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# Study the effect of Daily Treatment of Olive Oil in Male Rabbit on Blood Glucose level

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**Abstract**
The current research aimed to reveal the influence of daily administration of the Olive Oil orally on level of serum glucose in local male rabbit. Nine male rabbit used in this research, divided into 3 groups. First group dosed normal saline orally and considered as control group, the second group administered 2 ml of olive oil orally and pointed as G1 group, the last group considered G2 and given 4 ml of olive oil orally. The treatment continue for 14 days with estimation of blood glucose daily. The results of study appeared significant fall in blood glucose concentration in treated groups when compared before and after treatment in G1 and G2 groups. At same time, there was non-significant changes in blood glucose concentration in control group after 14 days of administration of olive oil. The level of blood glucose in G2 group decreased significantly as compared with G1 group after 14 days of treatment. The Olive Oil has strong and rapid effect in reducing the concentration of blood sugar in short period.
**Key words: Olive oil, Blood glucose, Rabbits**

**الملخص**
هدفت الدراسة الحالية للكشف عن تاثير التجريع الفموي لزيت الزيتون على مستوى كلوكوز الدم في ذكور الارانب المحلية. استخدمت 9 ذكور ارانب في هذا البحث، قسمت الى 3 حيوانات لكل مجموعة. جرعت المجموعة الاولى محلول الملح الفسيولوجي واعتبرت كمجموعة سيطرة، أعطيت المجموعة الثانية 2 مل من زيت الزيتون فمويا واعتبرت كمجموعة اولى، المجموعة الاخيرة أعتبرت كمجموعة معاملة ثانية وأعطيت 4 مل من زيت الزيتون فمويا. استمرت المعاملة لمدة 14 يوم مع تقدير كلوكوز الدم يوميا. أظهرت نتائج الدراسة بأن نقصان معنوي في تركيز كلوكوز الدم في مجاميع المعاملة عند المقارنة قبل وبعد المعاملة في المجموعة الاولى والثانية. في نفس الوقت، لم يكن هناك اي فرق معنوي في تركيز كلوكوز الدم في مجموعة السيطرة بعد 14 يوم من تجريع زيت الزيتون. كان هناك نقصان معنوي أكثر في كلوكوز الدم في المجموعة الثانية عندما قورن بالمجموعة الاولى بعد 14 يوم من المعاملة. يملك زيت الزيتون تاثير قوي وسريع في اختزال تركيز سكر الدم بفترة قصيرة.
**الكلمات المفتاحية: زيت الزيتون، كلوكوز الدم، ارانب**

## Introduction

Many herbal plants medications have been utilized for the diabetes mellitus (DM) treatment. Herbal medicines are used as results of their high efficiency, low adverse influence and a comparatively little expenditure.[1] Olive (*Olea europaea L.*) phenolics are known as greatful anti-oxidants. Both in vivo and in vitro researches, the olive oil give a key healthy food of Mediterranean diet.[2] *Olea europaea* L. (Oleaceae) is one of the main plant of the middle east regions. The cultivation method is thought to be by the trees election with large size fruits and elevated content of oil in it.[3] The olives used commercially is from the species *Olea europaea* (Zeytoon, Zeytin, Olive) which is a long-lived evergreen plant that is known by the dense tree branches with leathery, thick and oppositely arranging of leaves.[4] Olive leave extract (OLE) from Mediterranean olive has been described as a food supplement, which can be utilized in the form of tea, syrup and capsules. Also, OLE has hypotensive effects and its anti-oxidant function, hypoglycemic, cardio-protective properties, antimicrobial, radio protective agent, anti-atherogenic, anti-tumoral, anti-inflammatory, hypocholosterolemic, hepato-protective agent and anti-viral properties.[5]

*Olea europaea* from the family (*Oleaceae)* is cultured in tropical and warm temperature countries.[6] Leaves of olive have the highest percentage of bio-active components with extensive pharmaceutical applications including (oleuropein which found in oil of olive with range 0.005% to 0.12% and that reaches more (0.87%) whilst that in olive leaves nearly (1-14%).[7] The leaves of olive tree considered a source of major phytochemicals such as phenols and flavonoids which have different actions like anti-oxidant, anti-bacterial, anti-fungal..etc.[7] The major characteristic of anti-oxidant component is their capability to equalize free radicals like peroxide, hydroperoxide or lipid peroxyl and lower the oxidative influence that causing degenerative disorders.[8] The oleuropein is the main phenolic substance of olive leaves and differ in range (17- 23%) based on the harvesting leaves time.[9]

Oleuropein is most plentiful in developing fruits of olive but its level pointedly reduced as fruits matured.[10] Thus, olive oil gained by pressure of mature fruits involve small quantity of oleuropein.[11] Olive leaves is used as anti-diabetics[12] anti-hypertensive[13], Anti-inflammatory and utilized as diuretic.[14] In particular, different researchs have shown that olive leaves extracts (OLE) and their constituents has a various pharmacological and health improving activities like hypolipidemic and anti-atherosclerotic[15], antioxidant[16], protect liver, kidneys and heart against –induced toxicity[17] anticancer[18] and antiinflammatory effects.[19]

The olive leaves uses traditionally as anti-diabetic medication for the control and treatment of diabetes mellitus (DM).[20] Aqueous solution or extract of crude of olive leaves considered as hypo-glycemic medicine and decreased oxidative stress, indirectly through

falling serum glucose with preventing hyper-insulinemia.[21] In-vitro study on induced by alloxan-diabetic rats, the islets of Langerhans continuous infarctions and infiltration of lymphocyte while the treated group with olive appeared the irregularity of the size of islets, but they showed normal with lower granulation and some islets became so small and all of islets showed normal in the control group animals.[22]

**Materials and methods**

The aiming of research is investigate the influence of olive oil on level of serum glucose in rabbit males. Nine rabbits were bought from the local market and grouped into three groups. The first group given is 2cc of normal Saline as control group, The second group is given 2cc of olive oil as G1 group, The Third Group is given 4cc of olive oil as G2 group, for 14 days.

olive oil bought from commercial markets (Al-Burj company, Spain) which contain 60% of virgin olive oil which used in research. Carrot and lettuce food was given in the form of four meals a day, two meals of carrots and two meals of lettuce.

The amount of carrots was 300 gm for each group, and the amount of lettuce was one piece for each group equal to 400 gm. approximately. Before the dose was done, they were given carrots, and then prevent the groups from food for half an hour, after that each group dosed orally as mentioned above by syringe (Dynarex, China). The groups are left for two hours after the treatment with olive oil without giving food,

**Statistical analysis**

The statistical analysis done on each group withalculate P-Value that considered as reference to determine significant value to each group. One-way ANOVA utilized to determine the significancy between groups. The probability level was ($P \leq 0.05$) **(1)** show the blood glucose level (mean ± SD) of Control group.

The results of current research appeared that oral dosing of olive oil to rabbit for 14 days cause significant reduction in serum glucose concentration which is proportionate with increasing the administrate volume of olive oil, this results agree with previous study[23] who suggested that olive oil cause improvement of the hyperlipidaemic pancreatitis. The olive oil have bioactivity came from presence of oleuropein which is bioactive substance in olive products which is related to enhance metabolism of glucose. The hypo-glycaemic and anti-oxidant influence of oleuropein have been mentioned in diabetes mellitus induced by alloxan in rabbits. In streptozotocin induced diabetic rats, extraction of olive leaves decreased the level of blood glucose.[23]

Histological sections from the pancreas of rats fed rising diet with fat and virgin oil of olive in study of and then the blood glucose concentration of each group is measured by using of ear blood puncture and utilized electronic glucose meter (On call plus, Germany). All results of each group recorded daily.

**Results and discussions**

Table and figure (1) appeared non-significant ($P > 0.05$) differences in blood glucose range showed in control group members before and after the treatment with normal saline, mean was (98.33±8.70, 99.53±6.07, 99.73±9.22) mg/dl for 1 ,2 and 3 member of control group respectively.

Table (1) show the blood glucose level (mean ± SD) in Control group Figure (1) show the blood glucose level (mean ± SD) of Control group. Table and Figure (1) referred to non-significant ($P >0.05$) differences in control group before and after administration of Normal saline.

The G1 group revealed significant ($P \leq 0.05$) decreasing in concentration of blood glucose to all members of group when compared to control group. At same time, these group members recorded the significant ($P \leq 0.05$) elevation in blood glucose concentration with comparison to G2 group. The mean (M) and standard deviation (SD) of studied group members was (80.87±14.07, 78.40±8.05 and 78.07±11.32) mg/dl as mentioned in table and figure (2).Table and Figure (2) show significant ($P \leq 0.05$) reduction in serum glucose level after 14 days of administration of Olive oil to rabbit males in G1 group

(Aboul-Mahasen and Abdulrahman Alshali, 2019) appeared nearly restoration of pancreas and its normal histological features. The acini of pancreas were moderately regenerated in shape with no vacuolation. Most of the nuclei and the zymogen granules in cytoplasm of acini cells became resemble to control animals. The islet of Langerhans showed resembled to the control group rats and most of beta-cells in the central and peripheral areas of the islet with normal density with few lipid droplets were present this recovery due to positive influence of the polyphenols of extra virgin oil on β-cell role and suggested that extra virgin enhanced with these components may led to increasing in insulin production and led to glycaemic control in (type 2 DM) patients.[24]

Moreover, oleuropein has serum glucose lowering properties[25] suggest that the hypoglycemic influence of oleuropein occur as results modulation of many intracellular signals that are directly effect on regulation of serum glucose level. Fujiwara et al.[26] study the exposure of cultured mouse myoblasts to oleuropein at physiological levels which caused translocation of the glucose transporter (GLUT 4) to the plasma membrane. This action was done by adenosine monophosphate-activated protein kinase

(MAPK) activation and was related to elevation of glucose cellular internalization. In vivo study the mice showed high insulin sensitivity after fed on oleuropein.[27] The action of the high capacity and low affinity of glucose transporter GLUT-2 is lowered in culture of cells exposed to oleuropein as reported by Kerimi et al., (2019).[28]

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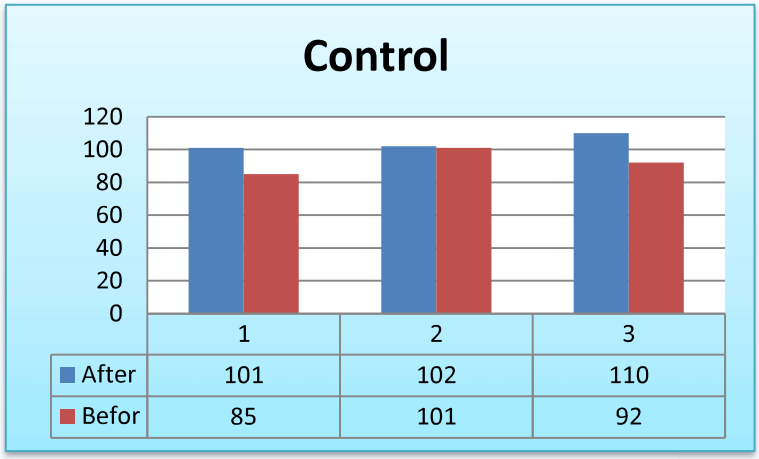


**Figure (1):** shows the blood glucose level (mean ± SD) of Control group.

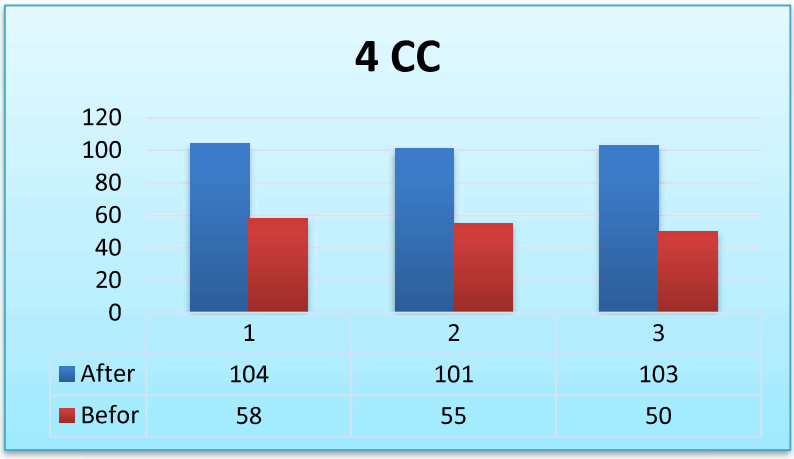


**Figure (2):** show the blood glucose level (mean ±(SD) of G2 group.

**Table (1)**: show the blood glucose level (mean ± SD) in Control group.

| | Control | | |
|---|---|---|---|
| Sample | **1** | **2** | **3** |
| After | 101 | 102 | 110 |
| Befor | 85 | 101 | 92 |
| Mean | 98.33 | 99.53 | 99.73 |
| SD | 8.70 | 6.07 | 9.22 |
| Diff. | -16 | -1 | -18 |
| P-Value | 0.162 | | |

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**Tabl (2):** show the blood glucose level (mean ± SD) in G2 group.

| | 4 CC | | |
|---|---|---|---|
| Sample | **1** | **2** | **3** |
| After | 104 | 101 | 103 |
| Befor | 58 | 55 | 50 |
| Mean | 67.67 | 64.47 | 66.00 |
| SD | 11.15 | 11.83 | 11.87 |
| Diff. | -46 | -46 | -53 |
| P-Value | 0.002 | | |

**Tabl (3):** show the blood glucose level (mean ± SD) in G2 group.

| | 2 CC | | |
|---|---|---|---|
| Sample | **1** | **2** | **3** |
| After | 128 | 100 | 110 |
| Befor | 80 | 74 | 74 |
| Mean | 80.87 | 78.40 | 78.07 |
| SD | 14.07 | 8.05 | 11.32 |
| Diff. | -48 | -26 | -36 |
| P-Value | 0.029 | | |