously twice a week considered as positive control animals ***3rd group***

This group included 15 rats were subdivided into 3 subgroups, the 1st was injected thyme dose of (500 mg/kg of body weight twice a week) for 10 days, the 2nd was injected the same dose for 20 days, and the 3rd was injected the same dose for 30 days.

- ***4th group***

This group included 15 rats were subdivided into 3 subgroups, the 1st was injected thyme dose of (750 mg/kg of body weight twice a week) for

10 days, the 2nd was injected the same dose for 20 days, and the 3rd was injected the same dose for 30 days.

- **5th group**

This group included 15 rats were subdivided in to 3 subgroups, the 1st was injected thyme dose of (1000 mg/kg of body weight twice a week) for 10 days, the 2 nd was injected the same dose for 20 days, and the 3rd was injected the same dose for 30 days.

- ***2nd experiment***:

Contain control as above in first experiment (1st group) and included 45 rats divided into 3 subgroups, the 2nd was administered feeding pellet mixed with thyme (50,100,150 g/kg of pellet twice a week) for 10 days, the 3rd was administered the same doses for 20 days, and the 4th was administered the same doses for 30 days

Collection of Organs :

Organs was collected from all rat groups (experimental and control) , after an autopsy and the withdrawal of blood was removed from the liver and kidneys by put them on filter paper to dry up from the blood so get the right weighing weight .

Results and Discussion :

These were included taking the study organic liver and kidney of 120 rats treatment with thyme to see the effect of this substance on the weight of each members appeared results were as follows : -

The statistical analysis show non significance in the weight of kidney (right , left) and liver of the rats that were treated with thyme in the concentration of (500 – 750) mg/kg of body weight by injection for 10 days comparison with control groups (- , +) , Also there was non significance recorded at (50 – 100) g/kg of pellet by feeding at the same days comparison with control group (-) , while there was significant decrease ($P \leq 0.05$) in the weight of them of the rats that were treated with the concentration of 1000 mg/kg of body weight, (0.90±0.04), (0.93±0.04), (11.12± 0.05) respectively comparison with control groups (-,+), (1.46±0.04), (1.49±0.05) , (14.90±0.15), (1.47 ±0.02) ,(1.48±0.05), (14.92±0.20) respectively, and in the animals were treated with thyme by feeding at 150g/kg of pellet (1.1±0.04),(1.02±0.03),(12.62±0.03) respectively , comparison with control group (-) , (1.46 ± 0.04), (1.49 ± 0.05) , (14.90 ± 0.15) respectively .

The statistical analysis show non significance in the weight of them of the rats that were treated with thyme in the concentration of 500 mg/ kg of body weight by injection for 20 days comparison with control groups (- , +) , Also there was non significance recorded at 50 g/kg of pellet by feeding at

the same days comparison with control group (-) , while there was a highly significant decrease (P≤0.01) in the weight of them of the rats that were treated with the concentration of (750-1000) mg/kg of body weight (1.00±0.03), (0.90±0.03), (11.24±0.05), (0.62±0.02), (0.58±0.02), (9.46±0.05) respectively comparison with control groups (-,+) (1.47±0.04), (1.48±0.05), (15.12±0.15), (1.47±0.05), (1.48±0.05), (15.10±0.20) respectively, and in the rats that treated with thyme by feeding at (100-150) g/kg of pellet (0.98±0.03), (1.00±0.04), (0.80± 0.02), (0.74 ± 0.02), (12.80 ± 0.05),(11.10 ± 0.05) respectively , comparison with control group (-), (1.47±0.04), (1.48±0.05), (15.12±0.15), respectively.

The statistical analysis show very a highly significant decrease (P≤0.001) in the weight of them of the rats that were treated with thyme in the concentration of (500 - 750 - 1000) mg/ kg of body weight by injection for 30 days (0.92±0.04), (0.97±0.03), (10.96±0.08), (0.64 ±0.02), (0.66±0.02) ,(9.28± 0.03), (0.46±0.02), (0.50±0.02), (7.46±0.18) respectively , comparison with control groups (-,+) (1.48±0.04), (1.46±0.05), (14.90±0.15), (1.49±0.02), (1.46±0.05), (14.88±0.20) respectively, Also there was a very highly significant decrease (P≤0.001) recorded at (50 - 100 - 150) g/kg of pellet by feeding at the same days (1.00±0.04), (1.01±0.03), (13.60±0.03), (0.76±0.02), (0.80±0.02), (12.00±0.09), (0.56±0.02), (0.62±0.02), (10.80±0.07) respectively comparison with control group (-), (1.48±0.04), (1.46±0.05), (14.90± 0.15), respectively.

The results of the statistical analysis of the present study in Figure (2A,B) , (3A,B) , (4A,B) .

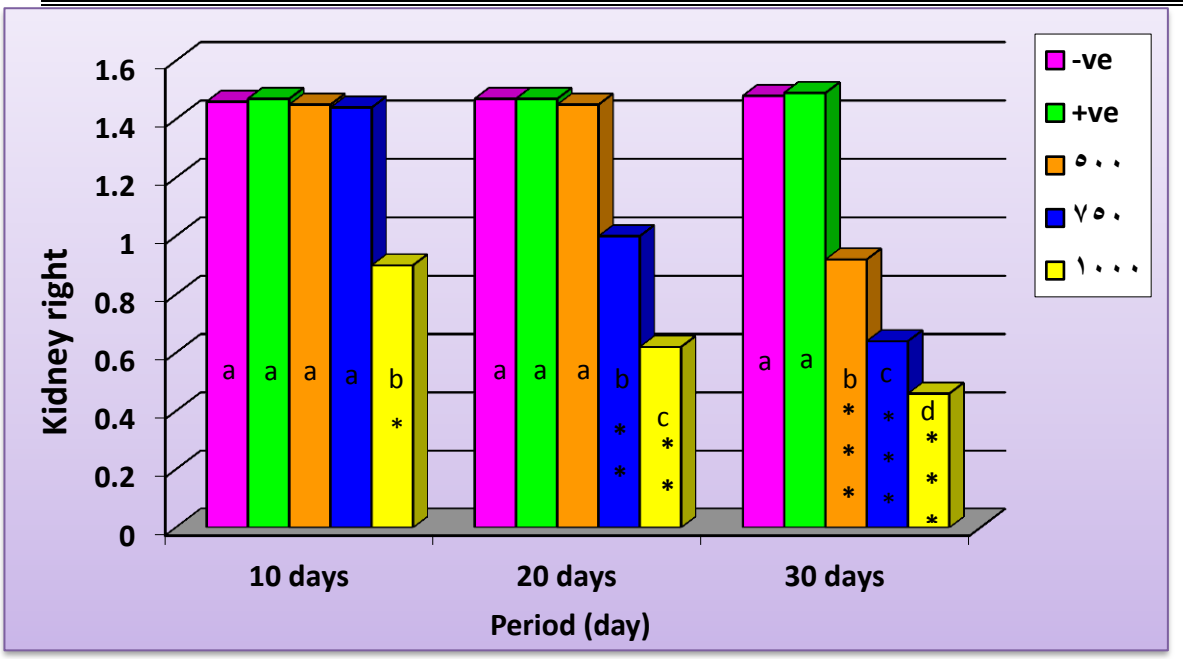
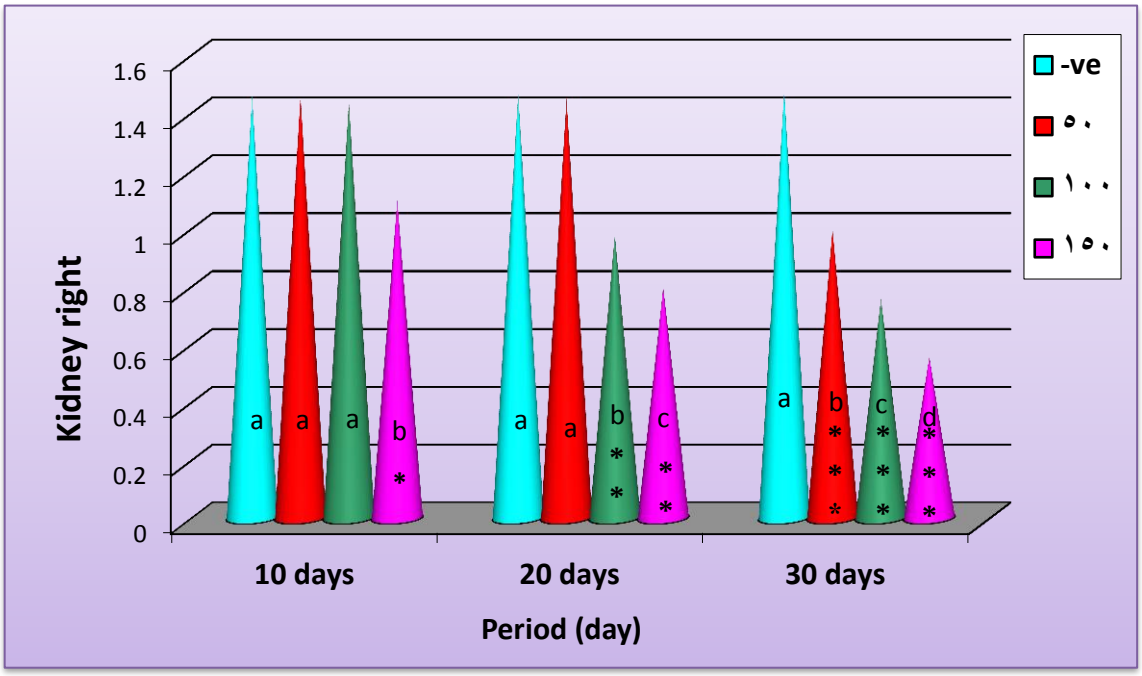


Figure (2 A) Effect of Thyme on the weight of Kidney right (g) by injection with difference period (10 , 20 , 30) days and difference concentration of thyme (500 , 750 ,1000) mg /kg of body weight comparison with control groups (- . +)
(*) significant decrease (P≤0.05)
(**) highly significant decrease (P≤0.01)
(***) very highly significant decrease (P≤0.001) .

Figure (2 B) Effect of Thyme on the weight of Kidney right (g) by Feeding with



difference period (10 , 20 , 30) days and difference weight of thyme (50 , 100 ,150) g / kg of pellet , comparison with control group (-)
(*) significant decrease (P≤0.05)
(**) highly significant decrease (P≤0.01)
(***) very highly significant decrease (P≤0.001) .

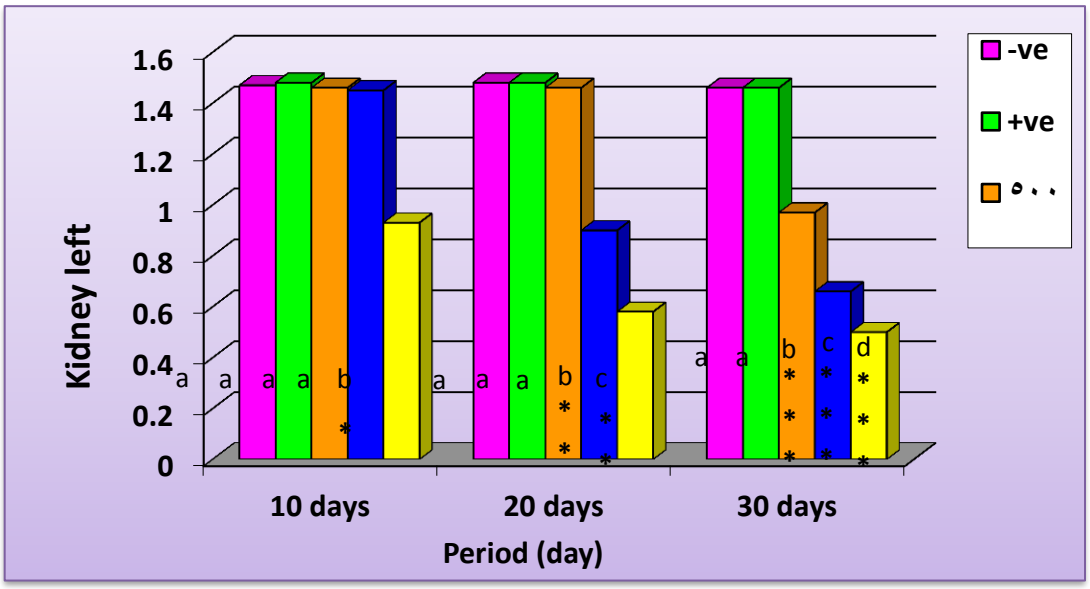


Figure (3 A) Effect of Thyme on the weight of Kidney left (g) by injection with difference period (10 , 20 , 30) days and difference concentration of thyme (500 , 750 ,1000) mg / kg of body weight comparison with control groups (- . +)
(*) significant decrease (P≤0.05)
(**) highly significant decrease (P≤0.01)
(***) very highly significant decrease (P≤0.001) .

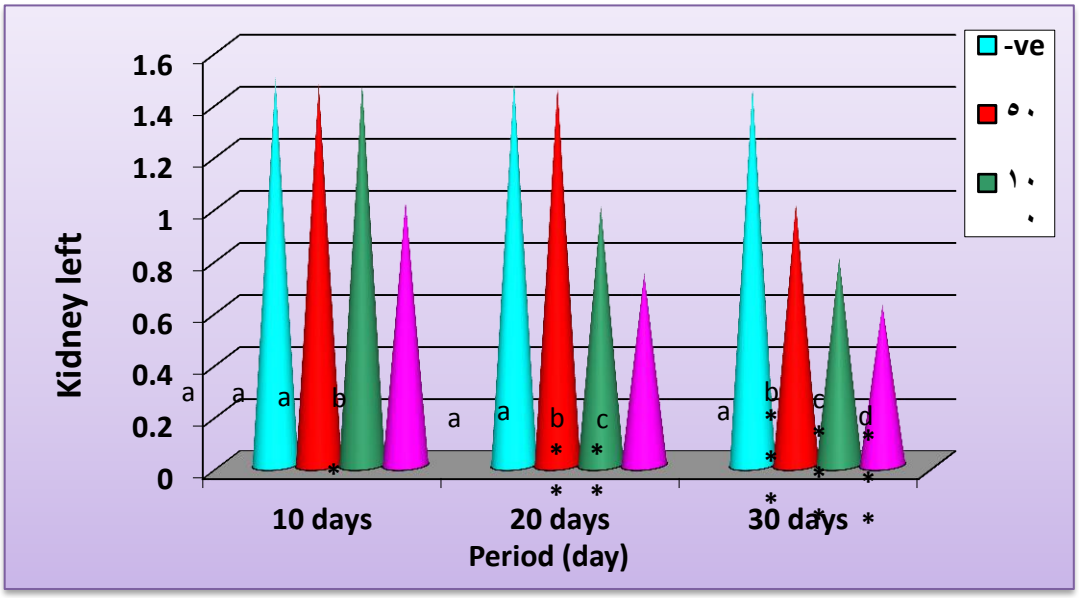
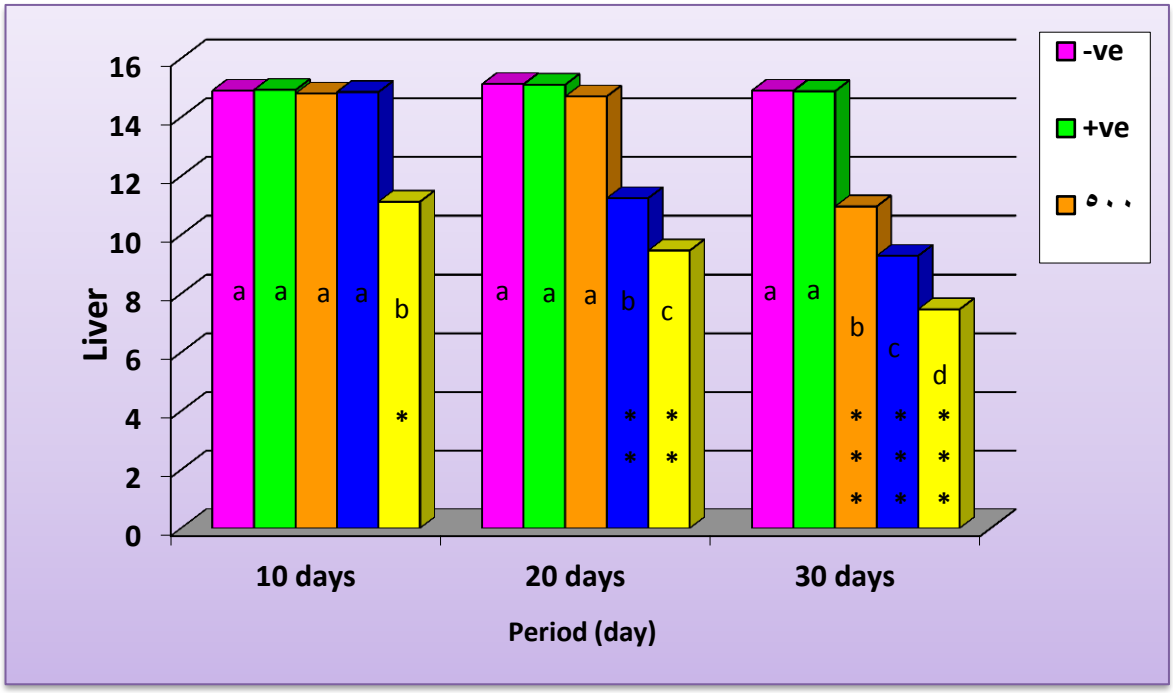


Figure (3 B) Effect of Thyme on the weight of Kidney left (g) by Feeding with difference period (10 , 20 , 30) days and difference weight of thyme (50 , 100 ,150) g / kg of pellet , comparison with control group (-)
(*) significant decrease (P≤0.05)
(**) highly significant decrease (P≤0.01)

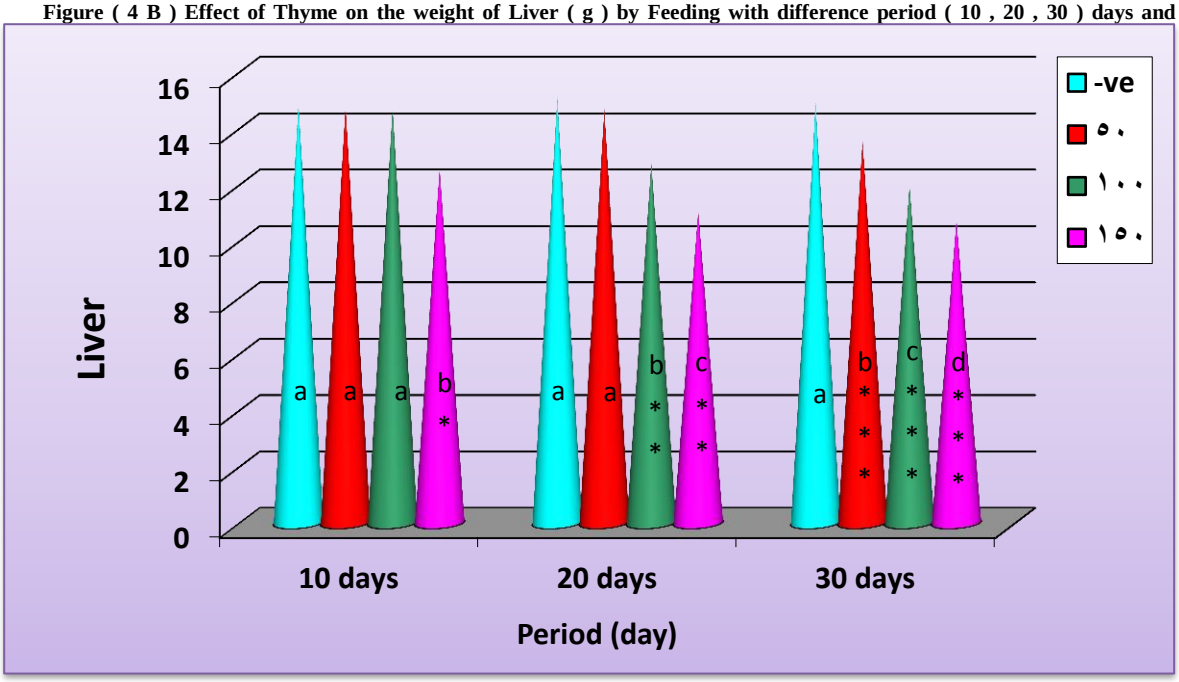
(***) very highly significant decrease (P≤0.001) .

Figure (4 A) Effect of Thyme on the weight of Liver (g) by injection with difference



period (10 , 20 , 30) days and difference concentration of thyme (500 , 750 ,1000) mg /kg of body weight comparison with control groups (- . +)
(*) significant decrease (P≤0.05)
(**) highly significant decrease (P≤0.01)
(***) very highly significant decrease (P≤0.001) .

Figure (4 B) Effect of Thyme on the weight of Liver (g) by Feeding with difference period (10 , 20 , 30) days and



difference weight of thyme (50 , 100 ,150) g / kg of pellet , comparison with control group (-)
(*) significant decrease (P≤0.05)
(**) highly significant decrease (P≤0.01)
(***) very highly significant decrease (P≤0.001).

Thyme contains thymol oil that act to reduce the weight of liver and kidney by works to organize the work of the thyroid gland secretions and stimulate digestion and diuresis resulting from the combustion of lipid in both the liver and kidneys , so it causes in decrease the weight of liver and kidneys, this result agreed with (Bölükbaşı *et al* ., 2006) Reported on 200 male chickens from Ross 308 strain Injected by (100 - 200) mg / kg of body weight for 42 days the result thyme was caused reducing the weight of each of liver , kidneys and brain ,the result of present study disagreed with (Lee *et al* ., 2004) who reported that thymol did not influence liver and kidneys weight .

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دراسة تأثير نبات الزعتر على وزن كلا من الكبد والكلى في ذكور الجرذان

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المستخلص

نظرا لزيادة تفشي استخدام نبات الزعتر في العراق وفي البلدان المجاورة خاصة في الآونة الأخيرة من الناحيتين الطبية والغذائية وما قد يسببه الاستعمال المفرط من الزعتر من إضرار جانبية والتي قد تصل إلى مرحلة الخطر ، و لذلك فإن هذه الدراسة تهدف إلى تقييم تأثير (500 – 750 – 1000) ملغم /كغم من وزن الجسم المعطاة لجرذان عن طريق الحقن في و أوراق الزعتر المجففة المطحونة المضافة الى العليقة (50 – 100 – 150) غم / كغم من العليقة في فترات زمنية مختلفة (10 – 20– 30) يوم لكل من الحقن والتغذية بمعدل مرتين كل أسبوع في وزن كلا من الكبد والكلى في ذكور الجرذان . أظهرت النتائج الإحصائية إن الزعتر سبب انخفاض معنوي ($p \leq 0.05$) في وزن كلا من الكبد والكلى ع للجرذان المحقونة بمستخلص الزعتر بتركيز 1000 ملغم / كغم من وزن الجسم ولمدة 10 أيام وأيضا في الجرذان المتغذية على العليقة الحاوية على الزعتر المطحون 150 غم / كغم من العليقة ، وفي 20 يوما حصل انخفاض معنوي عالي ($p \leq 0.01$) في وزن الكبد والكلى للجرذان المحقونة بمستخلص الزعتر 750 – 1000 ملغم / كغم من وزن الجسم وكذلك للجرذان التغذية على العليقة المحتوية على الزعتر المطحون 100 – 150 غم / كغم من العليقة في الفترة الزمنية 20 يوم أما في 30 يوم فقد حصل انخفاض معنوي عالي جدا ($p \leq 0.001$) في وزن الكبد والكلى في الجرذان المحقونة بمستخلص الزعتر (500 ، 750 ، 1000) ملغم / كغم من وزن الجسم مقارنة مع مجموعة السيطرة الموجبة والسالبة والمتغذية على العليقة الحاوية على الزعتر (50 ، 100 ، 150) غم / كغم من العليقة مقارنة مع مجموعة السيطرة السالبة .