Evaluation the Effects of Administration Iraqi Dates Kernels Oil (sayer) and Malaysian Palm Kernel Oil on Some Blood Parameters in Pregnant and Lactated Female Rats

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Abstract:

The present study evaluates the effect of the extraction of Iraqi Date kernels oil (Sayer), and Malaysian palm oil on some. Haematological parameters during later gestation and lactation periods of female rats. The Iraqi palm kernel oil was collected and extracted using the Soxhlet, and the pure Malaysian kernel oil was purchased from Malaysia. The study was divided into two experiments; the first included 15 pregnant females at gestation days 17-19 divided into a first control group of late pregnancy and a second later pregnant administration with 150μL of IDKO, the third subgroup of later pregnancy administration with 150μL of MPKO. The second experiment, lactating was done on lactated mothers from one day of parturition until weaning day, divided into three subgroups: first control group second group lactated mother administration with groups compared with control groups. The parameters: RBC, Hb, PCV, platelets, and basophils increased significantly, and MCH, MCHC, MCV decreased significantly in IDKO and MPKO groups than control in the first experiment (17-19) GD. WBC count increased significantly in IDKO group than control and MPKO while lymphocytes decreased and neutrophils increased in MKPO group. The result from lactating study report that RBC count Hb, PCV, MCV, and MCH did not change significantly in all groups, while lymphocyte decreased. MCHC AND neutrophil increased IN IDKO and MPKO. In contrast, platelets and eosinophils increased significantly, and WBC s count and

monocyte decreased in the IDKO group than control and MPKO group; WBCs and basophils elevated in MPKO more than in the control and IDKO. Conclusion: the administration of IDKO or MPKO supported and maintained hemopoietic tissue in pregnant and lactation states.

Keywords: kernel, oil, palm, blood.

Introduction:

The date is one of the oldest known fruit crops cultivated in North Africa and the Middle East for at least 5,000 years. The earliest record from Iraq (Mesopotamia) shows that date cultivation was established as early as 3,000 BCE. Because of the long history of date cultivation and the wide distribution and exchange of date cultivars, the exact origin of the date is unknown. However, it most likely originated from the ancient Mesopotamia area (Southern Iraq) or Western India (1). Iraq's most common commercial date varieties are Zahidi, Khastawi, Sayer, Khadrawy, Halawi, and Barhee (3). (4) explained that Date seed is a byproduct of the date fruit industry, which is usually discarded, used as an animal feed ingredient, or turned into non-caffeinated coffee by the Arabs. About 11-18% of date fruit weight is the seed composed of carbohydrates, dietary fiber, fat, ash, and protein. In addition, the antioxidant content in date seed oil (DSO) was found to be comparable with olive oil;

kernel oil is derived from the kernel seed of the oil palm (Poku, 2002 5). The reported composition was 3.1–7.1% moisture, 2.3–6.4% protein, 5.0–13.2% fat, 0.9–1.8% ash, and 22.5–80.2% dietary fiber. In addition, the seed contains high levels of phenolic compounds (3102–4430 mg gallic acid equivalents/100 g of seed powder) and has high amounts of antioxidants (580–929 lm trolox equivalents/g) and dietary fiber (78–80 g/100 g) (6). Palm oil retains 80% of the original carotenoids, making it a remarkable source of Vitamin A. These natural antioxidants act as buffers against free radicals and are believed to play a protective role in cellular ageing, atherosclerosis, cancer, arthritis, and Alzheimer's disease (7). The health benefits include a reduction in the risk of arterial thrombosis and atherosclerosis, inhibition of cholesterol biosynthesis and platelet aggregation, and reduction in blood pressure (8), and because limited studies in this field and date seed is available as a by-product. This study evaluated the effect of Iraqi and Malaysian palm oil extraction on

some Haematological parameters during the gestation and lactation period of female rats.

Material and Methods

Collecting Kernel palm oil: After collecting the Iraqi Palm fruit of *phoenix dactylifera* L.cv, sayer from farmlands in Basrah city, seeds were separate manual and then washed to remove the peels and any under the sun, then deposited from the *Elaeis geineensis* tree (9).

Preparation of Iraqi oils extracts

After cleaning, the Iraqi palm kernel was dried, grinding, and reached powder by an electrical grinder to get a uniform particle size, then used for extraction. 400 grams from all individual samples were defatted in a soxhlet apparatus, using 1000 ml. of hexane (boiling point of 40C°) for 3 hrs. at Marine Science Center, University of Basrah, according to the method (10). Separated oil has been extracted from the solvent using a rotary evaporator at 50°C for one hr. The extracted oil was evaporated in the oven at 40°C overnight and then kept in the refrigerated dark, sterile glass container at 4°C. the process was repeated several times to collect enough essential oil for further analysis.

Chemical composition of oils extraction

The oil was chemically analyzed using gas chromatography (11).at the GC laboratory, College of Agriculture, University of Basrah. From the GC-mass analysis.

Experimental Design: **Animals Culturing and Management**

Thirty health mature non-pregnant females and 10 mature male albino rats aged 8 weeks with each weight (200-220) grams body weight were obtained and acclimatized two weeks in laboratory condition for day before the experiments in College of Veterinary Medicine / University of Basrah, under the condition of temperature $(22 - 26\ C^0)$ and (12hours light / 12 hours dark), the rate was supplied a standard pellet diet and tap water.

First Experiment (late pregnant): divided into subgroups

1-groups as the control group (pregnant for third trimester period)

2- groups of pregnant female's rat administration (150μL) IDKO from day one of pregnancy until the third part of pregnancy.

3-groups of pregnancy females rat administration (150 μ l) KPKO from day one of pregnancy until third part of pregnancy.

After the end of administration days, 3 ml of blood was collected from each animal.

Second Experiment (Lactation female rats): 15 female rats after parturition divided into3 subgroups:1-group as a control group (lactated mother)2-group of lactated females rat administration (150 μL) IDKO from day one of parturition to 21 days 3- group of lactated females rat administration (150 μL) MPKO from day one of parturition until 21 days from weaning. After the end of administration days, 3 ml of blood was collected from each animal.

Collection of Blood Samples:

Blood samples (3ml) were collected from each animal under this study at the end of experiment by cardiac puncture,3ml put in anticoagulant tube(EDTA) for haematological study which used for a hematological analysis(RBC,WBC, Hb, MCV, MCH, MCHC, PCV, platelets and differential WBC(Thrall et al., 2004).

Hematological test:

RBCs count, Hb, PCV, WBCs count, platelets count and differential leukocytes measured using Hematological auto analyzer instrument (Genex-USA).

Complete blood count (C.B.C) Differential

Flow cytometers (FCM) is a technique which enables rapid analysis of a statistically significant number of cells at a single cell level. The main principle of this technique is based on the scattering light and emission of fluorescence which occurs when a laser beam hits the cells moving in a directed fluid stream. Depending on the source Beckman coulter United States, by using the deviceDxh500.

Statistical Analysis

The comparisons between groups were performed with one way analysis of variance (ANOVA) by using a computerized SPSS program (Statistical Program for Social Sciences). The results were expressed as mean ± SD. $P<0.05$ was considered to be lest limit of significance. Least significant different test (LSD) was calculated to test the difference between means (groups) for (ANOVA) (12).

Results

Table (1) shows that Later pregnancy showed a level ($p \leq 0.05$) in RBC increase significantly in (IDKO) and (MPKO) as compared with control. In comparison, Hb and PCV increase significantly in (MPKO) compared to (IDKO) and control groups. While a decrease significant in MCV, MCH, MCHC, and Platelets in (IDKO) and (MPKO) groups as compared with the control group.

Table (1) The effect of administration Malaysian and Sayer kernel palm oil on Hb, RBC, PCV , MCV , MCHP , MCHC and Platelets in female rats at Later pregnancy period

Later pregnant

	Control Normal saline	Malaysian kernel palm oil	Iraqi kernel palm oil
Hbg/dl	10.95±0.91 B	12.15±0.09A	11.77±0.77 AB
RBCs×10⁶cell/mm³	4.89±0.39 B	5.63±0.40 A	5.65±0.19A
PCV%	34.20±1.30 B	37.50±2.20A	38.10±0.80AB
MCVfl	65.97±0.70A	62.05±1.81B	60.30±0.78C
MCHPg	22.97±0.14A	20.35±0.37B	19.95±0.68B
MCHC%	35.00±0.86A	32.62±0.31 B	32.67±1.43B
Platelets%	394.47±194.18A	669.97±18.06 B	623.95±67.35B

In Table (2) Later pregnancy showed WBC and Basophil increase with significant differences at level ($p \leq 0.05$) in (IDKO) group as compared to (MPKO) and control group. At the same time, the Neutrophil increased significantly in (MPKO) group compared to (IDKO)and control groups. However, Lymphocytes decreased significantly in (MPKO) group compared to (IDKO) and control groups. While in Eosinophil and Monocyte number there was no significant differences.

Table (2) The effect of administration Malaysian and Sayerkernel palm oil on WBC, Neutrophil, Lymphocyte, Eosinophil, Basophile and Monocyte% in female rats Later pregnancy period

Later pregnant			
	Control Normal saline	Malaysian kernel palm oil	Iraqi kernel palm oil
WBC%	7.22± 0.19 B	7.26± 3.20 B	12.25± 2.35 A
Neutrophil%	11.77± 4.64 B	26.53± 6.58A	15.24± 6.36 B
Lymphocyte%	79.37± 8.20 A	66.50± 2.18AC	79.84± 8.72A
Eosinophil%	0.31± 0.02	0.33± 0.32	0.48± 0.23
Basophil%	1.11± 0.00B	2.35± 0.86A	3.84± 1.97A
Monocyte%	4.83± 2.28	5.76± 3.20	3.26± 0.32

In Table (3), at the lactation period, in MCHC at level (p ≤ 0.05) an increase in (IDKO) and (MPKO) as compared with the control group. At the same time, Platelet levels increased in (IDKO) compared with (MPKO) and control groups. There were no significant differences in all groups under this study in Hb, RBC, PCV, MCV, and MCH.

Table (3) The effect of administration Malaysian and Sayer kernel palm oil Hb, RBC, PCV , MCV , MCHP , MCHC and Platelets in female rats at lactation period

	lactation period		
	Control Normal saline	Malaysian kernel palm oil	Iraqi kernel palm oil
Hbg/dl	13.89± 1.07	13.31± 1.07	14.07± 0.60
RBCs×10^{6}cell/mm³	6.84± 0.82	6.05± 0.72	6.80± 0.65
PCV%	42.80± 30.00	41.90± 2.10	42.16± 2.27
MCVfl	59.77± 2.00	61.25± 3.42	59.72± 2.06
MCHg	20.92± 0.64	22.17± 1.20	21.62± 1.51
MCHC%	35.15± 0.47 B	36.67± 0.12A	36.0± 1.10±AB
Platelets%	627.60± 20.61B	617.57± 35.50B	697.02± 39.45A

In Table (4), at the lactation period, the WBC an increased at a level (p ≤ 0.05) significantly in (MPKO) group and decreased in(IDKO) as compared with control groups. The neutrophil level increased significantly in (IDKO) and (MPKO) compared to the control group. At the same time, Lymphocyte levels decreased in both (IDKO) and (MPKO) compared to the control group. Eosinophil increased in (IDKO) as compared with (MPKO) and control groups. However, in basophil, an increase significantly in (MPKO) group as compared with (IDKO) and control groups. In Monocyte, the level decreased significantly (IDKO) group compared to (MPKO) and control groups. In WBC, there were no significant differences in all groups under this study.

Table (4) The effect of administration Malaysian and Sayer kernel palm oil on WBC, Neutrophil, Lymphocyte, Eosinophil, Basophile, and Monocyte% in female rats during lactation period.

	lactation period		
	Control Normal saline	Malaysian kernel palm oil	Iraqi kernel palm oil
WBC%	11.85± 2.99B	12.69± 9.90A	8.05± 1.01C
Neutrophil%	1.93± 0.27B	6.93± 3.57A	7.35± 2.48A
Lymphocyte%	95.31± 0.66A	89.47± 3.83B	89.75± 2.40B
Eosinophil%	0.21± 0.17B	0.17± 0.11B	0.56± 0.00A
Basophil%	0.32± 0.14B	1.12± 0.43A	0.41± 0.21B
Monocyte%	2.48± 0.36A	2.73± 0.19A	1.76± 0.46B

Discussion:

The chemical composition of Iraqi date kernel oil and Malaysian palm kernel oil are analysed by using gas – chromatography, the results explain the important fatty acid attributed in (IDPO) and (MPKO) and ratio of it. Complete blood count and deferential WBC count is one of the most commonly used in diagnosing different pathological conditions (13) result from table 1 and 2 focused on the effect of (IDPO) and (MPKO) when administration pregnant rats until day (17 -19) of gestation, and found are increased significant at (p <0.05) in serum (RBC count, WBC, count, platelet count, HB, and PCV. These results provide the administrated (IDPO) and (MPKO) improved and supported the hemopoietic tissue through the increase the ability of the kidney to produce erythropoietin (14). Similarly, (15) showed that the administration of palm kernel oil to male albino rats supported the synthesis of hemopoietic. On the contrary, this study

reported that palm kernel oil diets did not significantly affect haematological indices when administering albino rats. (16) found that the pregnant rats at (18 -19) gestation days had lower all the haematological parameters we believed. The difference between our study may be due to the administration route or the amount of oil in diets. The increase at ($p < 0.05$) in the RBC indices is suggestive of a positive erythropoietin effect and, thus, enhances the normal physiological function of RBC (17). Platelet count did not change significantly in group administration (MPKO); we agree with (18) which show that oleic acid is one of the main components of the oils, oleic acid has a potent inhibitor of the Platelet aggregation factor. Furthermore, excess oleic acid impairs the incorporation of arachidonic acid into platelet phospholipids. Arachnoid acid is an essential fatty acid involved in synthesizing prostaglandins and thromboxane. Pregnancy and lactation are periods in adult life during which the immune system changes dramatically (19). An increase in WBC count indicates that oil, to an extent, affected the rats' immune systems (20). WBC supports the immune in this stage (21). An increase in WBC count indicates that oil, to an extent, affected the rats' immune system; this elevation in WBC could be helpful in

pathological conditions with a compromised immune system (20). Parturition describes immunological response, so the early event in parturition is an increased responsiveness of peripheral leukocytes to chemotactic stimulation expressed by reproductive tissue that is ascertained with increased WBC count in (IDPO) administration when compared with Malaysian and control group.

Many studies focused on (MPKO) properties but did not found studies investigate the activity of (IDPO) (specially Sayer date) on the haematology of pregnancy and lactation female rats .this is the first study done on pregnancy and lactation female rats .conclude to use as a reference for further study.

From table 3 and 4, administration (IDPO) or (MPKO) in lactating female rats did not differ significantly in RBC count, HB , PCV ,MCV, and MCH compared with control, so these results can be concluded that the two types of oils have effect in the haematological status for lactation mothers, that depending on study of (22;14;23) who clarified that the RBC , HB, and PCV in lactation female rat did not effect by lactating properties compared with nonmated mature females in Wister rats at day 20 after delivery from the same

Table recorded decreased significantly at (p > 0.05) in lymphocyte and increase in neutrophil in groups of lactating mother administration with (IDPO) and (MPKO) compared with the control group, this is maybe resulting from atrophy in the spleen. Hence agreement with (22), who revealed the atrophy was caused by peripheral lymphocytes, and diminished T lymphocytes depended on immunity in rats (24). The number and percentage of neutrophils were increased while the percentage of lymphocytes decreased in lactation female rats (22). These data align with previously described hematology during pregnancy (25, 16).WBC increased in all groups of lactated female rat administration (MPKO), then (IDPO), and control groups. Due to differences in the ratio of the component in oils, the difference ratio of the main component of oils may increase the sensitivity cases that are ascertained by an increase in eosinophil. We concluded that the administration of (IDPO) and (MPKO) maintain a healthy state for the animal during pregnancy and lactation.

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تقييم تأثير تجريع زيت نواة التمر العراقي (الساير) وزيت نواة النخيل الماليزي على بعض مقاييس الدم في إناث الجرذان الحوامل والمرضعات

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الخلاصة

أجريت الدراسة الحالية لتقييم تأثير زيت نواة التمر العراقي (المستخلص) Phoenix dactylifera L. cv. Sayer وزيت نواة النخيل الماليزي Elaeris guineensis jacq (على بعض المتغيرات الدموية، خلال فترات الحمل والرضاعة المتأخرة لإناث الجرذان الامهق. تم استخلاص زيت نواة التمر العراقي بواسطة Soxhlet وقسمت الدراسة الى تجربتين الاولى (فترة الحمل المتأخرة) حيث تم اعطاء الجرذان الحوامل حتى اليوم (19-17) من الحمل والثانية (فترة الرضاعة) الممتدة من 1 إلى 21 يومًا بعد الولادة حتى الفطام. تم تقسيم كل من هذه التجارب إلى ثلاث مجموعات، كل مجموعة تضم: 5 جرذان إناث (غير معاملة)، 5 إناث جرذان تجرع يوميًا 150 ميكرولتر زيت نواة التمر العراقي (IDKO)و 5 جرذان تجرع يوميا 150 ميكرو لتر من زيت نواة النخيل الماليزي.(MPKO) .أظهرت نتائج التجربة الأولى (فترة الحمل المتأخرة) من اليوم الأول للحمل حتى اليوم (19-17) من الحمل زيادة في HB ، RBC، PCV والصفائح الدموية في (MPKO) ، بينما لوحظ زيادة عدد كريات الدم الحمراء والصفائح الدموية في (IDKO) ، ولكن في MCV و MCH و MCHC أظهرا انخفاضًا في (MPKO) و (IDKO) ، أظهر WBC و Basophil زيادة في (IDKO)، بينما أظهرت العدلات زيادة في (MPKO) ، ولكن أظهرت الخلايا الليمفاوية انخفاضًا في (MPKO) ، بينما لا توجد فروق ذات دلالة إحصائية في الحمضات و.Monocyts أما التجربة الثانية (فترة الرضاعة) بعد الولادة حتى الفطام فقد أظهرت النتائج زيادة في (IDKO) ، بينما لم تكن هناك فروق ذات دلالة إحصائية في HB ، RBC ، PCV، MCV، MCHوMCHC ، في WBC أظهرت زيادة في (MPKO) ، في حين لوحظ أنخفاض في (IDKO) ، أما الخلايا الليمفاوية فقد أظهرت انخفاضًا في (MPKO) و (IDKO) ، بينما أظهرت العدلات زيادة في (MPKO) و (IDPO)، بينما Monocyts أظهر انخفاضًا في (IDKO) ، ولكن لوحظ في الحمضات زيادة في (IDKO) ، بينما في Basophil أظهر زيادة في.MPKO.

الكلمات المفتاحية: kernel، زيت، نخيل ، دم.

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