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Effect of Oxidized Palm Oil on Serum Electrolytes and Histological Alteratons in Kidney of Albino Mice

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Abstract;
To probes out the oxidative effects of (palm oil) on electrolytes and histo-logical alteration in mice kidney. Twenty four albino mice were distributed into three (I to III) groups consist 8 mice in every group. (Group I) was fed with common food, (FPO) (groups II) and oxidized palm oil (10HPO), (group III) were feed for a 4 weeks. Results revealed that, Group II (55.5 ± 4.04 g) and III (68.11± 9.97 g) mice gain significant ($p < 0.05$) body weight. Creatinine retention was prominently more noteworthy ($p<0.05$) in oxidized Group III(138.54±2.50mg/dl) Urea concentration levels were measured in control (Group I) of mice existed (5.6±0.55 mg/dl) and in original palm oil (Group II) remained (4.0±0.52 mg/dl) whereas in thermo-chemically palm oil (Group III) were (4.80±.50 mg/dl) Serum centralism of potassium ions in fresh palm oil Group II (6.05±0.15mmol/L) was basically ($p<0.05$) higher then control Group I (5. 77±0.36 mmol/L) and thermally oxidized Group III (5.77±0.18 mmol/L) Concentration of Sodium ions in control (Group I) were (135.67±067 mmol/L) and in fresh palm (Group II), were (130.17±1.26 mmol/L) however in thermally oxidized (Group III) were (140.17±1.67 mmol/L). noticeably (($p<0.05$) greater in thermally oxidized (Group III) Histologically, group II confirmed vacuoles in the medullar region, while group III checked cell in the medullary portion that see swelling with varying tubules contain esinophilic content in the lumen. It is established that oxidized palm oil has impact on organ and should be avoided
Keyword: thermally oxidized oil, cytoplasmic eosinophilic, histo-pathological,

Introduction

The vegetable palm oil is acquired from both seed and fruit of palm tree.it is the tropical monocotyledon perennial tree belonging to family *Elaeis guineensis* (Pereira et al., 1991,).It is semisolid at normal temperature (Nor and yusoff 2000). There are two type of edible oil are produced from mesocarp and seed kernel, which is used for its appetizing properties and the seed produces palm kernel oil, which has broad use in the oleo compound industry. The yellow color of palm *E. guineensis*, fruits is associated to period of ripening. The immature meso-carp contains large amounts of chlorophyll; less carotene then ripens fruit (Edem, 2009). The main largest natural source of palm oil are tocotrienol' tocopherols, vitamin K and nutritional magnesium with an unsaturated 10% linoleic acid, which is omega-6 fatty

acid and is very vital for dropping cholesterol level and also as anti-cancer agent. Tocotrienols are fat-soluble vitamin E isomers, and the chief antioxidants component of palm oils (Yamada, et al 2000).). Tocotrienols are antioxidant and too significant for defense system against free radicals produced in a body (Esterbauer et al, 1991). Palm oil also contains most abundant beta (β)-carotene as chief source of vitamin (A), which is very essential in the optical process. palm oil is also help to enhancement vitamin A levels in human and confirmed it from in pregnant women blood level and breast feeding child (Sivan et al 2002).The main component tocotrienols protect the absorption of delicate polyunsaturated fats in the brain, and thus diminish the risk of stroke. (Khanna et al 2005).In count, it is also work as an anti-oxidant that protect and destroys free radicals in a body (Edem,2009).Palm oil is consumed as fresh or heated from ancient of time (Gapor et al,1989) Fresh palm oil has low oxidation value (Mesembe et al 2004).

Edible fats are generally heated further to reduce natural pleasantness.Though,the Oxidation has a harmful effect on edible oils (Isong, 1988). Furthermore, following eating of oxidized palm oil, the production of extremely cytotoxic and disparaging products (Pantzaris, 1975), which are deleterious to the body, is followed (Tappel, 1973).

Long period ingesting of oxidized oils has been described to basis essential fatty acid deficiency, fatty livers, growth retardation, thrombosis, nucleic acid deficiency denaturing of key biochemical enzymes. As thermally Palm oil degradation created different free hydroxyl radical in a body which may produce many diseases (Pantzaris,1995).

Therefore the current research was proposed to probe the oxidative effect palm oil on electrolytes and histological alteration in kidney of mice.

Materials and Method

Materials:

Bio-Chemical Kits were used for the effects of confirmation of createnin, potassium sodium; blood urea and Histopathology of kidney were conducted.

Sample oils

Palm oil were divided into two portion at the ratio of1:1 the natural palm oil has been heated for 10 time at (100 ° C) and orally nourish to mice one gm/kg body weight dosage**.**

Animal's model

All experimental mice were fed ad libitum with standard laboratory animal's diet and free access to tap water. Mice were adjusted to the new location for one week before the experiment.

Experimental scheme

The 24 experimental albino mice were partitioned into 3 groups (a) Control group (Group I) animals were fed with a normal diet .(b) (Group II) feed fresh palm oil (FPO group) and (c) Group III mice received oxidized palm oil.

Blood Sample

After 4 week of feeding palm oil, the animals were sedated with pure chloroform subsequently an overnight fast. Blood sample were collected from jugular vein of mice into heparinized bottles for counting and analysis of creatnin, sodium potassium and urea.

Histopathological Examination of kidney

The kidney was preserved in standard formalin solution stained and tissue section was made from kidney tissue through microtome. Slides were observed under microscope, model no

(MPN: EXC-500) and the photograph were capture through camera (LMAD7-1-1,) of the microscope, with the resolution 1.3 MP.

Data analysis. Statistically the data was cheek through SPS software.

Results

The current experiment was performed to test the oxidative effect of oil on cretinine, sodium, potassium and urea and histological alterations in mice kidney. The group II and group III respectively showed noteworthy increase in body weight, electrolytes and histological change in kidney,

Body weight changes in mice. The body weight of mice was measured of each group pre and post experiment (Table 1). It was observed that, TOP group III animals exhibit a significant change in body weight as linked to the control group mice ($p < 0.05$). Our results revealed that, Group II and III mice gain significant ($p< 0.05$) body mass (Table 1).

Table;1 Body weight changes of animals during experiment

S.No	Animal Group	(N*)	Original weight (g) (M±SEM)*	(N*)	Last weight(g) (M±SEM)*	Gross Weight Gain(g) (M±SEM)*
1	Control (I)	8	243 ±4.95	8	267± 2.9	24 ± 2.05
2	Fresh palm oil (II)	8	244± 16.05	8	299 ± 12.01	55.5 ± 4.04
3	oxidized palm oil (III)	8	232± 23.90	8	296± 13.30	68.11± 9.97

Effects on creatinin concentration

The Creatinin absorption of mice was measured of each group (Table). It was observed that, Creatinine retention was prominently more noteworthy ($p<0.05$) in oxidized (Group III) as related with (Group I) and **(**Group II) the data were exhibited in (Table 2)

Table (2) Effect on cratinin concentration of the albino mice

S. No.	Group*	N*	Creatinin mg/dl (M± SEM)*
1.	Control	8	124.56±3.08
2.	(FPO)Fresh Palm Oil	8	134.45±2.54
3.	Thermally oxidized Palm oil	8	138.54±2.50

Effects on urea concentration of mice, Urea concentration levels were measured in control (Group I) of mice existed (5.6±0.55 mg/dl) and in original palm oil (GroupII) remained (4.0±0.52 mg/dl) whereas in thermo-chemically palm oil (Group III) were (4.80±.50 mg/dl) appeared in (Table 3)

Table 3 Effects on urea concentration of mice

S. No.	Group*	N*	Urea mg/dl (M±SEM)*
1.	Control	8	5.6±0.55
2.	Fresh Palm Oil(FPO)	8	4.0±0.52
3.	Thermally oxidized palm oil	8	4.80±0.50

Effect on Potassium concentration of the albino mice,
The Potassium absorption was measured for each group in experiment.It was observed that Serum centralism of potassium ions in fresh palm oil (Group II) was basically ($p<0.05$) higher then control (Group I) and thermally oxidized (Group III) the data is displayed in (Table 4).

Table 4 Effect on Potassium concentration of the albino mice,

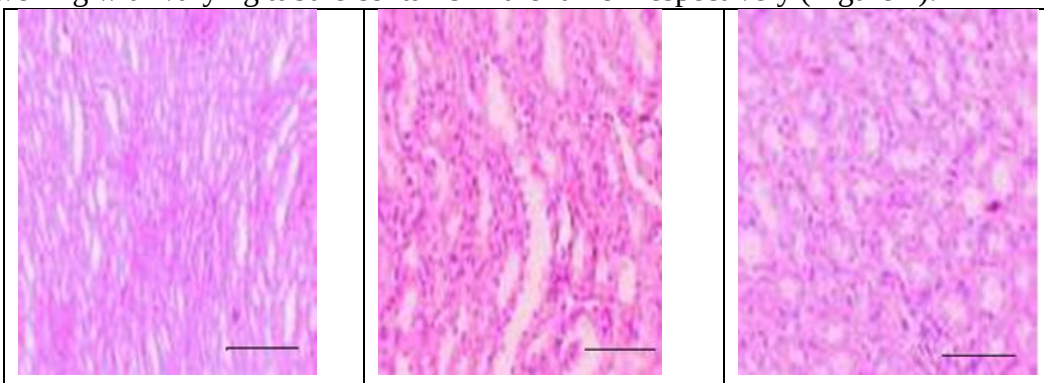
S. No.	Group*	N*	Potassium mmol/L (M±SEM)*
1	Control	**8**	5. 77±0.36
2	Fresh Palm Oil	**8**	6.05±0.15
3	Thermally oxidized palm oil	**8**	5.77±0.18

Effect on Sodium concentration of the albino mice
The concentration of Sodium ions in control (Group I) were (135.67±067 mmol/L) and in fresh palm (Group II), were (130.17±1.26 mmol/L) however in thermally oxidized Group III were (140.17±1.67 mmol/L). the absorption of Na+ was noticeably (($p<0.05$) greater in thermally oxidized (GroupIII) then control (Group I) (Table 5)

Table 5 Effects on Sodium concentration of the albino mice

S. No.	Group*	N*	Sodium mmol/L (M±SEM)*
1.	Control	8	135.67±0.67
2.	Fresh Palm Oil	8	130.17±1.126
3.	Thermally oxidized palm oil	8	140.17±1.67

Histopathological alteration of kidney of mice, the microscopic studies of fresh palm oil (group II) kidney confirmed vacuoles in the medullar region, while group III feed with thermally oxidized palm oil checked chambers in the kidney medullary section sighted swelling with varying tubule contains in the lumen respectively (Figure 1).



A B C

Figure 1: Histological alteration of Kidney of mice,

A (control): **B**: group II feed with fresh palm oil confirmed vacuoles in the medullar region, **C**: group III feed with chemically ionized palm oil checked chambers in the kidney medullary section sighted swelling with varying tubule contains in the lumen ; Bar line on the pictures display 1mm;

Histo-pathological alteration of testes of mice

A fine vacuole was demonstrated in the in cytoplasm as well as in nucleus of tests cell in group III feed with oxidized palm oil. Shown in fig number 1;

Discussion; The current work was carried on to find out palm oil oxidative effects of on body weight, electrolytes and histo-logical alterations in kidney and testes of albino mice. The result revealed that prolong Ingestion of oxidized palm oil induced significant change in body weight, electrolyte imbalances and alteration in kidney in experimental mice. It is clear from our result that the ingestion of oxidized palm oil induce weight, the mean body weight change was 25 ± 2.05 and 68.11± 9.97grams in mice fed control diets and thermally oxidized, respectively. The body weight change was significantly higher thermally oxidized palm (groupIII) compared to control ($p< 0.05$) (table 1)

It is clear from previous studies (Kirdpon, etal 2006) that the Sodium and potassium ions are the most abundant extracellular ion, and responsible for muscle contraction.. The imbalance of sodium and potassium is proof of renal risk.

Absolute Creatinine clearance and plasma test, and the amount of urine flow, as well as urea clearance, are used to determine the glomerular filtration rate and performance of the kidneys. In spite of the fact that not generally done anymore, they stay helpful tests for renal capacity. Saka, etal (2012) In this manner, the concentration of creatinine and urea in plasma could be utilized as markers of nephrotoxicity. The present research indicate that the eating of heated palm oil induce important increase in creatinin which is similar to the study of (Ani e tall 2015) find out in his experiment that the sodium particle value in the oxidized palm oil

was essentially greater than the fresh palm oil feeding group and control group, while it was lower in (group II). (Khanna et al 2005) Performed experiment and recommend that important component of palm oil tocotrienols protect the brain and decrease the risk of stroke.The histopathology of kidney of oxidized palm, oils (Group III) checked cells in the kidney medullary section seeing swelling with varying tubule contains in the lumen (Luber, 1988) described that the kidneys in thermally oxidized palm oil (TPO) group were actually damaged. (Isong et al., 2000) stated, feeding of oxidized lipid diet harm kidney in experimental animals . The oxidative products produced during heating of palm oil initiate renal damage and increasing the growth of renal carcinoma. (Rohr-Udilova et al., 2008) stated that; prolong ingestion of heated palm oil mice must saw to origin alterations in kidney tissue. According to Xian et al (2012). Some study recommends that use of frequently recooked cause plaque in the blood arteries of different organ. While small animals were feed with a diet containing warmed 10 times palm oil, they show plaques in artery though rats fed fresh palm oil up to six months, did not show (Jaarin,e tall. 2016) described that The kidney tissue inflammatory alteration were significant in (10HPO) then fresh palm oil group. A fine vacuole was demonstrated in the in cytoplasm as well as in nucleus of tests cell in group III feed with oxidized palm oil

Conclusion: it is concluded from the experiment that the absorption of oxidative palm oil reasons imbalance in serum electrolytes and histological alteration in kidney and testes.

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