PHYSIOLOGICAL EFFECTS OF *Moringa olifera* SEED EXTRACT ON SOME HEMATOLOGICAL PARAMETERS, THYROID HORMONES AND LIVER ENZYMES IN LABORATORY RATS

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ABSTRACT

This study was conducted in the veterinary medicine college animal house and aimed to investigate aboute the physiological effects of moringa oliferal extract on the physiological stute of animal after administration. Eighteen female rats were divided in to three groups, the first group was considered as control group and adminstreted orally only normal saline during the experimental period 30 days. The second group was administrated with 200mg/kg/daily of moringa olifera extratct, the third group was given orally 400mg/kg/day. The result there was signification increase in the RBC,Hb and PCV value in the 400mg/kg group in compare with control and other treatment group,and significant increase in both treatment groups 200 and 400mg in MCH , MCHC,WBC count and lymphocyte % in compare with control groupwhile there was significant decrease in MID% ALT,AST , ALP and TSH value in both treatment groups in compare with controle group.While significant increase in T3 and T4 levels in both treatment groups in compare with controle group.

INTRODUCTION

Herbal medicine is nevertheless the mainstay in the developing countries for principal health care. This is specifically because of the universal trust that

natural tablets are beside any aspect of effects [1] .Plants have performed a significant role in maintaining human health and improving the excellent of human lifestyles for hundreds of years and have served people well as valuable aspects of medicines, beverages, cosmetics, and dyes[2] . *Moringa oleifera*, (Family: Moringaceae) is a multipurpose tree, used as a vegetable, spice, a source of cooking and beauty oil and as a medicinal plant[3]. *Moringa oleifera* is one of the main names currently in plants and in drug research. A large wide variety of reviews on the nutritional qualities of *Moringa oleifera* now exist in both the popular literature. *Moringa* is a highly valued plant, dispensed in many countries of the tropics and the subtropics, generally recognized as Drumstick tree, indigenous to Northwest India [4] .*Moringa oleifera* is the satisfactory known of the thirteen species in the genus Moringa of household Moringaceae. These are *Moringa oleifera*. M. *borziana, M. concanensis, M .drouhardii, M. longitude, M. ovalifolia, and M. hildebrandtii* [5] .Most of the sections of the plant possess antimicrobial endeavor [6] .Different components of this plant comprise a profile of necessary minerals and are an excellent source of protein, vitamins, amino acids and more than a few phenolics. The Moringa plant presents a rich and rare combination of zeatin, β- sitosterol and kaempferol. Moringa olifera is very vital for its medicinal value. Various components of the plant act as an antitumor, antipyretic, antiepileptic, anti-inflammatory, antiulcer, diuretics cholesterol lowering, antioxidant and antifungal activities [7].

Moringa oleifera tree offers off an incredible quantity of seed pods all through their reproduction months. An average-sized moringa oleifera tree can produce hundreds or even thousands of seed pods each year[8]. Several biological activities have been reported in the plant moringa Oleifera including biological coagulation in drinking water through its seed [9] .This study aimed to determine the physiological changes in blood parameters and liver enzymes when administration *moringa olifera* alcoholic seed extract to the laboratory Rats.

MATERIAL AND METHODS

Preparation of seed extract

The extract prepared according to the method of [10] by taking 50g of moringa seed and removing the shield on it and driedn temperature 37c° for 4h. thereafter; seeds grinded and tack weight 50g,they were put in cellulose tube call (Thumb), put the thumb

in soxhlets and added 300ml of ethanol to the soxhlets, The period of extraction was 4h, then the solvent was evaporated under controlled temperature. then the mixture was put in rotary Vacuum evaporation, appropriate weights of the residue were prepared to obtain the concentration that was used for this study (200 and 400 mg/Kg/day oral administration).

Experimental design

In this study, 18 female rats were used weigh 200-250g, every 6 animals were put in a plastic cage, all animals housed for 1 week before starting the experiment for adaptation.The 18 female rats were divided into three groups, the first group (control) oral administration with normal saline , the second group (experiment) was given orally 200 mg /Kg/ day *Moringa olifera* alcoholic seed extract and the third group was given orally 400 mg /Kg/ day for 30 experimental days and the dose that was used in this study was according to the safety dose that mentioned by [11]using *Moringa olifera* which had the same result with the LD_{50} that was done in this experiment by using *Moringa olifera* seed alcoholic extract.

Blood collecting

At the end of the experiment, blood samples were collected from experimental and control animals after sacrifice through the heart puncture directly to set well-labeled sterile tubes containing EDTA for hematological examinations. Another set tube without EDTA was also used to collect blood, immediately covered and left in room temperature for coagulation and then centrifuged to separate serum out, decanted, deep-frozen for serum biochemical analysis such as liver enzymes according [12] .

Statistical Analysis

All the recorded data were analyzed for ANOVA II [13] using Complete Randomized Design (CRD) using a computer packaged program [14] Least significant differences (LSD) was calculated to compare the significant differences between means of treatments were ANOVA showed significant differences. This data were expressed as mean ±stander Error (M±S.E.) .

RESULT AND DISCUSSION

Table 1 showed significant $p \leq 0.05$ effects of the extract on the blood parameters by increasing RBC count in the dose 400mg as compare with control and anothor dose and

also a significant increase (P≤0.05)in hemoglobin concentration Hb, PCV(packed cell volume).In both treatment groups in comparison with the control group, MCH, and MCHC which was an indicator of the size of the red blood cells also showed significant changes (P≤0.05)by an increase in red cell size in dose 200mg of moringa in comparsion with control.This is agreement with [15,16] that showed significant increase in blood parameters in rabbits and mice due to the use ofmoringa . The results of study also agree with study [11] which showed significant (p≤0.05) increase in the MCHC rabbit and mice. While [17,18] recorded that the moringa contains a lot of vitamins like Vit. A, B complex (B_1, B_3, B_6, and B_7), C, D, E and K that improve body activity when administrated to the animal.

Table 1: Effects of *M. olifera* alcoholic seeds extract on some blood parameters in female rats blood (means±S.D)

Groups	PARAMETERS					
	RBC ($x10^6/mm^3$)	HB (g/dl)	PCV (%)	MCV (fl)	MCH (Pq)	MCHC (g/dl)
CONTROL	6.00b ±0.54	10.68b ±1.21	34.10b ±3.01	59.86 ±0.74	16.68b ±2.63	28.21b ±4.35
M.O. 200mg/kg	6.43b ±0.33	12.13a ±0.51	37.85a ±1.32	60.60 ±2.21	19.31a ±1.29	33.76a ±3.94
M.O. 400mg/kg	7.14a ±0.69	12.55a ±1.18	39.94a ±3.72	58.22 ±1.98	17.88ab ±0.80	31.31ab ±0.41

* different letters mean significant differences p≤0.05.

Table 2 there was significant (p≤0.05) increase in the WBC count and lymphocyte cell percentage due to the administration of moringa alcoholic extract while there was significant (P≤0.05) decrease in the MID% (monocyte), while no significant change was shown in the GRAN% (Granulocyte) and this increase in the WBC count, may refer to the role of moringa in supporting the immune system of the body against different infection [19]. This agreed with [20] who found that the moringa plant treatment effects improved antioxidant enzyme activity and reduced the free radical roots.

Also, this data agreed with the results of [21] who found that there was an increase in the lymphocyte (lymphocytosis) due to the increase in the immune response of the animal to moringa extract.The increase in the lymphocyte indicated that the extract increases the animal activity to defense against the infection accordingly the moringa extract may be considered an antimicrobial agent [22] . [23,24] referred to that the moringa extract has immunological effects through increase the WBC efficacy by its content lectins which work on an amplifier the immunity and the immune properties.

Table 2: Effects of *M. olifera* alcoholic seeds extract on total WBC count and their types of leucocytes in female rat's blood. (mean±S.D)

Groups	PARAMETERS			
	WBC x10^3/mm^3)	LYM%	MID%	GRAN%
CONTROL	5.40b ±0.50	53.20c ±1.76	18.22a ±4.53	28.58 ±8.50
M.O. 200mg/kg	7.70a ±1.32	60.90b ±9.43	8.30b ±1.53	30.78 ±4.47
M.O. 400mg/kg	7.66a ±0.77	67.44a ±6.53	2.68c ±1.28	29.88 ±1.41

* different letters mean significant differences $p \leq 0.05$

Table (3) showed significant ($P \leq 0.05$) decrease in liver enzymes (ALT, AST, and ALP) in both treatment groups with a different dose on moringa seed extract in comparison with the control group. This result was in agreement with [25] who was discovered that the Moringa oleifera seed extract exhibited anti-fibrotic effects on liver fibrosis in rats and showed significant protective effects against CCl4-induced liver fibrosis in rats which were confirmed by histological findings as well as biochemical analysis of a maker of collagen deposition in the liver known as hydroxyproline. And indicated that treatment with Moringa has stimulated hepatoprotective effects against hepatocellular injury by blocking the increase of two enzymes, ALT, and AST, which are indicators of liver health

conditions. The hepatoprotective properties of Moringa seed extract which was discovered from an anti-fibrotic study by [25] which indicated that the Moringa oleifera also possessed anti-inflammatory properties against CCl_4 induced liver damage and fibrosis. While the decrease in serum ALP in the treatment groups may be beneficial in the metabolic activity of the liver.

Table 3: Effects of *M. olifera* alcoholic seeds extract on liver enzymes (ALT, AST, and ALP) in female rats serum. (mean±S.D)

Groups	PARAMETERS		
	ALT IU/L	AST IU/L	ALP IU/L
CONTROL	257.74a ±20.82	117. 4a ±21.81	354.45a ±71.32
M.O. 200mg/kg	221.13b ±16.92	109. 5b ±8.79	274.38b ±48.67
M.O. 400mg/kg	71.10c ±15.48	59. 3c ±13.28	83.35c ±11.70

* different letters mean significant differences $p \leq 0.05$

The result that illustrated in the table (4) showed significant $p \leq 0.05$ decrease in the TSH level in both administrated concentration of moringa as compared with the control group, while the level of both T_3, T_4 showed a significant increase in both treatment groups in compared with control group. which clearly proved that the response to moringa extract administration in hypothyroidism condition lead to normalize hormone level. Furthermore, there are reports where TSH level was inversely correlated with T4 levels but the levels of T3 were variable [26,27] Elevated TSH level directly reflects impaired thyroid hormone production [28].

The better co-relation of TSH with T4 may be due to the reason that TSH is mainly produced from the pituitary gland while only 7% of T_3 is secreted. The rest of the T_3 production is dependent on the peripheral conversion of T_4 to T_3 which in turn dependent

on many factors including bioavailability of enzyme deiodinase, drugs, a disease in which inactive T_3 form instead of T_3[27] .

Table 4: Effects of *M. olifera* alcoholic seeds extract on thyroid hormones (TSH, T3, and T4) in female rats serum. (mean±S.D)

Groups	PARAMETERS		
	TSH IU/ml	T3 ng/dl	T4ng/dl
CONTROL	1.30A ±0.16	29.90B ±1.38	4.50B ±0.54
M.O. 200mg/kg	0.81B ±0.03	53.81A ±12.27	7.70A ±0.46
M.O. 400mg/kg	0.48C ±0.05	61.50A ±13.71	8.00A ±1.14

* different letters mean significant differences $p \leq 0.05$

تاثير استخدام المستخلص الكحولي لنبات المورينغا على بعض المعايير الدمية ومستوى هرمون الغدة الدرقية وانزيمات الكبد في اناث الجرذان المختبرية

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الخلاصة

أجريت هذه الدراسة في بيت الحيوانات بكلية الطب البيطري وتهدف إلى الكشف عن التأثيرات الفسيولوجية لمستخلص المورينغا على الحالة الفسيولوجية للحيوان بعد الاعطاء .ثمانية عشر من اناث الجرذان تم تقسيمها إلى ثلاث مجموعات ، واعتبرت المجموعة الأولى مجموعة ضابطة وتمت اعطائها عن طريق الفم فقط بمحلول ملحي طبيعي خلال الفترة التجريبية ٣٠ يومًا. المجموعة الثانية اعطيت 200 mg / kg يوميا من مستخلص نبات المورينغا ، المجموعة الثالثة أعطيت 400mg / kg / day عن طريق الفم .النتيجة كانت هناك زيادة معنوية في قيمة RBC كريات الدم الحمراء ، والهموغلوبين Hbوحجم كريات الدم المضغوط PCV في مجموعة٤٠٠ mg / kg ٤٠٠ مقارنة مع مجموعة السيطرة والمعالجة الأخرى ، وزيادة كبيرة في كل من مجموعات العلاج mg ٢٠٠ و ٤٠٠ في عدد MCH و , WBC , MCHC ، ٪ Lymphocyte في المقارنة مع مجموعة السيطرة و في الوقت نفسه كان هناك انخفاض كبير في قيمة MID ٪ ،ALT ،AST ،ALP ،TSH في كل من مجموعات العلاج مقارنة مع مجموعة السيطرة .بينما زيادة كبيرة في مستويات T3 و T4 في كلتا المجموعتين العلاج في مقارنة مع مجموعة السيطرة.

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