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Study Effect of Date Seeds Powder on Female Rats

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Abstract:

Date palm (*Phoenix dactylifera, L.*) seed is a good source of mineral nutrients and phenolic compounds. In this study, the changes in minerals, antioxidant compounds (phenolics, tannins, and flavonoids), and phenolic profile of date seeds were investigated. This study aimed to study effect of date seeds powder on female rats, identify the histopathological effects of date seeds on ovaries, uterus and liver organs. Evaluation of some biochemical analysis such as HGP, some liver functions, blood lipids, sugar accumulative, feed efficiency rate, body weight gain and some internal organs weight in tested albino rats were also measured. Evaluation of some active compounds such as phenolic compounds. Phytoestrogen of date seeds powder using HPLC were also determined. Twenty-five (25) female albino rats (Sprague - Dawley strain) weighing (150±10 g) divided to 5 groups (5 rats each). The first group fed on standard diet; the second; third; fourth and fifth groups fed standard diet containing 5, 10, 15 and 20% date seeds powder, respectively. After 28 days form ingesting diets results were recorded. Date seeds raised female hormone and activated ovaries.10% and 15% date seeds powder were the best for liver functions such as GPT (glutamate pyruvate transaminase) and the best mean value of BWG (body weight gain). 10% date seeds powder decreased serum glucose level and serum lipid profile such as cholesterol, triglyceride, LDL (low density lipoprotein, VLDL (very low density lipoprotein) and serum urea. 10% date seeds powder increased level of HDL (high density lipo protein) , HGP (hemoglobin) and E2 hormone (Estradiol).

Key words: *Date palm (Phoenix dactylifera), flavonoids, Phenolic compounds.*

Introduction

Abdul Afiq *et al.*, (2013) reported that date palm is an important plant in arid regions with more than 20 varieties reported all over the world. Date seed is by product of date fruit industry which is normally being discarded, used as animal feed ingredient or turned in to non-caffeinated coffee by the Arabs. About 11:18% of date fruit weight is the seed which is composed of carbohydrates, dietary fiber, fat, protein. In addition, the antioxidants content in date seed oil was found to be comparable with olive oil, which can be as a good source of antioxidants in order to fulfill the consumers demand. Oleic acid is the major fatty acid found in DSO (date seeds oil), followed by lauric, linoleic, palmitic and meristic acid.

The seeds of Ruzeiz and Sifri date cultivars, on the average, contained 6.5% protein, 10.4% fat, 22.0% fiber, 1.1% ash, and 60.0% carbohydrates on a dry weight basis. Mineral analysis showed higher concentration of K followed by P, Mg, Ca and Na. Among the microelements, Fe was in higher concentration (7.4 mg/100g dry weight) followed by Mn, Zn and Cu. Oleic (44.25%), lauric (17.35%), meristic (11.45%), palmitic (10.30%) and linoleic (8.45%) were the major fatty acids in date seed oil. Tryptophan (chemical score = 77) was the first limiting amino acid in date seed proteins **(FAO/WHO, 1973).**

Dates are rich in energy and carbohydrates, mainly fructose, glucose and sucrose, which are absorbed in the upper gut, but also contain relatively high amounts of dietary fibres (6.4-11.5 %). The latter exist mainly as insoluble fibre with smaller amounts of soluble fibre **(El-Sohaimy *et al.*, 2010).**

Tang *et al.*, (2013) reported that dried dates had 14.6% moisture, 63.9% sugars, 8.7% fiber, 2% protein, 63% carbohydrates and (mg/100g) Na, K 750, Ca 86, Ng 59, P 64, Fe 1.6, Cu 0.21, Zn 0.3.

Wu *et al.*, (2004) reported that Deglet Nour and Medjol varieties have a high phenolic content (661 and 572 mg of gallic acid equivalent [GAE]/100 g, respectively).

The oleic, linoleic, lauric and palmitic acid that occurred in Deglet Nour seed oil were 41%, 12%, 18% and 11%, respectively, while in Allig seed oil, the oleic, linoleic, lauric and palmitic acid content were 48%, 21%, 6% and 15%, respectively. The oleic acid content of 24 cultivars of the date seed oil ranges from 41 to 59%, which could be a

good source of C18:1 fatty acid **(Al-Shahib *et al.*, 2003a**) , (**Besbes *et al.*, 2004).**

Date fruit (Phoenix dactylifera L.) contains high levels of both dietary fiber and polyphenols **(Hong *et al.*, 2006).**

Date seed can be as a good source of dietary fiber, phenolic component and natural antioxidant, which can be further developed into new products or already existing products **(Hamada *et al.*, 2002).**

In comparison, higher dietary fiber was detected in another study that was carried out on three different date varieties, which range from 65% to 69% of date seed, indicate the high content of lignin and resistant starch **(Hamada *et al.*, 2002)**.

On the other hand, protein also had been detected to be present in date seed in considerable amount. Albumin, globulin, prolamin and glutelin are among the soluble protein that was detected in date seed, with 5-6% of total protein content **(Hamada *et al.*, 2002).**

Dates have the highest concentration of polyphenols among the dried fruits **(Vinson *et al.*, 2005).**

Dates are a good source of antioxidants due to the carotenoids and phenolics with quantity 3942 mg/100 g and antioxidants constituents 80400 μmol/100 g **(Bilgari *et al.*, 2008)**.

Natural antioxidants could be obtained from plant in the form of phenolic compounds such as flavonoids, phenolic acids and alcohols, tocopherols, tocotrienols, ascorbic acid and carotenoids **(Ali *et al.*, 2008).**

Both tocopherols and tocotrienols with these eight vitamins (α-, β-, γ-, and δ-tocopherols and tocotrienols, respectively) are also known collectively as vitamin E **(Adhikari *et al.*, 2008).**

El Fouhil *et al.* (2010) reported that the hypoglycemic effect of date seed extract combined with insulin decreased the blood glucose level significantly toward normal when compared to the effect of insulin administered as a single drug for treatment of diabetes.

El-Fouhil *et al.*, (2013) found that the efficiency of an extract from date seeds has been tested successfully on the glycemic control of type I diabetes mellitus in rats.

Date seeds increased levels of HGP (Hemoglobin) in adult males and females **(Deborah, 2018)**.

Estriol and pregnanediol were isolated, for the first time, from date seeds of Zaghlool date seeds. Biological screening of petroleum ether extract of Zaghool cultivar date seeds showed a significant estrogenic and progesterone like action on immature female rabbit **(Abd EL Wahab *et al.*, 1997).**

Although isoflavones and closely related phytoestrogens are sold as dietary supplements, there is little scientific evidence for either the safety of long-term supplementation of health benefits from these compounds. Some studies have identified potential risks from high intake of isoflavones, such as women with a history of breast cancer, but this concern has not been substantiated with high-quality clinical research **(Nicola, 2014)**.

Estradiol (E2), also spelled estradiol, is an estrogen steroid hormone and the major female sex hormone. It is involved in the regulation of the estrous and menstrual female reproductive cycles. Estradiol is responsible for the development of female secondary sexual characteristics such as the breasts, widening of the hips, and a female-associated pattern of fat distribution and is important in the development and maintenance of female reproductive tissues such as the mammary glands, uterus, and vagina during puberty, adulthood, and pregnancy. It also has important effects in many other tissues including bone, fat, skin, liver, and the brain. Though estradiol levels in males are much lower compared to those in females, estradiol has important roles in males as well. Apart from humans and other mammals, estradiol is also found in most vertebrates and crustaceans, insects, fish, and other animal species **(Anon, 2019).**

Estradiol is produced especially within the follicles of the ovaries, but also in other tissues including the testicles, the adrenal glands, fat, liver, the breasts, and the brain. Estradiol is produced in the body from cholesterol through a series of reactions and intermediates. The major pathway involves the formation of androstenedione, which is then converted by aromatase into estrone and is subsequently converted into estradiol. Alternatively, an drostenedione can be converted into testosterone, which can then be converted into estradiol. Upon menopause in females, production of estrogens by the ovaries

stops and estradiol levels decrease to very a medication, for instance in menopausal hormone therapy; for information on estradiol as a medication **(Anon, 2019).**

Genistein and daidzein may stimulate existing breast tumor growth and antagonize the effects of tamoxifen. Women with current or past breast cancer should be aware of the risks of potential tumor growth when taking soy products **(Mario L de lemos, 2001).**

The effects of iso flavones on a variety of estrogen-regulated organs point to both beneficial as well as adverse effects on human health. It is of particular importance that psychovegetative climacteric complaints such as hot flushes are, if at all, only slightly influenced by isoflavones **(Anon 2007).**

Survival from ovarian cancer has not changed significantly in the past twenty years requiring development of additional treatment protocols. We studied the effect of genistein and daidzein on ovarian cancer cell growth. Materials and Methods: Five ovarian cancer cell lines from Stage IIIC disease were evaluated. Sulforhodamine B and colony formation assays were used to analyze growth inhibitory effects of genistein and daidzein alone and with cisplatin, paclitaxel or topotecan. Apoptosis induction was studied by determining caspase-3 activity. Results: Inhibition of growth (50-80%), colony formation and colony size was seen at 144 μm of genistein, 0-23% reduction was demonstrated at 9 μm (**Peter *et al.*, 2007).**

Material and Methods

Materials:

Palm date Zaghlool kind used in this study were purchased from local markets in Tala town, Menoufia Governorate, Egypt and date seeds were obtained from the date fruits.

Casein, corn oil, vitamins mixture, cellulose, starch and minerals, were obtained from El-Gomhoreya Company, Cairo, Egypt.

Preparation of Date seeds:

The seeds were hand cleaned to render them from dust, washed by soaking in distilled water for 5 minutes, drained at room temperature for 2-3 days. The seeds were dried at (105ºC) roused, crushed and

grinded in coffee grinder to become powder, then packed in polyethylene bags and stored in dry place until used.

Experimental design

Twenty-five female white albino rats were obtained from Medical Research Institute Dokki, Giza, Egypt. Experimental was applied in the laboratory of the Faculty of Home Economics, Menoufia University. Rats were kept in wire cages. The diet was introduced in special feed cups to avoid scattering of feed. Also, water was provided to the rats by glass tube through the wire case. The animals were housed individually in well aerated cages under hygienic laboratory conditions and fed standard diet according to **AIN, (1993)**.

Analytical method

Determination of serum total cholesterol, according to **Allain**, **(1974).** Determination of serum total triglyceride, according to **Fossati and Prencipe, (1982).** Determination of serum HDL-cholesterol according to **Lopez, (1977).** Calculation of serum VLDL and LDL-cholesterol, according to the method of **Lee and Nieman, (1996)** as follows:

VLDL (mg/dl) =Triglycerides (mg/dl) / 5

LDL (mg/dl) = (Total cholesterol – HDL) –VLDL.

Determination of GPT (ALT) according to the method of **Henry (1974)** and **Yound, (1975).**

Estimation of urea, according to the enzymatic method of **Patton and Crouch, (1977).**

Determination of fasting plasma glucose, according to the method of **Trinder (1969).**

Histopathological examination:

Small specimens from liver, ovary and uterus were collected neutral buffered formalin, dehydrated in ascending concentration of ethanol (70, 80 and 90%), cleared in xylene and embedded in paraffin. Sections of (4 - 6) Mm thickness were prepared and stained with hematoxylin and eosin according to **Bancroft *et al.* (1996).**

Statistical analysis:

The data were statistically analyzed using a computerized SPSS v20 program by one-way ANOVA. The results are presented as mean ± SD. Difference between treatments at ($P \leq 0.05$) were considered significant of **SPSS, (2010)**.

Results and Discussion

Effect of experimental diets on estradiol hormone:

The best significant treatment was recorded for group 10% of date seeds powder when compared with the control and all other groups. 10% was the highest value and 5% was the lowest value as compared with the control group. There weren't significant differences could be seen for 5%, 15% and 20% date seeds powder.

Table: (1) Effect of date seeds powder on estradiol hormone in female rats (5%,10%, 15% and 20%) groups.

Variables	Control	Inflamed groups			
		Date seeds powder 5%	Date seeds powder 10%	Date seeds powder 15%	Date seeds powder 20%
E2(mg/dl)	**7.64±0.29**	**7.74±1.625**	**18.60±6.50**	**11.90±1.00**	**9.96±1.24**

Values are expressed as means ± SD; means in the same raw with different letter are significantly different (P ≤ 0.05) E2; estradiol.

Effect of date seeds powder on some analyses:

Effect of experimental diets on hemoglobin, there were not significant differences between groups. 10% was the highest value as compared with the other groups. The obtained results accorded with **Bain (1995).**

Regarding effect of experimental diets on serum glucose,10% date seeds powder was the best level which decreased serum glucose level.

Experimental diets did not show significant changes in serum urea levels between all groups. Meanwhile, 20% had the highest value as compared with control these results agreed with **Halaby, Mona *et al.* (2014)**.

Regarding the effect of experimental diets on liver functions such as GPT (ALT), the best effect was recorded for 15% and 10% date seeds powder groups as compared with the control. 5% and 20% experimental diets were significantly reduced as compared with the control group. The obtained results agreed with **Orabia *et al.* (2014)**; **Atallah *et al.* (2014)**; **Hussein *et al.* (2015) and Platat *et al.* (2015)**.

Table (2): Effect of date seeds powder on some biochemistry analysis of 5%, 10%, 15% and 20% female rats groups.

Variables	Control	Inflamed groups			
		Date seeds powder 5%	Date seeds powder 10%	Date seeds powder 15%	Date seeds powder 20%
HGB(g/dl)	**12.80±0.200**	**12.90±0.200**	**13.45±0.450**	**12.35±0.150**	**12.45±1.15**
Glucose(mg/dl)	**38.00 ±13.00**	**63.60±11.50**	**31.50±6.50**	**35.00±0.00**	**39.00±1.00**
Urea(mg/dl)	**41.50 ±4.50**	**48.50±3.00**	**38.50±13.50**	**43.00±2.00**	**50.00±10.00**
GPT(mg/dl)	**123.00 ±1.00**	**100.50±0.50**	**128.00±13.00**	**129.00±31.50**	**100.00±9.00**
BWG (g/dl)	**15.6±4.8**	**12.7 ±5.5**	**9.15±2.7**	**17.0±4.8**	**17.8±3.9**
FER(g/dl)	**0.045±0.00015**	**0.037±0.00006**	**0.27±0.00009**	**0.52±0.00015**	**0.52±0.00016**

Values are expressed as means±SD; means in the same row with different letter are significantly different (P≤0.05). HGB; Hemoglobin, GPT; glutamic pyruvate transaminase, *BWG; body weight gain, FER; feed efficiency rate.*

Regarding the effect of body weight gain of different rats which fed on the basal diet (control) and basal diet blend with date seeds powder (5%, 10%, 15% and 20%) ,there were not significant differences between the control and other groups. The best mean value of (BWG) was recorded for group fed on 10% date seeds powder when compared with the other tested groups. There were no significant changes among 5, 10, 15 and 20% date seeds powder and the control group. These results agreed with **Elgasim *et al.* (1995).** Date seeds powder improved the feed intake and body weight gain decreasing weight of female rats compared with control.

Effect of date seeds powder on serum lipid profile:

For total cholesterol, it could be found that there was no significant between groups 5, 10, 15 and 20% as compared with the control. 5 and 20% were increased level as compared with control. 10 and15% was decreased level as compared with the control **(Platat *et al.*, 2015** and **Atallah *et al.*, 2014)**.

For triglyceride, there was a significant between 20% and the control. 10 and 15% were increased level as compared with the control. 10% was decreased as compared with the control **(Schwarz *et al.*, 2003)**.

The values of HDL-c, LDL-c and VLDL-c:

For HDL, there was significant change among group 20% and the control group. 10% concentration was increased as compared with the control. 20% were decreased as compared with the control.

Concerning LDL-c, it could be noticed that 20% was the highest value and 10% was the lowest value among all groups. There was no significant between 5, 15 , 20% and the control **(Gaziano *et al.*, 2007)**.

The results of VLDL-c are presented. There was a significant change among 20% and the control group. Level of 5 and 20% was increased as compared with the control. Levels of 15 and 10% were decreased as compared with the control.

All results of HDL, LDL, VLDL, agreed with **(Platat *et al.*, 2015) ;(Atallah *et al.*, 2014) ; (Halaby, Mona *et al.*, 2014).**

Table (3): Effect of date seeds powder on lipids profile on female rats of (5%, 10%, 15% and 20%) groups

Variables	control	Inflamed groups			
		Date seeds powder 5%	Date seeds powder 10%	Date seeds powder 15%	Date seeds powder 20%
CH (mg/dl)	**83.00±9.0**	**87.50 ±2.50**	**75.00 ±3.50**	**80.50 ±5.00**	**87.50±8.50**
TG (mg/dl)	**87.50 ±7.50**	**102.50±27.50**	**77.50±2.50**	**82.50 ±2.50**	**120.00 ±15.00**
HDL (mg/dl)	**30.50 ±0.50**	**30.00 ±1.00**	**33.50±0.50**	**31.50±1.50**	**26.50±1.50**
LDL (mg/dl)	**35.00±7.00**	**37.00±4.00**	**24.00 ±1.00**	**31.50 ±6.50**	**44.00±7.50**
VLDL (mg/dl)	**17.50±1.50**	**20.50±5.50**	**15.50±0.50**	**16.50 ±0.50**	**24.00±3.00**

Values are expressed as means ± SD; means in the same raw with different letter are significantly different (P ≤ 0.05) CH; Cholesterol, TG; Triglyceride, HDL; High density lipoprotein, LDL; Low density lipoprotein, VLDL; Very low-density lipoprotein.

Histopathological investigation

Effect of date seeds powder on histological of female rats groups (1control and 10%group3).

Microscopical examination of liver of rat from group 1 revealed the normal histological structure of hepatic lobule, while examined sections from group 3 revealed cytoplasmic vacuolization of hepatocytes

and formation of newly formed bile ductuoles.

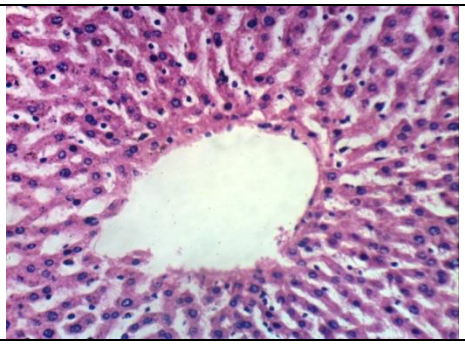
Microscopically, ovary of rat from group 1 showed no histopathological changes while, some examined sections from group 3 showed congestion of ovarian blood vessels and atresia of follicles whereas, other sections revealed no histopathological changes with normal graffian follicles.

Microscopically, uterus of rat from group 1 showed no histopathological changes while, some examined sections from groups 3 showed vacuolation of focal endometrial epithelium ,while other sections from those groups revealed no histopathological changes.

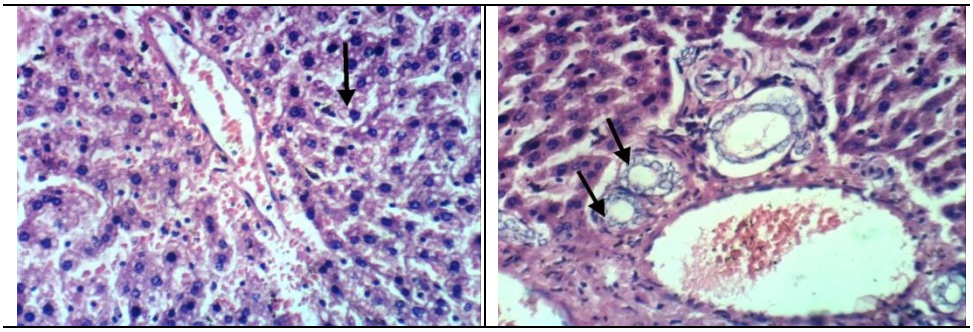
Histopathology	**Changes in tissuses**		
Inflamed groups	Liver	Ovary	Uterus
Group1 (control)	N	-	-
Group2 (5%)	+	+	+
Group3 (10%)	+	+	+
Group4 (15%)	+	+	+
Group5 (20%)	+	-	-

n; normal, (+) there is changes, (-) there is no changes.

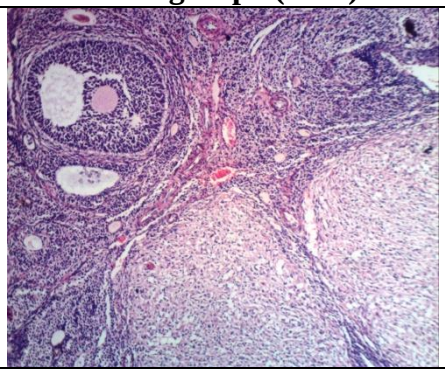
Fig (1): shows effect of date seeds powder on histological of female rats group 1(control) and group 3 (10%).



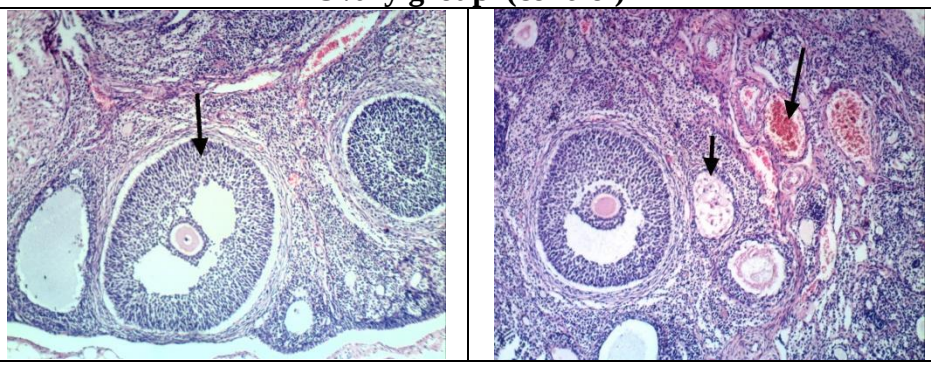
Liver group 1(control)



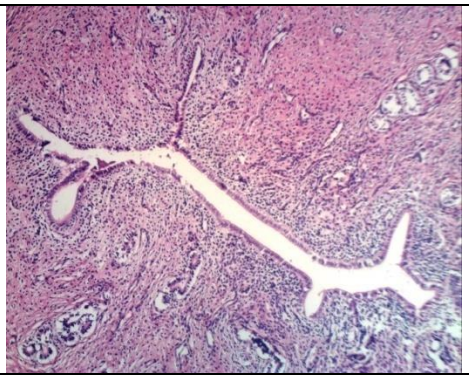
Liver group 3(10%)



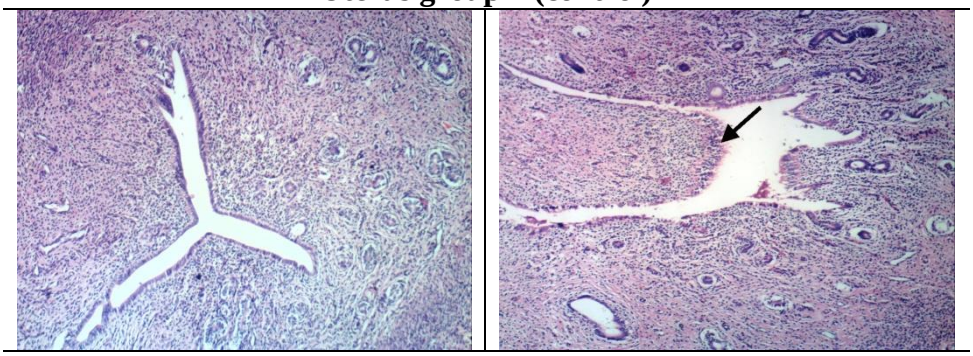
Ovary group1(control)



Ovary group3 (10%)



Uterus group 1 (control)



Uterus group 3 (10%)

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دراسة تاثير مطحون نوى التمر على اناث الفئران

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الملخص العربى

التمر هو رمز للحياة في الصحراء حيث أنه أكثر المحاصيل توافقا مع درجات الحرارة العالية والجفاف والملوحة. وتعتبر التمور مصدر جيدا لمضادات الأكسدة حيث لديها اعلى تركيز من المواد الفينولية والفلافونويدات بين الفواكة المجففة ومن المعروف أهمية هذه المركبات في الأكسدة والتي تلعب دور هام في امتصاص الحديد والشقائق الحرة وكذلك فهي مصدر جيد للكاروتينات المضادة للأكسدة لما لها من تأثير وقائي على الأنسجة.

هدف هذه الدراسة هو دراسة التأثير العلاجي لمطحون نوى البلح على زيادة الهرمونات الأنثوية وتنشيط التبويض في اناث الفئران حيث يتم تقييم تأثير نوى البلح على كل من: وزن الجسم ونسبة كفاءة التغذية السليمة ونسبة وزن الأعضاء (كبد وكلى وطحال وقلب ورئتين) ووظائف الكبد والكلى ونسبة السكر في الدم ونسبة الهيموجلوبين ومعرفة نسبة إحدى هرمونات الأستروجين.

وقد أجريت الدراسة على (25 فأر) أبيض اناث بالغ يتراوح وزن كلا منهم (150±10جم)، تم وضع الفئران بشكل فردى في أقفاص فى ظروف صحية طبيعية. تم تغذية كل الفئران على النظام الغذائي الأساسي لمدة أسبوع قبل بدء التجربة، وتم تقسيم الفئران إلى 5 مجموعات متساوية (5 فئران في كل مجموعة) ثم اضافة مطحون نوى التمر بنسبة 5و10و15و20 % من النظام الغذائى الاساسى بالاضافة للمجموعة الضابطة .

وقد أظهرت النتائج المتحصل عليها مايلي:

1- التأثير على معدل اكتساب الوزن، المأخوذ الغذائي ومعدل الاستفادة من الغذاء:

تم تسجيل أفضل قيمة بالنسبة لمعدل اكتساب الوزن للمجموعة التي تغذت على مطحون نوى البلح بنسبة 10% و20% بالمقارنة مع المجموعات الأخرى. بالمقارنة بين المجموعات الأخرى 15% و5% كانت أقل اكتساب للوزن من المجموعات الأخرى بالمقارنة بالمجموعة الضابطة.

كما أن أفضل قيمة لمعدل الاستفادة من الغذاء في المجموعة 10% و20% وهذا يرجع للتأثير الإيجابي لمطحون نوى البلح في نقص الوزن.

2- التأثير على وزن الأعضاء:

بالنسبة للكبد: أدى مطحون نوى البلح الى إنقاص وزن الأعضاء عند مقارنتها بالمجموعة الضابطة وكانت أعلى مجموعة هي 20% مطحون نوى البلح حيث كانت الأكثر فاعلية في إنقاص الوزن ويليها15% ثم5% بينما10% من مطحون نوى البلح هي الأقل في إنقاص الوزن.

بالنسبة للقلب: أعلى نسبة في المجموعات هى 5%و20% بالمقارنة بالمجموعة الضابطة لكن ينقص في المجموعة 10% وأقل نسبة في 15%.

بالنسبة للرئتين: اقل نسبة في مجموعة 20% مقارنة بالمجموعة الضابطة تليها 10% ثم 5% وبالتدريج وأعلاهم في مجموعة 15%.

بالنسبة للطحال: هناك نقصا فى وزن المجموعات 5%و15%و10% ثم 20% كانت أقلهم بالتدريج مقارنة بالمجموعة الضابطة.

بالنسبة للكلى: أعلى نسبة في مجموعة 10% تليها مجموعة 5% ثم 20% ثم 15%بالتدريج بالمقارنة بالمجموعة الضابطة.
بالنسبة للرحم والمبيضين: أعلى نسبة في المجموعة 5% وتليها المجموعة 15% و10% و20% بالتدريج دون فروقات معنوية لديهم بالمقارنة بالمجموعة الضابطة.
وكان أفضل تأثير على وزن الأعضاء كانت مجموعة 10و20% من مطحون نوى البلح.

3- التأثير على مستوى الجلوكوز بالدم:
أظهرت جميع المجموعات التي تم اختبارها تغييرات كبيرة مع المجموعة الضابطة. في حين أظهرت المجموعة (5%) اختلافًا كبيرًا فكانت أعلى مستوى عند مقارنتهما بالمجموعة الضابطة وكان أقلهم مستوى المجموعة10% من مطحون نوى البلح يليها 15%.

4- التأثير على دهون الدم:
تم تحسين مستويات الدهون في الدم عن طريق زيادة مستوى مطحون نوى البلح وكانت أفضل النتائج للمجموعات 10% ويليها 20% ثم 15% من مطحون نوى البلح.
بالنسبة للكولسترول الكلي، يمكن أن نجد أنه لا يوجد أي فروق معنوية بين المجموعات 15% و5% لكن أقل نسبة في مجموعة 20% تليها 10%.
بالنسبة لليبوبروتين مرتفع الكثافة كانت المجموعات التي تغذت على10% و15% مطحون نوى البلح أعلى من المجموعة الضابطة بينما المجموعة 5% و20% أقل نسبة بالتدريج.
بينما الليبوبروتين منخفض الكثافة كانت المجموعة 15% أعلى قيمة تليها 5% وكانت 20% أقل قيمة تليها 10% بين جميع المجموعات بالمقارنة بالمجموعة الضابطة.
بالنسبة لليبوبروتين منخفض الكثافة جدا كانت المجموعة 20%أعلى قيمة تليها 5% وكانت10% أقل قيمة تليها 15% بين جميع المجموعات بالمقارنة بالمجموعة الضابطة.

5-التأثير على وظائف الكبد:
بالنسبة لانزيم الجلوتاميز سجلت أفضل النتائج للمجموعة15 و10% بالتدريج وأقلهم كانت المجموعة 5%و20% بالتدريج دون أي فروقات معنوية.

6- التأثير على نسبة اليوريا في الدم:
كانت أعلى النسب في المجموعات 20%و5%و15% بالتدريج وأقلهم نسبة في المجموعة 10% بالمقارنة بالمجموعة الضابطة.

7- التأثير على مستوى الهيموجلوبين بالدم:
كانت أعلى نسبة في المجموعة 10% تليها 5% وأقلهم نسبة 15% تليها 20% بالمقارنة بالمجموعة الضابطة.

8- التأثير على مستوى الـE2 بالدم:
كانت أعلى نسبة للهرمون الأنثوي في المجموعة 10% تليها 15% ثم 20% ثم 5% بالتدريج بالمقارنة بالمجموعة الضابطة وكانت أقل نسبة فيهم وذلك يدل على تأثير مطحون نوى البلح على زيادة الهرمون الأنثوي الأستروجين في جميع النسب لكن كانت أعلى نسبة في المجموعة 10% وهي الأفضل في معظم النسب على الإطلاق.