

STUDY THE EFFECT OF GROUND OLIVE LEAVES IN TWO LEVELS ON SEXUAL  
HORMONES LEVELS IN MALES RABBITS

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**ABSTRACT**

The present research was designed to demonstrate the effectiveness of two different levels of Ground Olive leaves (5% and 10 %) in diet on levels of reproductive hormones like Testosterone , Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH) in male rabbits, twenty one male rabbits with body weight average 1-1.4 Kg and 4.5-5 months age have been bought from the local markets and they divided randomly to three similar groups and fed on concentrate pellets diets with green roughage , the male Rabbits have been divided in 7 animals /group with equal weights. The 1<sup>st</sup> group (T1) control group was offered tap water and fed concentrate pellets without ground olive leaves , The 2<sup>nd</sup> one (T2)(5% Ground Olive leaves / diet) offered tap water and fed concentrate pellets with 5% Ground Olive leaves /diet , while the 3<sup>rd</sup> one(T3)(10% ground Olive leaves) offered tap water and fed concentrate pellets with 10% ground olive leaves /diet and the nutrition were been continued along 8 weeks . In this study we measured the role of use ground Olive leaves in rabbits male diet on levels of hormones like testosterone, FSH, LH in blood along the period of experiment.

The results showed decrease in Testosterone level in serum significantly (P<0.05) while a significant increase (P<0.05) in LH level occur and there is account differences in FSH level that produced from pituitary gland. We concluded that the use of ground Olive leaves have impact on fertility of rabbits males through its disruption in

biosynthesis or intervention with production of hormones in genital system of Rabbits male.

## **INTRODUCTION**

The successful and complete reproductive functions are depending on the balanced of endocrine hormone produced by hypothalamus ,pituitary gland , testis .

Gonadotropin releasing hormone (GnRh) produced by the hypothalamus triggers the release of gonadotrophins i.e FSH(Follicular stimulating hormone ) and LH(Luteinizing hormone) from pituitary gland (1), LH stimulates the production of Testosterone hormone fromleydig cells in testis while FSH connects with receptors in the sertoli cells and stimulates spermatogenesis (2)LH is controlled through the production ofGnRh and also through the feedback effects of steroids (1,3).

Testosterone is a steroid hormone from androgen group , morphologically and physiologically testosterone act development of genital system of rabbits males and secondary sexual characteristics and spermatogenesis (4).

Testosterone is mainly produce by leydig cells of the testis and fewer extent in kidney , liver , adrenal cortex(5), Oleuropeinis one of the important polyphenols where the olive leaves are richest source of them compare with other parts of olive tree , as per kilogram of Olive leaves include 2 gm of Oleuropein(6) , the previous studies refers to the role of Olive leaves in reduction of Cholesterol level in blood (7)which is important for synthesis of sexual hormones especially Testosterone hormone because the cholesterol considered as the precursor for Testosterone production through it's action on leydig cells (8,9)the aims of this study was the important of use Ground Olive leaves on reproduction and hormone production in Rabbits males .

## **MATERIALS AND METHODS**

The research conducted in animal house / veterinary med.college /university of Baghdad were used 21 male Rabbits , rate weight 1-1.4 Kg with age of 4.5-5 months , they were purchased from local Market and put in metal cages , rabbits were fed on concentration food(pellets) , in addition to providing green diet , they have been divided into 3 groups.The 1<sup>st</sup> group(T1)control group which beengiven water and intensive feed – free of ground Olive leaves , 2<sup>nd</sup> group(T2)(5% Olive leaves /diet)by

mixing 50gm of ground Olive leaves with 1 Kg of pellets (concentrated feed), and the 3<sup>rd</sup> one (T3)(10% Ground Olive leaves )were they mixed 100 gm of Ground Olive leaves with 1 kgof Pellets (concentrated feed).

The Ground Olive leaves were air dried then milled using electric grinding machine to make powder which was mixed with wet pellets (macerated in water) to make paste which was well mixed and placed in electric meat grinding machine to produce a new pellets mixed with ground Olive leaf .The manufactured feed pellets were mixed with powder of Olive leaves as follow: 50 gm of Ground Olive leaves were mixed with 1 kg of concentrated pellets/ group of (5% Olive leaves /diet) and 100 gm of Ground olive leaves with 1 kg of concentrated Pellets /group of (10% Olive leaves /diet) . Animals were weighted at each week end in the morning and before submission of the diet .

The technique of Enzyme – Linked immune sorbent assay (ELISA) was used to determine the levels of each Testosterone ,LH and FSH in serum specimens, the ELISA kits were supplied from Biocheck , Inc.(10,11,12).

#### **Statistic :**

SAS software used as a statistical analysis of the data has been compare the significant differences between the averages by less significant difference test LSD (Least significant differences) (13).

## **RESULTS AND DISCUSSION**

Table (1) showed a significant diminution in Testosterone hormone concentration in (T2,T3) groups compare with (T1)at a long time of experimental period .

The most important polyphenols exist in Olive leaves structure called (Oleuropein )in which the leaves consider a rich origin of this material in compare with rest parts of Olive tree ,The Oleuropein have inhibitory or block effect on enzymes that related with Testosterone biosynthesis.Polyphenol substance causes decreased cholesterol absorption and increase its excretion in fecal, polyphenols had a beneficial action on enzymes involved in cholesterol metabolism (14).The Oleuropein have an inhibitory action on 17- $\beta$ -hydroxysteroid dehydrogenase enzyme this enzyme act to convert Androstendione in Leydig cell to Testosterone (15)and lack of 5- $\alpha$ -reductase

enzyme which convert Testosterone to the active phase of testosterone hormone in muscle called "DHT" Di hydro Testosterone (16).

The studies refers that the Olive leaves reduce Cholesterol(7) which is important for synthesis of sexual hormones especially Testosterone hormone because the cholesterol considered as important precursor for Testosterone composition through its action on Leydig cells (8,9) Cholesterol is a lipid soluble and mostly located associated with external Mitochondria membrane in the Leydig cell, the diversion of Cholesterol to steroids hormone occur in internal mitochondrial membrane of Leydig cell (7) the rate limiting step in this process is the transport of free Cholesterol from the Leydig cell cytoplasm into their Mitochondria, this step is carried out by steroidogenic acute regulatory protein called "STAR" (17). In other studies they notice the diameter and thickness of seminiferous tubules will decrease significantly in animal handled with Olive leaves which contain polyphenols in their structure this decrement may be belonged to the reduction in testosterone hormone concentration similar reported (18,19).

**Table (1): The Testosterone levels in male Rabbits blood (ng/ml)**

| Weeks         | T1(Control)       | T2(5%Olive)       | T3(10%Olive)      |
|---------------|-------------------|-------------------|-------------------|
| <b>o-time</b> | <b>0.92±0.17A</b> | <b>0.96±0.12A</b> | <b>0.93±0.13A</b> |
| <b>w1</b>     | <b>1.69±0.25A</b> | <b>0.87±0.96B</b> | <b>0.27±0.12C</b> |
| <b>w2</b>     | <b>1.66±0.15A</b> | <b>0.37±0.89B</b> | <b>0.25±0.29B</b> |
| <b>w3</b>     | <b>1.74±0.07A</b> | <b>0.43±0.89B</b> | <b>0.53±0.24B</b> |
| <b>w4</b>     | <b>1.10±0.10A</b> | <b>0.47±0.82B</b> | <b>0.30±0.24B</b> |
| <b>w5</b>     | <b>2.30±0.65A</b> | <b>0.43±0.13B</b> | <b>0.43±0.67B</b> |
| <b>w6</b>     | <b>1.57±0.10A</b> | <b>0.10±0.00B</b> | <b>0.53±0.23B</b> |
| <b>w7</b>     | <b>1.29±0.36A</b> | <b>0.33±0.03B</b> | <b>0.47±0.27B</b> |
| <b>LSD</b>    | <b>0.8874*</b>    | <b>0.2714 N.S</b> | <b>0.5093 N.S</b> |

\* (P<0.05) , NS: Non-significant.

The results showed in table(2) that there is a significant increase LH level in blood (T2,T3) groups as compare to (T1) a long time of the experiment period. Hormonal response play a important action in mediating the physiological and behavioral processes that influence animal fertility (20,21) much focus is on the hormone that secretes reproductive axis how they regulated the secreted the brain and

pituitary coordinate and provide central drive to the reproductive axis through life(22) , the region of the brain that involved in the regulation of reproductive function and many of body's basic homeostatic function in the hypothalamus decrease the firing of testosterone hormone from Leydig cell lead to GnRhactivation of pituitary LH and FSH (23)in this present study , serum testosterone showed a significant ( $P<0.05$ )decrease in the groups (T2,T3)which have Olive leaves in their diet.Luteinizing hormone (LH) is produced by gonadotrophic cells in the anterior pituitary gland in Rabbits male , the neurons of the hypothalamus compose and secretegonaotropin-releasing hormone, which induces the production andsecretion of LH from the pituitary gland. LH causes the composition of testosterone in the Leydig cells of the testis, when testosterone decrease in serum it will causefeedback reaction on hormones release from the hypothalamus and pituitary (24).

**Table (2): The Luteinizing hormone levels (LH) in blood of male Rabbits(ng/ml)**

| Weeks  | T1(Control) | T2(5%Olive) | T3(10%Olive) |
|--------|-------------|-------------|--------------|
| O-time | 1.75±0.24A  | 1.76±0.29A  | 2.11±0.36A   |
| w1     | 1.07±0.67B  | 2.59±0.35A  | 2.77±0.30A   |
| w2     | 1.5±0.31B   | 3.47±0.50A  | 2.96±0.22A   |
| w3     | 1.59±0.33B  | 3.32±0.18A  | 3.37±0.24A   |
| w4     | 1.33±0.33B  | 3.22±0.42A  | 4.08±0.32A   |
| w5     | 1.40±0.25B  | 3.64±0.30A  | 3.26±0.21A   |
| w6     | 1.37±0.32B  | 2.93±0.50A  | 2.93±0.22A   |
| w7     | 1.63±0.32B  | 3.00±0.00A  | 3.31±0.18A   |
| LSD    | 0.8374      | 1.0483 *    | 0.7924*      |

\* ( $P<0.05$ ) , NS: Non-significant.

The results showed in Table(3)there is slightly elevation in Follicular stimulating hormone (FSH)level in all groups a long the period of experiment (T1,T2,T3) this hormone is synthesized from pituitary gland after the secretion of Gonadotropic releasing hormone from Hypothalamus when Testosterone level become low and this hormone is responsible for spermatogenesis(25).This hormone regulates function of Sertoli cells including increasing the production of androgen binding protein and necessary for normal spermatogenesis and sperm maturation. , important factor in the

initiation and continue of spermatogenesis(26,27) improvement in sperm motility may had been brought about by increasing intercellular cAMP, which is known as a very activet factor in stimulating sperm motility (28).

**Table (3): The Follicular stimulating hormone FSH levels in blood of male Rabbits(ng/ml).**

| Weeks  | T1(Control) | T2(5%Olive) | T3(10%Olive) |
|--------|-------------|-------------|--------------|
| o-time | 2.77±0.42A  | 2.44±0.38A  | 2.24±0.88A   |
| w1     | 3.29±0.15A  | 3.41±0.29A  | 3.83±0.17A   |
| w2     | 3.46±0.64A  | 3.37±0.34A  | 3.41±0.52A   |
| w3     | 3.27±0.63A  | 3.19±0.16A  | 3.80±0.12A   |
| w4     | 3.33±0.29A  | 3.53±0.53A  | 4.33±0.09A   |
| w5     | 3.48±0.62A  | 3.62±0.22A  | 3.34±0.45A   |
| w6     | 3.47±0.33A  | 3.66±0.38A  | 3.29±0.24A   |
| w7     | 3.46±0.38A  | 4.04±0.22A  | 3.07±0.55A   |
| LSD    | 1.3897*     | 0.9239*     | 0.9962*      |

\* (P<0.05)

### تأثير استخدام مستويين من اوراق الزيتون المطحونة في مستوى الهرمونات الجنسية في ذكور الارانب

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### الخلاصة

تم قياس تأثير استخدام اوراق الزيتون المطحونة (5% ، 10% في غذاء الارانب) على مستوى الهرمونات مثل التستوستيرون والهرمون اللوتيني وهرمون المحرض في الدم في ذكور الارانب . احدى وعشرون من ذكور الارانب وبوزن 1-1.4 كغم وبعمر 4.5 شهر تم شراؤها من السوق المحلي وقسمت عشوائيا الى ثلاثة مجاميع متساوية وغذيت على العلف المركز البلت والعلف الاخضر الجت وبواقع 7 حيوانات للمجموعة

الواحدة. المجموعة الاولى (المعاملة ١) معاملة السيطرة قدم لها الماء والعلف المركز بدون اوراق الزيتون المطحونة ، المجموعة الثانية (المعاملة ٢) (٥% اوراق الزيتون المطحونة / غذاء ) قدم لها الماء وغذيت على غذاء حاوي على ٥% منه اوراق الزيتون المطحونة و(المعاملة ٣) ١٠% اوراق الزيتون المطحونة / غذاء ) قدم لها الماء وغذيت على غذاء حاوي على ١٠% منه اوراق الزيتون المطحونة واستمرت التغذية ل ٨ اسابيع .

النتائج اشارت الى انخفاض معنوي ( $P < 0.05$ ) في مستوى التستوستيرون في الدم في حين لوحظ ارتفاع معنوي في مستوى الهرمون اللوتيني وايضا ارتفاع حسابي في مستوى الهرمون المحرض المفرز من الغدة النخامية . نستنتج ان استخدام اوراق الزيتون المطحونة لها تاثير سلبي على خصوبة ذكور الارانب من خلال عمل اضطراب في بناء والتداخل في انتاج الهرمونات في الجهاز التناسلي في ذكور الارانب .

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