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Effect of Honey Intake on Some Hematological Parameters and Testosterone, Luteinizing Hormone in Sample of Iraqi Men

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ABSTRACT

Introduction and Aim: Natural honey has many biological activities including increase Hematology (Red Blood Cell (RBC), Packed Cell Volume (PCV), Hemoglobin (Hb), Platelets (PLT) and Prothrombin time (PT)) and serum of testosterone and Luteinizing hormone. The aim of these study to know the effect of honey intake on some blood profile and to know the extent of honey impact on testosterone level.
Material and Methods: About 20 healthy men were selected aged 45-60 years in Baghdad, given 50 gram Eucalyptus honey daily orally for 30 days and tested blood samples were collecting to measure the previous parameters before and after treatment.
Results: The study found that there was a significant increase in all hematology parameters and testosterone hormone after eat the honey.

Keywords- Honey, Hematological Parameters, Hormones.

I. INTRODUCTION

Honey is a natural product of bees formed from nectar collected from flowering vegetation. Honey has a rather complex chemical structure and is a nature product , it contains more than 180 substance, including sugars such as fructose, glucose, enzymes such as glutathione and catalase ;trace elements such as copper, iron, calcium and zinc; vitamins such as vitamin C, vitamin E, vitamin A and certain flavonoids and phenolic acid.[1] In modern medicine ,honey has been used for the treatment of respiratory diseases ,urinary diseases, gastrointestinal diseases, skin, ulcers, wounds, eczema, psoriasis, dandruff, diaper dermatitis and antimicrobial activity.[2] And increases antibody production against thymus dependent.[3]And raises antioxidant, serum iron and blood indices, improve insulin production and decreases blood glucose levels.[2] Honey has protective role in blood parameters in laboratory animals.[4] Honey an increase RBC level because it contained strong antioxidants that reduce oxidative stress.[5] Honey contained vitamin E and F, which are necessary for the formation of the reproductive cells and lead to the growth of sperm in males, causes muscle and increase the strength of the body. [6] Honey stimulate the testes to manufacture testosterone level and decrease in sperm production.[7] Bees honey has a clear effect in increasing fertility and treatment of infertility in both sexes, because contain many compound that increase sexual ability and raise the level fertility.[8] After marriage, the couple dreams of completing the foundations of their small family and establishing their structure, waiting for newborn to enter their lives. But some may have problems with pregnancy, for many different reasons, including a man with infertility.[9] Many reasons for male infertility is related to endocrine or decline in the production of male hormone were cause by deficiency of LH or FSH hormones that stimulate the testes to

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manufacture testosterone levels and decrease in sperm production.[7] Bees honey has a clear effect in increasing fertility and treatment of infertility in both sexes, because contain many compounds that increase sexual ability and raise the level fertility.[8]

II. MATERIAL AND METHODS

The study was carried out on 20 healthy men volunteers who did not consume alcohol until collecting their doses donors with chronic diseases and smokers were excluded. They age range from (45-60) years in the city of Baghdad for the period October ,2023 to January,2024. The samples were exams blood tests complete blood count (CBC) which included (Red blood cells, Hematocrit hemoglobin, Platelets, Prothrombin time) and testosterone hormone. Test were performed before consuming honey and after consuming. Mentioned test were performed in a health center AL-Dorra laboratory for medical diagnostics and AL-Yusr specialty laboratories. Each man was given 50 grams of pure Eucalyptus honey daily with breakfast for a month. Five milliliters of blood were drawn from each individual before and after consumption between (8-11am).The blood samples was divided into three aliquots :2 ml of blood was dispended in tube containing sodium citrate 9NC (PT) tube ,second 2 ml of blood transferred into tube containing anti-coagulant ethylene diamine tetra acetic acid (EDTA) and stored at (2-8℃) each from EDTA tube and PT tube for analysis of CBC and PT.1ml of blood was left to clot for 20-30 minutes at 37℃ in an incubator , and separated by centrifugation at 3000 rpm for 10 Minnite to get a serum kept at (-20℃) used for testosterone and LH hormones.

Determination of CBC according to (Koepke,1991).[10] PT analysis according to (Hirsh *et al*.,1992).[11] and testosterone analysis according to method of (Lashansky,1991).[12] For all parameters arithmetic mean ($\acute{x}$) and standard deviation (SD) were determined, all data were analyzed by a combined t-test (Microsoft office: Excell statistical Analysis, 2013).

III. RESULT AND DISCUSSION

1. Result and discussion of Hematology

Table (1) show significant difference (P<0.05) in count of RBC before treatment of honey (4.46±0.52)10^6 /µl and (5. 33±0.38) 10^6 /µl after treatment. Hematocrit (HCT٪) or packed cell volume (PCV٪) was increased significantly (P<0.05) before treatment (40.31±0.88٪) vs (42.38±0.76٪) after treatment. In Table (1) hemoglobin level (Hb) g/dl was increased significantly (P<0.01) before treatment (12.81±0.66) vs. after treatment (14.82± 0.89). That is mean they honey modified the Hb, PCV and RBC in men. Platelets (PLT) 10^3 / µl level was increased significantly (P<0.01) after treatment with honey (292 ± 15.11) compared with before treatment (203± 14.45) show Table (1). Prothrombin time (PT) was increased significantly (P<0.05) after treatment (13.04± 0.55) second compared with before treatment (12.60 ± 0.77) second. That is mean they honey increased the PT in blood show Table (1).

Table (1) Effect of Eucalyptus honey on RBC, Hb, PCV, Platelets and Prothrombin time before and after 30 days of treatment.

Parameters	Before treatment ($\acute{x}$±SD)	After treatment ($\acute{x}$± SD)	Normal value in men
RBCs (10^6 /µl)	4.46±O.52	5.33± 0.38*	4.35-5.65 10^6 /µl
(PCV٪)	40.31±0.88	42.38± 0.76*	38.3-48٪
Hemoglobin (Hb) g/dl	12.81±0.66	14.82±0.89**	13.2-16.6 g/dl
Platelets (PLT) 10^3 / µl	203±14.45	292±15.11**	150-400 10^3 / µl
Prothrombin time (PT) second	12.60±0.77	13.04±0.55	11-13.5 second
*P<0.05 ** P<0.01			

The increase in the RBC level after eat honey in the breakfast for a month in this study was in agreement with that reported by Bhachandra *et al*., 2018 a marked on increase in erythrocyte level in male treated with honey for 15 days orally.[4] For another test show honey used an increase in RBC level because honey contained strong antioxidants that prevent stress.[5] Honey therapy substantially mitigated extreme blood count decline.[13] Honey increased the serum iron concentration, likely due to iron content, but honey could also increase the absorption of iron and utilization of iron.[2] Bhachandra *et al*., 2018 substantial increase in hematocrit level when treatment with honey compared with before treatment.[4] The rise in PCV is due to the honey content of iron.[2] A strong rise in hemoglobin levels were found and the

findings were before (13.57±0.55) and after (14.20±0.58) honey treatment.[14] From these result Manuka honey has shown a significant increase in hemoglobin level, nutrients such as iron concentration in blood, it was found that honey increased Hb level in normal subjects.[2] This may explain the increase in RBC and hemoglobin following honey administration. Platelets play a crucial role in thrombosis and inflammation of primary hemostasis.[15] The findings of this study suggest that adding natural honey induces platelet aggregation inhibition. The mechanism by which honey inhibits the aggregation of platelets can be explained by several factors such as, honey contains hydrogen peroxide.[16] On the other hand, Ahmed *et al*., 2011 showed Eucalyptus honey increased platelet inhibition aggregation compared to control as a guide.[17] The hypothesis that honey dose not have a high effect on platelets count as a result of honey containing antioxidant preventing LDL oxidation and thus reducing platelet aggregation. These results of the current study were similar to the results of.[17] Which found that prolongation of prothrombin time (PT) and reduction of fibrinogen levels in honey administrators' sample, it can there before be concluded that honey can influence the platelet function by inhibiting LDL oxidation, which indirectly affects the function of platelets.[18] Moreover Rao *et al*.,2000 showed that pronged PT is caused by a lack of extrinsic coagulation factors I, II, V, VII and X.[19]

2-Result and Discussion of Testosterone Hormone

Results in Table (2) show the effect of Eucalyptus honey on level of serum testosterone hormone, before and after treatment there is a highly significant (P<0.01) difference found, the serum level was increased significantly (P<0.01) after treatment (6.63± o.67) ng/ml vs. before taking honey (4.83± 0.97) ng/ml.

Table (2) The effect of natural honey on the serum Testosterone and Luteinizing hormone level before and after 30 days of treatments.

Hormones	Before treatment (x̄±SD)	After treatment (x̄±SD)	Normal value in men
Testosterone (ng/ml)	4.83±0.97	6.63±0.51**	2.5-10.7
Luteinizing (mIU/mL)	4.04±0.81	5.88±0.76	1.8-8.6
** P<0.01			

The mechanism by which honey increases serum testosterone may be by enhancing the development of luteinizing hormone, enhancing the viability of Leydig cells, enhancing testicular oxidative injury and inhibiting the effect of honey on testosterone from positive (+) to shift (+) on negative effects on testosterone.[20] Therefore, still, so many research studies have focused on enhancing serum levels of testosterone in males. Honey also includes antioxidants such as glucose oxidase that reduce the stress on sperm cells for oxidation.[21,22] The increase in testosterone was in agreement with that recorded by Hayder *et al*.,2020 who found that increased testosterone level in serum after 30 days from eating to (6.13 ± 0.59) ng/ml it was before (3.82±0.44) ng/ml ,the percentage of change (18.50 %) [23].[23] Also, Riydah,2018 showed an increase in the level of hormone testosterone in 43 Iraqi men aged (20-40 year) given every one 50 gram of natural honey eaten daily with breakfast for 30 days the study found that there was a significant (P<0.01) increase in testosterone from (4.72± 1.77) ng/ml before taking to (6.93±2.07) ng/ml after taking honey.[9] The study in Table (2) showed highly significant (P<0.01) increase in the level of LH hormone where the mean of concentration of LH (4.04±0.81) mIU/mL before and (5.88±0.76) mIU/mL after treatment. The mechanism by which honey increases serum testosterone may be by enhancing the development of luteinizing hormone, enhancing the viability of Leydig cells, enhancing testicular oxidative injury, enhancing the expression of STAR genes, and inhibiting the effect of honey on testosterone from positive (+) to shift (+) on negative effects on testosterone.[24,20] Consequently, the amount of LH produced directly affects the serum testosterone level mechanistically. However, natural honey prevents normal damage of Ledig cells in male tests and increases the synthesis of testosterone.[25] The increase of LH was in agreement with that recorded by Hayder *et al*.,2020.[23]

IV. CONCLUSION

Intake honey every day 50gm increase serum level of testosterone and LH by increasing the production of Luteinizing hormone enhancement blood profile because contain iron and other elements, increased time coagulation and increased anti-oxidant.

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