MEDWIN PUBLISHERS
Committed to Create Value for researchers

Food Science & Nutrition Technology
ISSN: 2574-2701

Effect of Nsukka Red Palm Oil on Haematological Parameters of Paracetamol Treated Albino Wister Rats

Olaniru BO[1], Ocholi MI[2], Etukudoh NS[3], Dawud AF[2], Iheanacho CU[4], Obeta MU[5]*, Ugwu BK[6] and Ntuhun BD[4]

[1]Department of Chemical Pathology, Jos University Teaching Hospital, Nigeria
[2]Department of Human Physiology, Ahmadu Bello University, Nigeria
[3]Department of Haematology, Federal School of Medical Laboratory Science, Nigeria
[4]Department of Haematology, Jos University Teaching Hospital, Nigeria
[5]Department of Chemical Pathology, Federal School of Medical Laboratory Science, Nigeria
[6]Department of Medical Laboratory Science, Bayero University, Kano, Kano State, Nigeria

Research Article
Volume 5 Issue 3
Received Date: May 07, 2019
Published Date: June 12, 2020
DOI: 10.23880/fsnt-16000219

***Corresponding author:** OBETA Uchejeso, Department of Chemical Pathology, Federal School of Medical Laboratory Science, Jos, Nigeria, E mail: uchejesoobeta@gmail.com

Abstract

Nsukka palm oil (red palm oil -RPO) has been described as one of the best RPO in Nigeria. It has been the most expensive RPO among others. RPO has an antioxidant activity. Paracetamol equally has been one of the most commonly used analgesic and antipyretic drug that has been highly abused because of self-medication among Nigerians. The study was aimed at discovering the RPO effect on the toxicity of paracetamol in haematological parameters. Twenty albino Wister rats, divided into four groups of five rats each were used in this study, the first group was the control group while the rest group were the experimental groups, group 3 and 4 were pretreated with 1ml and 2ml red palm oil respectively, however on the fifth day 3g/kg body weight of oral paracetamol was given to group 2, 3 and 4. Haematological parameters - red blood cell count, white blood cell count and white cells differential count were also assayed using routine methods. The group with 1ml RPO showed significance (5.10±0.04) $P<0.05$ of RBC when compared with control (4.66.10±0.05) and paracetamol (4.88±0.05) groups. The group with 2ml RPO (9.02±0.05), 1ml RPO (8.98±0.05) showed significance at $P<0.05$ when compared with groups Control (6.06±0.05) and Paracetamol (7.40±0.23) in WBC counts. The group with 1ml RPO (65.02±1.05) showed significance at $P<0.05$ in neutrophil when compared with control (63.00±0.63) and Paracetamol (62.90±0.84) and 1ml RPO (20.60±0.81) showed significance at $P<0.05$ in lymphocyte count when compared with control (22.20±0.80) and Paracetamol (23.80±0.37). RPO has effects on haematological parameters especially on albino rats treated with paracetamol and can be volume dependent based on the weights. Nsukka red palm oil could be recommended in paracetamol toxicity in animals and man.

Keywords: Nsukka; Red Palm Oil; Haematological Parameters; Paracetamol; Albino Rats

Introduction

Paracetamol is a commonly used analgesic and antipyretic which is considered save at therapeutic dose, Paracetamol is categorized as a mild analgesic which is commonly used for the relief of headaches and other minor aches and pains, it also form major ingredient in numerous cold and flu remedies Currently, the major source of world palm oil production is from South- East Asia, particularly in Malaysia and Indonesia [1,2] though history has it that they collected the seeds from

Nigeria. Today about seventeen countries produces palm oil worldwide Malaysia and Indonesia account for about 85% of global palm oil production where 4.5 million earn a living from palm oil, Nigeria is a leading producer of palm oil in Africa and also among the top five producer of this producer in the world [3] but Nsukka red palm oil has been commended in terms of quality and taste.

The health benefits of red palm oil (RPO) have been recapitulated in several animal feeding experiments where RPO has conferred beneficial signaling and biochemical manifestations, such as boost in anti-oxidant potential, control of inflammation, preservation of viability and evasion of apoptosis/necrosis. Studies have also shown that RPO consumption has protective effect against ischemic damage [4]. These health benefits of RPO are due to its unique composition as it contains a balanced saturated (SFA) and unsaturated fatty acids in approximately 1:1 ratio, - 51% SFA, 38% monounsaturated fatty acid (MUFA) and 11% polyunsaturated fatty acid (PUFA). Also, it is a cocktail of bio-available minor nutrients such as tocopherols and tocotrienols, squalene, phytosterols, coenzyme Q10, carotenoids like β-carotene and lycopene [5].

African RPO, Nsukka oil inclusive has been shown to contain Iron(mg) -5.6, Calories -746, Protein(%)-2.2 Fat (%)-81.9, Carotene (ug) -50,680.6, Times >14.6 Thiamine (mg) -0.35, Fiber (%)-3.8, Ascorbic Acid (mg)-12.5, Ash (%)-1.3, Niacin (mg)-1.81, Calcium (mg)-136.1, Riboflavin (mg)-0.17, Phosphorus (mg)-61.1 per 100g with varying percentages of fatty acids [5] and nutritional content as Iron (mg)-5.5, Calories-882, Fat (%)- 99.6, Carotene (ug) -27,417.1, Carbohydrate (%)-0.4, Calcium (mg)-7.0, Riboflavin (mg)-0.03, Phosphorus (mg)-8.0 per 100g. No wonder red palm oils has being named as the most consumed vegetable oil across the globe [6-9].

Blood is an essential component of the human body that occurs in fluid form and is about 5Liters in an adult [10]. It is made up of plasma which is about 55%, consisting of water protein and some waste product, while the rest 45% of the blood is composed of the cell components of which there are three major cell types, the red blood cell, white blood cell and platelets [11]. All blood cells are produced from pleuripotential stem cell (multi potential stem cell) in the bone marrow which undergoes series of differentiation until it becomes a committed stem cell for the production of thrombocyte, leukocyte or erythrocytes [12].

Full blood count and deferential WBC count is one of the most commonly used blood testing procedure used in diagnosing various pathological conditions, it gives information about the oxygen carrying capacity of the blood through assaying RBC count, hematocrits and hemoglobin level of blood, it also gives information about immunity through the assay of white blood cell count and differentials. These tests are of importance in diagnosing anemia, certain cancers, infections, acute hemorrhagic state, allergies and immunodeficiency diseases as well as monitoring of side effects of certain drugs [13,14].

Methodology

Twenty albino wister rats weighing between 120-160g where purchase from human physiology department of Ahmadu Bello University Zaria animal house, and were kept under suitable laboratory condition in an aluminum wire gauze cage two weeks prior to the commencement of the experiment for acclimatization, and throughout the duration of the experiment, the animals were allowed free access to water and feed (vital feed growers).

Animals were divided into four groups, five animals in each group.
Group One- Control group (distil water only).
Group Two- animals were administered 3g/kg body weight parocetamol (48hours) to induce hepatotoxicity using Ajibade, et al. [15].
Group Three- animals were administered 1ml of palm oil for seven days and 3g/kg body weight of paracetamol on day 5 of the experiment.
Group four- animals were administered with 2 ml palm oil for seven days and 3g/kg body weight of paracetamol on day 5 of the experiment.

On day eight of the experiment after animals has undergone an overnight fast, the animals were anesthetized using chloroform before they were sacrificed, and blood was withdrawn directly from the heart and were collected into heparinized bottles for hematological analysis [16]. The haematological analyses were carried out according to the methods of Ochei & Kolhatka [17] for red blood cells, white blood cells and differential white blood cells.

For statistical analysis, values are presented as means ± SE of the mean. Comparisons between different groups were carried out by one way analysis of variance (ANOVA). The level of significance was set at $P < 0.05$. SPSS was used for statistical analyses.

Results

Effects of Red Palm Oil on Some Hematological Parameters in Paracetamol Induced Hepato-Toxicity

The effect of red palm oil were also evaluate on some hematological parameter as illustrated below from the result

obtained there were significant increase in the red blood cell count and white blood cell count while for the differential white blood cell count there was no significant changes (Table 1&2).

Groups	Control	Paracetamol	1mL RPO	2mL RPO
RBC (× 109/Litre)	4.66±0.05[b]	4.88±0.05[a]	5.10±0.04[ab]	4.86±0.07
WBC (×106/Litre)	6.06±0.19b	7.46±0.23a	8.98±0.20ab	9.02±0.20 [ab]

Table1: Effect of Nsukka Red Palm Oil (Rpo) on Red Blood Cell and White Blood Cell Count in Paracetamol Induced Hepato-Toxicity.
[a]significant difference at P<0.05 compared with control group
[b]significant difference at P<0.05 compared with paracetamol group
Those without superscript, shows no significant difference at P<0.05

Groups	Control	Paracetamol	1mL RPO	2mL RPO
NEUTROPHIL	63.00±0.63	23.80±0.37	65.80±1.16a	64.20±0.81
LYMPHOCYTE	22.20±0.80	23.80±0.37	20.60±0.81a	22.60±0.75
MONOCYTE	7.80±0.20	8.00±0.32	8.20±0.58	7.20±0.37
EIOSINOPHIL	5.20±0.20	5.60±0.40	4.80±0.37	4.60±0.51
BASOPHIL	1.40±0.24	0.80±0.37	0.60±0.24	1.40±0.40

Table 2: Effects of Nsukka Red Palm Oil (Rpo) on Differencial White Blood Cell Count in Paracetamol Induced Hepato-Toxicity.

Discussion

The hematological parameter for white blood cell count and red blood cell count showed significant changes because there was significant increase in the number of red blood cell and white blood cell in the groups given palm oil compared to the control group and paracetamol group. Elevation of white blood cells indicates presence of infection, inflammation or neuroses, leukocytosis may also occur as a result of physical or emotional stress [12], which could be the reason for elevated WBC count in this study because rats were subjected to force feeding with red palm oil for seven days while elevated RBC count as seen in this study might be as a result of erythrocytosis which is an increase in red blood cell production [17], this is an indication that red palm oil might possess the ability of increasing the process of erythropoiesis by stimulating erythropoietin production in the kidneys. It also buttress the role of red palm oil in improving wellbeing [18,19].

Conclusion

Nsukka red palm oil (RPO) is helpful in the management of paracetamol induced toxicity in the area of haematological parameters. Notably, the effect of red palm oil on white blood cell count and red blood cell count which shows an increase in these hematological parameters could be an indication that Nsukka RPO could improve hematopoiesis. It is recommendable to use Nsukka RPO as an additive in the management of paracetamol toxicity and drugs overdose. More research is encouraged in the studies with red palm oil and haematological parameters and drug toxicity knowing fully well that RPO is one basic ingredient that is not missed in Nsukka food, Nigerian food, and most global food in general. The red palm oil has no enemy and no contraindications [20,21] associated with the consumption in most aspects of usage as food.

References

1. Sundram S (2013) First report: isolation of endophytic Trichoderma from oil palm (Elaeis guineensis Jacq.) and their in vitro antagonistic assessment on Ganoderma boninense. J Oil Palm Res 25(3): 368-372.

2. Obahiagbon (2012) A review of the Africa palm oil (Elaeis guinesis jacq). America Journal of biochemistry and molecular biology, pp: 1-14.

3. Ranjeetha Pakiam (2013) Malaysia Keeps Palm Oil Export Tax Unchanged To Spur Shipments.

4. Aguila MB, Pinheiro AR, Mandarim-de-Lacerda CA (2005) spontaneously hypertensive rats left ventricular cardiomyocyte loss attenuation through different edible oils long-term intake. International Journal of Cardiology 100(3): 461-466.

5. Sundram K, Sambanthamurthi R, Tan YA (2003) Palm fruit chemistry and nutrition. Asia Pac.J Clin Nutr 12(3): 355-362.

6. Helene D (2018) The nutritional value of red palm oil. Achieving Sustainable Cultivation of Oil Palm 2: 217-231.

7. Afshia K, Johari BE, Hannif H, Desa A., Farah S (2012) The reflection of moisture content on palm oil development during the ripening process of fresh fruit. Journal of food Agriculture and Environment 10: 203-209.

8. Dawodu FA (2009) Physico chemical studies on oil extraction processes from some Nigerian grown plant seeds EJAF CHEM 8(2): 102-110.

9. Akinola O, Oguntibeju, Adisa AW, Owojube OS (2010) Physiochemical properties of palm oil from different palm oil local factories in Nigeria. Journal of food, agricultural and environment 3(8):264-269.

10. Guyton A, Hall J (2011) Blood body fluid and kidney. Text book of medical physiology eleventh edition 5: 291-415.

11. Pierige F, Serafini S, Rossi L, Magnani M (2008) Cell-based drug delivery. Adv Drug Deliv Rev 60: 286-295.

12. Beverly GG, Kathrine P (2003) Understanding complete blood cell count with differentials. American Society of Peri Anesthesia Nurses 2: 96-117.

13. Glasziou P, Irwig L, Mant D (2005) Monitoring in chronic disease: a rational approach. BMJ 30 (7492): 644-648.

14. Tanumihardjo SA, Surles RL (2010) The modified relative dose response value in serum and milk are positively collated over time. Journal of nutrition 136: 939-945.

15. Ajibade AJ, Fakunle PB, Shallie PD (2012) some histological observations and microstructural changes in the nissl substances in the cerebellar cortex of adult wistar rats following artesunate administration. Current Research in Neuroscience 2(1): 1-10.

16. Ochie J, Kalhatkah A (2008) Introduction to Medical Laboratory Science, Theory and Practice: Tata McGraw-Hill publishing company limited, pp: 111- 128.

17. Garrett K, George-Gay B, Chernecky C (2002) Red blood cell counts, Clinical Medical Surgical Nursing. Philadelphia, pp: 274-282.

18. Oguntibeju O, Esterhuse A, Truter E, (2009) Red palm oil nutritional, physiological and therapeutic roles in improving human wellbeing and quality of life. Brit J biomed science 66(4): 216-222.

19. Sron B (2005) Palm oil track record, Global oil and fats 2: 24-25.

20. Starzl TE, Kaulla TL, Hermann G, Brittain RS, Warddell WR (2010) Homo-transplantation of liver in human. Surg Gynecol obstet 117: 659-676.

21. Boon CM, Ng MH, Choo YM, Mok SL (2013) super red palm and palm oleins improve the blood pressure, heart size, aortic media thickness and lipid profile in spontaneously hypertensive rats. Plos One 8(2): e55908.