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RESEARCH ARTICLE
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Dosing In Three Levels Of Apricot Seed Oil And Its Effects On Some Blood Characteristics And Liver Tissue Changes In Awassi Sheep.

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ABSTRACT

The experiment was conducted in the animal production field of the College of Agriculture - Tikrit University for the period from (21/8/2023 until 3/12/2023). Fifteen Awassi lambs were used in this experiment, their ages ranged between 4-5 months, with an average initial weight of (24.42 ± 0.2) kg. The lambs were divided into three groups (five lambs for each group), and their average weights were similar (24.34, 24.40, 24.54) kg, and the treatments were randomly distributed. On three treatments, a mass feeding system was adopted, and on one feed of concentrated feed at a rate of (3) % of the animal's live weigh.

The results indicated the following:

1- Dosing (0.0015) % of apricot oil led to significant differences (P≤0.05) in percentage of (Neutrophilic white blood cells, corpuscular volume rate, corpuscular hemoglobin rate, corpuscular hemoglobin concentration rate). There were no significant differences in the number of white blood cells.

While the dose (0.0020) % of apricot oil led to a significant increase (P<0.05) in the percentage (white blood cell rate, red blood cell number and red blood cell size) and there were no significant differences in the rest of samples Physical blood characteristics for all treatments.

2- There was a significant increase (P≤0.05) in the percentage (blood urea, insulin) in the lambs of the first treatment compared to the second and third treatments, and there were no significant differences in the rest of the biochemical characteristics in the blood of all treatments.

3- The results of a study showed that dosing animals with different percentages of apricot oil (0.0015, 0.0020) % led to changes in the liver tissue of the third and second treatment animals compared to the first treatment animals, which led to the expansion of the hepatic portal vein in the portal region and the infiltration of white blood cells and blood cells Lymphatic.

The aim of this study is to determine the effect of different levels of apricot seed oil on the physical, biochemical, and blood characteristics and liver tissue changes in Awassi lambs.

***Keywords*:** Apricot Oil, Blood Characteristics, Tissue.

INTRODUCTION

Sheep meat is one of the most important sources of protein that the human body needs [1]. Consumers are becoming more concerned with the quality of the food they eat [2]. The World Health Organization has suggested limiting intake of trans fatty acids due to hypercholesterolemia and their prothrombotic effects which are associated with an increased risk of cardiovascular disease [3]. Sheep meat is characterized by containing a high amount of protein, minerals and vitamins that are extremely important for human nutrition [4]. In addition, some studies aimed to use vegetable oils in feeding sheep. Among the vegetable oils used apricot seed oil Prunus armeniaca, is considered a rich source of vitamins and unsaturated fatty acids. It is a health supplement that is squeezed from apricot kernel seeds. It is then possible to use apricot seed oil in this research and dose it on Iraqi Awassi lambs and study its effect on biochemical and physical blood parameters, and liver tissue.

MATERIALS AND METHODS:

Blood Samples:

In the twelfth week of the experiment, blood samples were taken from all lambs after they had fasted for approximately (13) hours. Blood was collected using a (5) ml needle (Syeinge method) from the jugular vein in the neck area [5]. An amount of blood (5) ml was taken from each animal, and (2) ml of blood was placed in sterile plastic tubes (Lavender Tube) containing the anticoagulant Ethylene Diamine Tetra Acetic Acid (E.D.T.A) type (EDTA K3) to conduct the procedure. Physical examinations, blood pictures, Complete blood count (CBC) and the samples were stirred to ensure that the blood was homogeneous with the anticoagulant and that blood clots did not occur within the samples. As for the remaining part of the

blood (3) ml, it was placed in plain plastic tubes free of anticoagulant, and left for half a period. An hour at laboratory temperature (20) °C, then the samples were placed in a centrifuge (Centri fuges) type (Sigma) of German origin at a speed of (3000 rpm x duration 15 minutes) for the purpose of separating the blood serum from the rest of the components. Blood, then the serum was withdrawn from the Plain Tube using a Pipette and the serum was placed in sealed tubes (Eppendorf Tube) and then placed in the refrigerator at a temperature of (-4) °C for the purpose of conducting biochemical, hormonal and enzymatic tests.

Physical Blood Tests cbc:

Blood cell examination WBC and RBC and HGB and PCV.

The blood picture (WBC, RBC, HGB, PCV) were examined in the laboratory, and the blood sample tubes were placed on a circulatory device (Spiramix) of English origin, for (10) minutes to ensure the mixing and homogeneity of the blood with the anticoagulant, then a sample tube was placed Blood on the Medonic M51 device. Automated (Part-Diff-5) of Swedish origin, where (10) microns of a blood sample stored in a tube containing an anticoagulant were drawn using (Prob), and the blood was drawn by the device automatically, and then the sample number was recorded on the screen.

Biochemical Blood Tests:

Kidney function examination and Blood Hormones and Liver Enzymes and Blood Proteins:

Urea, creatinine, growth hormone, insulin, AST, ALT, globulin, albumin and total blood protein were examined in the laboratory. Serum was applied to empty special tubes, the serum sample tube was then placed on a German-made Cobas 6000 automatic device, and pipetted with a (10) µm pipette. From the (Serum) sample using (Prob), blood was drawn automatically using the device, then the sample number was recorded on a smart touchscreen.

Liver Tissue Examinations:

Liver tissue examination was performed using the method Banchroft and Stevens [6]. An amount of (4) grams of liver samples were taken at a rate of (0.5) ml for all experimental treatments in the meat laboratory in the animal production department of the College of Agriculture / Tikrit University, and they were cut into two pieces to ensure homogeneity with the solutions, then the samples were washed with clean water to remove the blood from them. Then the samples were placed in a diluted formalin solution of (10) % to fix them for (24) hours in laboratory conditions at a temperature of (20) C°, then the samples were transferred to alcohol solutions ascending from (50) % then (70%) then (80%) then (90%) then (100%). The duration of each pass was (1) hour. Then the samples were placed in xylene for (1) hour for drying, then the samples were placed in a wax oven at a temperature of (60) C° for (24) hours, after which the samples were taken out of the oven and poured into standard molds, then cut into small parts using a microtom device with a (6) micrometer. The wax was baked from the samples by placing them in xylene, after which the samples were placed on glass slides. Then perfusion was performed with alcohols > (100% then 90% then 80% then 70%. After that the samples were stained with hematoxylin dye for (20) minutes, then with colored dye for (48) hours, then alcohol. For a minute, the samples were dried and the liver tissue was examined on slide glass slides the next day using an optical microscope of English origin and photographed with a digital LED camera mounted on the microscope with (10-40) X magnification.

Statistical Analysis:

In this study statistical program Statistical Analysis System [7]. was used and using Duncan's multiple range test [8]. Data and variable analysis was used to study the effect of oil on various experimental variables in the studied traits according to a completely randomized design (CRD). Data were analyzed by SAS.

Mathematical Model of Design:

$Yij = \mu + Ti + eij$

Since:

Yij: the value of the jth view of transaction i.

µ: general average.

Ti: effect of treatment i.

eij: Random error that has a normal distribution with a mean of zero and a variance of σ2e.

RESULTS AND DISCUSSION:

Physical Characteristics of Blood:

We note from Table (1) that there is no significant effect of white blood cell (WBC) result for all experimental treatments, while we find that the second treatment recorded a mathematical increase of (10.63) 10^3/ml compared to the first treatment and third treatment, which amounted to (9.49). and (6.91) 10^3/ml respectively. The reason for the lack of significance may be that the percentage of apricot oil used did not affect this property.

We also notice from Table (1) that there was a significant effect on the amount of white blood neutrophils (NEU), as we find that the first and second treatments were significantly ($P<0.05$) superior to the third treatment, reaching (40.60) and (47.58) % respectively. While the third transaction recorded (23.24) %. The reason may be that the percentage of oil used led to a reduction in the percentage of neutrophil blood cells in the third treatment group of animals.

Table (1) also indicates there were significant effects in the rate of white blood cells (LYM), as we find that the third treatment was significantly ($P<0.05$) (69.72) % superior to the first and second treatments. It reached (55.06) and (47.62) %. respectively. The reason for the moral superiority may be that the percentage of apricot seed oil used had a clear effect in

increasing the rate of white blood cells in the blood of the third treatment animals, which led to its moral superiority.
We also note from the same table that there is no significant effect on the concentration of white blood cells (MON) in all experimental treatments. However, the third treatment recorded the highest rate of (6.02) % compared to the first and second treatments, which amounted to (3.72) and (3.74) %, respectively. The reason may be that the percentage of oil used did not have a significant effect on this characteristic.
We note from Table (1) there were no significant effect in level of white blood cell acidosis (EOS) for all experimental treatments, as it reached (0.16), (0.52), and (0.26) % for treatments (T1, T2, and T3), respectively. The reason may be that the percentage of oil used did not have a significant effect on this characteristic.
We also note from the same table there were no significant effect in basal level of white blood cells (BAS) for all experimental treatments, as it reached (0.46), (0.54), and (0.76) % for treatments (T1, T2, and T3), respectively. The reason may be that the percentage of oil used did not have a significant effect on this characteristic.
Table (1) indicates there were significant effect in result of red blood cells (BRC) as the first and third treatment were significantly superior ($P \leq 0.05$) and recorded (9.96) and (10.34) 10^6/ml respectively, over the second treatment, which reached (8.24) 10^6/ml. the reason maybe effect of the percentage of oil with which the animals of the third treatment were dosed led to an increase in the number of red blood cells.
We also note from Table (1) there were no significant effect in blood hemoglobin (HGB) for in experimental treatments, as it reached (11.12), (10.92), and (11.18) gm/dL for the three treatments (T1, T2, and T3) respectively. The reason may be that the percentage of oil used did not have a significant effect on this characteristic.
We also notice from Table (2) there were significant effect in volume of packed red blood cells (HCT), where the third treatment was significantly ($P<0.05$) superior and recorded (33.10) % over the second treatment, which reached (27.46) % and recorded a significant increase over the first treatment It reached (32.10) %. The reason may be that the percentage of oil used had a noticeable effect on this characteristic in the third treatment.
Table (1) indicates there were significant effect in average corpuscular volume (MCV), as the second treatment recorded a significant ($P \leq 0.05$) superiority, reaching (33.32) FI, over the first and third treatments, which reached (32.25) and (32.03) FI, respectively.
The same table also indicates there were significant effect in level of intracellular hemoglobin (MCH), as the second treatment recorded a significant superiority ($P \leq 0.05$) amounting to (13.25) picograms, over the first and third treatments, which amounted to (11.27) and (10.93) pictograms, respectively.
Table (1) also indicates there were significant effect in cell hemoglobin concentration (MCHC), as the second treatment recorded a significant superiority ($P \leq 0.05$) amounting to (39.76) %, over the first and third treatments, which amounted to (34.91) and (34.08) %, respectively.
The reason for this may be due to the percentage of oil used in dosing the lambs of the second treatment, which had a clear effect on the physiological changes and led to an increase in the percentages of (MCV, MCH, MCHC) **Physical characteristics of blood**

Adjectives	Mean ± standard error			Moral level
	T1	T2	T3	
White blood cells (WBC) 10^3/ml	9.49 ± 1.17 a	10.63 ± 1.71 a	6.91 ± 1.05 a	NS
White blood cell neutrophils (NEU) %	40.60 ± 5.43 a	47.58 ± 3.79 a	23.24 ± 6.75 b	*
White blood cell rate (LYM) %	55.06 ± 5.42 b	47.62 ± 3.53 b	69.72 ± 4.77 a	*
White blood cell concentration (MON) %	3.72 ± 0.36 a	3.74 ± 0.81 a	6.02 ± 2.78 a	NS
White blood cell acidity level (EOS) %	0.16 ± 0.08 a	0.52 ± 0.31 a	0.26 ± 0.10 a	NS
Basal level of white blood cells (BAS) %	0.46 ± 0.05 a	0.54 ± 0.08 a	0.76 ± 0.16 a	NS
Red blood cell (RBC) count 106/ml	9.96 ± 0.63 a	8.24 ± 0.19 b	10.34 ± 0.62 a	*
Hemoglobin (HGB) gm/dL	11.12 ± 0.58 a	10.92 ± 0.28 a	11.18 ± 0.45 a	NS
Volume of packed red blood cells (HCT) %	32.10 ± 1.95 ab	27.46 ± 0.59 b	33.10 ± 1.88 a	*
Average corpuscular volume (MCV) Fl	32.25 ± 0.28 b	33.32 ± 0.22 a	32.03 ± 0.34 b	*
Average corpuscular hemoglobin (MCH) Pg	11.27 ± 0.68 b	13.25 ± 0.27 a	10.93 ± 0.67 b	*
Mean corpuscular hemoglobin	34.91 ± 1.87 b	39.76 ± 0.58 a	34.08 ± 1.79 b	*

concentration (MCHC) %

Averages ± standard error.

* - Different letters represent significant within the row at the level (P≤0.05).

NS: represents no significant within the row recorded for the treatment within the studied trait.

T1-- The first treatment (control) without dosing apricot kernel oil.

T2-- The second treatment: Dosing apricot kernel oil at a rate of (0.0015%) of the animal's live weight.

T3-- The third treatment: Dosing apricot kernel oil at a rate of (0.0020%) of the animal's live weight.

Biochemical Characteristics of Blood:

The results of Table (2) showed that there was significant effect in level blood urea, as the first treatment (control) recorded the highest level of urea and was significantly superior (P≤0.05) reaching (55.98) mg/dL, over the second treatment reaching (43.16) mg/dL. It did not differ significantly from the third treatment, which amounted to (47.48) mg/dL. The reason may be that the percentage of apricot oil used had a clear effect on maintaining the level of urea in the blood or had a clear effect on reducing its concentration in lambs blood treatments dosed with apricot oil.

Table (2) indicates that there was no significant effect in creatine levels in all three experimental treatments, as they amounted to (0.61), (0.64) and (0.69) mg/dL, respectively. And there was no significant effect in growth hormone as they amounted to (0.3) ng/ml for all experimental treatments. The reason for the lack of a significant effect may be that the diets used in all experimental treatments included balanced amounts of the most efficient protein in meeting the nutritional needs of lambs and their direct impact on performance, growth, and final weight.

We note from table (2) there were significant effect in the insulin level of the experimental treatments, where the first treatment (control) recorded the highest insulin level and significantly superior (P<0.05) amounting to (0.80) %, over the second and third treatments amounting to (0.22) and (0.20) %. Respectively, the reason may be due to the significant effect of apricot oil levels on the pancreatic tissues, which led to the cells inhibiting insulin secretion and decreasing its percentage in the blood.

Table (2) also indicates there were no significant effect in levels of liver enzymes (AST) and (ALT) in all three experimental treatments, although the third treatment recorded the highest level. Still, it did not reach the level of significance, its level in (AST) reached (96.06), (85.96) and (104.86) mmol/L, respectively. and in (ALT) they are (12.66), (10.80) and (15.02) mmol/L, respectively. This may be due to the significant effect of apricot oil on these characteristics.

We also notice from Table (2) there was a significant effect in percentage of blood proteins for all three experimental treatments (T1, T2, and T3), as their levels in (T.Protein) reached (6.76), (6.88), and (6.83) gm/dL. The levels in Albumin reached (3.16), (3.14), and (3.32) gm/dL, respectively, and the levels in Globulin reached (3.59), (3.74), and (3.51) gm/dL, respectively. The reason for the lack of significant effect may be that the diets used in all experimental treatments included balanced amounts of protein that were more efficient in meeting the lambs' nutritional requirements and had a direct impact on performance and growth.

Biochemical characteristics

Adjectives	Mean ± standard error			Moral level
	T1	T2	T3	
Urea mg/dL	55.98 ± 3.70 a	43.16 ± 1.82 b	47.48 ± 2.92 ab	*
Creatinine mg/dL	0.61 ± 0.05 a	0.64 ± 0.07 a	0.69 ± 0.04 a	NS
Growth Hormone nano gram/ml	0.03 ± 0 a	0.03 ± 0 a	0.03 ± 0 a	NS
Insulin %	0.80 ± 0.18 a	0.22 ± 0.02 b	0.20 ± 0 b	*
AST mmol/L	96.06 ± 5.94 a	85.96 ± 10.05 a	104.86 ± 7.44 a	NS
ALT mmol/L	12.66 ± 1.14 a	10.80 ± 1.20 a	15.02 ± 1.76 a	NS
T.Protein g/dL	6.76 ± 0.18 a	6.88 ± 0.28 a	6.83 ± 0.32 a	NS
Albumin gm/dL	3.16 ± 0.03 a	3.14 ± 0.08 a	3.32 ± 0.07 a	NS
Globulin gm/dL	3.59 ± 0.16 a	3.74 ± 0.25 a	3.51 ± 0.30 a	NS

Averages ± standard error.

* - Different letters represent significance within the row at the level (P≤0.05).

NS: represents no significant difference within the row recorded for the treatment within the studied trait.

T1-- The first treatment (control) without dosing apricot kernel oil.
T2-- The second treatment: Dosing apricot kernel oil at a rate of (0.0015%) of the animal's live weight.
T3-- The third treatment: Dosing apricot kernel oil at a rate of (0.0020%) of the animal's live weight.

Liver Tissue Tests:

The results of histological examinations showed that the liver tissue of the animals of the first treatment (control), without dosing apricot kernel oil, and which were fed the same concentrated diet for all experimental treatments, in which the liver tissue contained a central vein in the middle of the hepatic lobule and was surrounded by a number of white blood cells, liver cells around The central vein appeared in groups closely packed together, and each cell contained one or two spherical-shaped nuclei. They were found around the blood sinusoidal cells, some containing autophagic cells (Cover cells).

Image (4A-T1) Central vein (A) Leukocyte infiltration around the central vein (B) Aggregates of compact hepatocytes (C) Blood sinusoids (D) Coover cells (E).

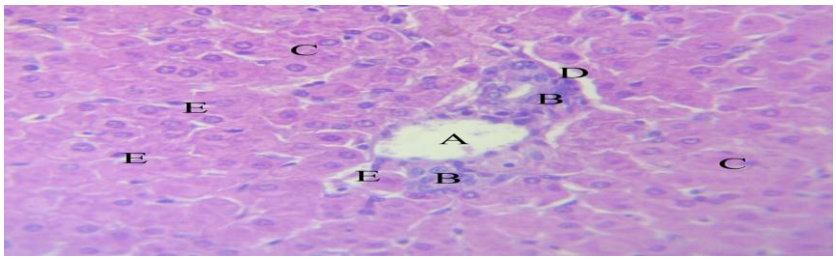

Image (4A-T1). A - The first experimental unit.

T1- first transaction

The results of histological examinations of the liver tissue of the second treatment animals were shown, which was dosed with apricot seed kernel oil at a rate of (0.0015) % and which was fed the same concentrated diet for all experimental treatments, showed the presence of hyperinflation in the size of hepatocytes containing one or two spherical nuclei, with a network. Of the blood sinusoids, which contained Coover cells, the results also showed the presence of nodular infiltration of lymphocytes and the rest of the autophagic white blood cells around the hepatic cells and around the cenral vein, in which the central vein contained some decomposed red blood cells. Image (4B-T2).

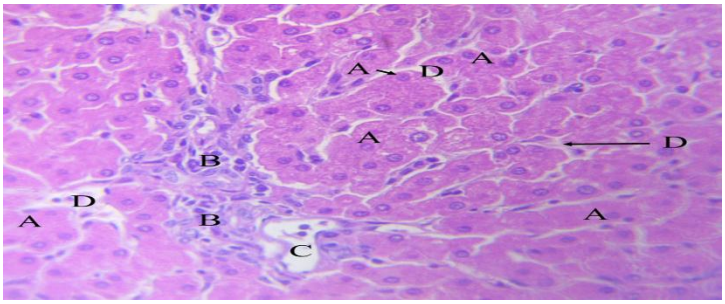

Image (4B-T2): Hyperplasia of hepatocytes (A), nodular infiltration of white blood cells (B), central vein (C), sinusoidal blood with Coover cells (D).

B - The first experimental unit.

T2- The second transaction.

The results of histological examinations of liver tissue were also recorded for the second experimental unit within the third treatment, which was dosed with apricot kernel oil at a rate of (0.0020%) and which was fed the same concentrated diet for all experimental treatments. The liver cells appeared excessively large, multi-ribbed, uniform-shaped, with blue spherical nuclei in their centre. Surrounding the cells was found a network of vascular channels, blood sinusoids containing some autophagic cells, and the portal area appeared small in size and contained small branches of the portal vein, hepatic artery, bile duct, and lymphatic vessel, with numbers of white blood cells infiltrating around it. Image (4C-T3).

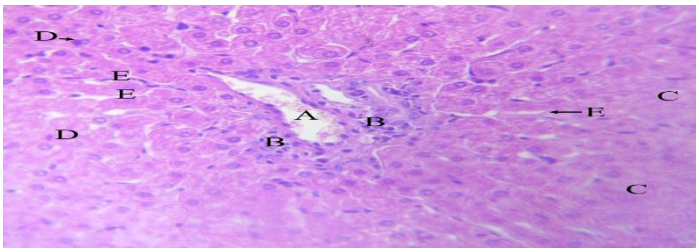

Image (4C-T3): Hyperplasia of liver cells and they appeared uniform in shape with central nuclei (A), sinusoidal network containing Coover cells (B), portal vein branch (C), bile duct branch (D), lymphocytes in the portal region (E).
C-The second experimental unit.
T3-The third transaction.

Conclusions:

We conclude from this study that dosing sheep with (0.0020) % apricot seed oil led to a significant increase ($P<0.05$) in the percentage (number of white blood cells, number of red blood cells, size of red blood cells). It also showed that a dose of (0.0020) % of apricot oil had a noticeable effect in maintaining urea levels in the blood.

The results also showed that using apricot oil (0.0020%) had a significant effect on liver cells, which led to changes in liver tissue, expansion of the hepatic portal vein, and the cells containing decomposed red blood.

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التجريع بثلاث مستويات من زيت بذور المشمش وتأثيرها على بعض صفات الدم وتغيرات أنسجة الكبد في الأغنام العواسية.

نشأت كريم جواد البياتي[1] **ميسلون وائل إبراهيم[2]**

قسم الإنتاج الحيواني ، كلية الزراعة ،جامعة تكريت ، العراق. 2024

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الخلاصة

أجريت التجربة في حقل الإنتاج الحيواني التابع لكلية الزراعة – جامعة تكريت للفترة من (8/21 /2023 ولغاية 3/ 12/ 2023). تم استخدام خمسة عشر حملاً عواسياً في هذه التجربة، تراوحت أعمارها بين 4-5 أشهر، ومتوسط وزنها الأولي (24.42 ± 0.2) كغم. قسمت الحملان إلى ثلاث مجاميع (خمسة حملان لكل مجموعة) وكان متوسط أوزانها متشابهاً (24.34، 24.40، 24.54) كغم، ووزعت المعاملات عشوائياً. في ثلاث معاملات تم اعتماد نظام التغذية الجماعية، وعلى تغذية واحدة من العلف المركز بمعدل (3) % من الوزن الحي للحيوان.

وأشارت النتائج إلى ما يلي: -

1- تجريع نسبة (***0.0015***) % من زيت المشمش أدى الى وجود فروق معنوية (***P≤0.05***) في النسبة المئوية (خلايا الدم البيضاء العدلة، معدل حجم الكرية، معدل هيموكلوبين الكروية، معدل تركيز هيموكلوبين الكروية). ولم تكن هناك فروق ذات دلالة إحصائية في عدد خلايا الدم البيضاء.

بينما ادت تجريع نسبة (***0.0020***) % من زيت المشمش الى زيادة معنوية (***P≤0.05***) في نسبة (معدل خلايا الدم البيضاء، عدد كريات الدم الحمر، حجم كريات الدم الحمر) ولم تكن هناك فروق معنوية في باقي صفات الدم الفيزيائية لجميع المعاملات.

2- وجدت زيادة معنويا (***P≤0.05***) في نسبة (يوريا الدم، الانسولين) في حملان المعاملة الأولى مقارنة بالمعاملة الثانية والثالثة، ولم تكن هناك فروق معنوية في باقي صفات الكيموحيوية في دم جميع المعاملات.

3- أظهرت نتائج دراسة ان تجريع الحيوانات بنسب مختلفة من زيت المشمش (***0.0015***، ***0.0020***) % أدى الى حدوث تغيرات في أنسجة الكبد لحيوانات المعاملة الثالثة والثانية مقارنة مع حيوانات المعاملة الأولى، مما أدى الى احداث توسع الوريد البابي الكبدي في المنطقة البابية وارتشاح خلايا دم البيض والخلايا اللمفية.

- تهدف هذه الدراسة إلى تحديد تأثير مستويات مختلفة من زيت بذور المشمش على وضع صفات الدم الفيزيائية والكيموحيوية وتغيرات أنسجة الكبد في الحملان العواسية.

الكلمات المفتاحية: زيت المشمش، صفات الدم، انسجة الكبد.