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Short Communication

Some Haematological Parameters in Rabbits Treated With Methanolic Extract of *Garcinia Kola*

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ABSTRACT

This study investigates the effect of methanolic extract of *Garcinia kola* on some haematological parameters of adult male rabbits. The rabbits (1.55kg) were assigned into two groups; A (control, n = 10) and B (experimental, n = 10). In addition to water and feed given *ad libitum*, the experimental group received 100mg/day of methanolic extract of *Garcinia kola* for 4weeks. At the end of the experiment, blood was obtained for assessment of the data herein presented. Results (paired sample t-test) as judge against with the control values presented significant reduction ($p<0.05$) in the values of PCV, Hb, neutrophil and eosinophil counts, a significant increased ($p <0.05$) in the WBC and lymphocyte counts and an unchanged monocyte and basophil counts. Considering the clinical significant of the haematological changes (PCV and Hb) that were presented, excessive ingestion of *Garcinia* kola therefore, is not without negative effects to well-being.

Keywords: *Garcinia kola*, hematological parameters, herbal medicine, male, rabbits.

INTRODUCTION

With the shifting of attention from synthetic drugs to natural plant products, plant that were once considered of no value are now investigated, evaluated and developed into drugs (Dada and Ikuerowo, 2009). one of such plant is *Garcinia kola*. *Garcinia kola (G. kola)* is commonly known as bitter kola, male kola or false kola; 'Adu' in Esan, 'Miji-goro' in Hausa, 'Akilu or Ugolo' by the Igbos, 'Orogbo' among the Yoruba tribes of Nigeria. It is a medium-sized tree growing up to 12 m tall and 1.5 m wide and usually found in the rain forest of Nigeria (Iwu 1993). The fruit, which is in the size of an orange, is used as food and herbal medicine and produces reddish, yellowish or orange colour fruits containing 2 to 4 seeds covered with brown seed coat (Aniche and Uwakwe, 1990; Adesanya et al., 2007). The seed is masticatory used in traditional hospitality, cultural and social ceremonies and gives a bitter taste when chewed. This plant has been referred to as a 'wonder plant' because almost every part of it has been found to be of medicinal importance (Hutchinson and Dalziel, 1956). The seed extract and dry powdered seed have been made into various forms including tablets, cream, and toothpaste (Iwu, 1985).

Most likely due to its claimed aphrodisiac activity (Uko et al., 2001) couple with testosterone production and spermatogenic properties (Braide et al., 2003; Oluyemi et al., 2007), it is rational to imagine it extensive and excessive consumption among Nigeria men. It is base on this assumption of its excessive consumption among male that male rabbits were

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selected for this study. It is therefore the aim of this study to investigate the possible alterations that may be at hand on some basic hematological parameters using adult male rabbits as a model. This is considered significant because haematological parameters as such provide important information about the internal environment of an organism (Masopust, 2000).

MATERIALS AND METHODS

Plant extract; *G.kola* seeds were bought fresh from Aduwawa market in Benin City, Edo state, Nigeria. It was taken to the Botany Department, Faculty of Natural Sciences of Ambrose Alli University, Ekpoma, for authentication. It was then sent to Pharmacognothic unit of the Department of Pharmacy, University of Benin, Benin City, where the extract was processed. The maceration and percolation method of extraction was used for *G. kola* extraction.

Experimental animals and procedure; The experiment was conducted in the physiology laboratory 1 of the College of Medicine, Ambrose Alli University, Ekpoma, Edo State., between the months of September 2010 to November 2010. Twenty (20) adult male rabbits (mean weight of 1.55kg) were used for this study. They were purchased from Aduwawa market in Benin City, Edo state, Nigeria, and kept in stainless steel cage with plastic bottom grid and a wire screen top in Physiology Lab 1 of the Department of Physiology, College of Medicine , Ambrose Alli University for 1 week to adapt to the new environment with feed and water supplied *adlibitum.* On the second week, the animals were randomly assigned into two groups (n = 10); group A (control) and group B (test). They were then allowed two weeks of acclimatization fed water and feed only. On the first day of the experiment (ie the 4th week), group B received in addition to water and feed given ad libitum 100mg/day of methanolic extract of G. kola. The administration of the G. kola was performed using orogastric tubes and syringes to minimize the loss of test substance (Ejebe et al., 2009) and lasted a period of 4 weeks. The administrations were conducted between the hours of 09.00 am and 10.00am daily.

Sample collection and analysis: Twenty-four hours after the last administration, the experimental and control groups were anaesthetized with chloroform vapor and whole blood was obtained by cardiac puncture from each rabbit and collected into anticoagulant treated sterile bottles.

The blood samples were used for the determination of packed cell volume (PCV), Haemoglobin concentration (Hb), white blood cell count (WBC) and differential counts. PCV was estimated using micro-haematocrit method as described by Dacie and Lewis, (1991). The Hb concentration was determined using cynomethaemoglobin as described by Dacie and Lewis, (1991). WBC counts were estimated by visual means using the new improved Neubauer counting chamber as reported by Dacie and Lewis, (1991). The differential white blood cell count was carried out using Leishman's stain as described by Dacie and Lewis (1991).

Statistical analysis; The mean ± standard error of mean (X ± SE) and the paired sample t-test statistical was performed. The significance level was set at $p < 0.05$.

RESULTS

Erythrocyte values: The effect of oral administration of 100mg/day of methanolic extract of *G. kola* on erythrocytes of male rabbits fed for 28days are as presented in table 1. There was a statistically significant ($p<0.05$) reduction in PCV (%) and Hb (g/100ml) in the treated rabbits when compared to the corresponding values obtained for that of the control.

Table 1:
Effect of methanolic extract of *G. kola* on erythrocyte parameters

Parameters	Control (n= 10)	Test (n= 10)
PCV (%)	37.60±0.70	33.70±0.97*
Hb (g/dl)	13.10±0.19	11.71±0.36*

*Values are mean ± S.E. * = p<0.05*

Table 2:
Effect of methanolic extract of *G. kola* on leucocyte parameters

Leucocyte parameters	Control (n= 10)	Test (n= 10)
WBC ($x10^3/mm^3$)	5.35±0.18	6.91±0.15*
Neutrophil (%)	49.30±0.68	43.60±0.69*
Lymphocytes (%)	30.70±0.80	39.20±0.53*
Monocyte (%)	16.00±0.54	16.4±0.97
Eosinophil (%)	4.60±1.10	0.90±0.28*
Basophil (%)	0.60±0.27	0.10±0.10

*Values are mean ± S.D. * = p<0.05*

DISCUSSION

Recall that under normal conditions the composition of blood is reasonably constant for any particular species with changes falling with fairly narrow limits (Banerjee et al., 2002). The observed significant reduction of PCV and Hb counts in this study is an indicative of *G. kola* to be capable of inducing RBC haemolysis. This finding on the effect of G. kola extract on erythrocyte values is in accordance with the study of Uko et al (2001) who reported a reduction in Hb (g/100ml), Haematocrite (%) and erythrocytes (10^6ml) but in disagreement with the study of Ahumibe and Braide (2009) who reported PCV, Hb, and RBC to significantly ($P < 0.05$) increased in response to treatment with G. Kola. Dada and Ikuerowo (2009) reported a non significant change in erythrocyte values in fish fed varies concentration of G. kola and then concluded that G. kola has a positive influence on the haematological indices. Interestingly, the study of Esomonu et al (2005), reported significant reduction in PCV, RBC and Hb in rats treated with 2g/kg of G. kola in the 1st week but becomes non significant different to the control in the 2nd through 5th week. Does it mean that the body has developed defensive physiological mechanisms to this substance?

The observed changes on the WBC count following the ingestion of methanolic extract of G. kola revealed significant increased. Thus this study reconfirmed the immune- beneficial significant of G. kola. This finding is in accordance with the study of Uko et al., (2001) and Dada and Ikuerowo (2009), who reported a proliferation of total leucocyte counts but disagrees with the study of Ahumibe and Braide (2009) who showed white blood cell (WBC) counts not to increase with increasing G. Kola dosage. The observed effect of G. kola on WBC explains the antimicrobial potentials of the plant extract in view of the major role that WBC assume in the immunity defense mechanism of the body in both man and animal as reported by Dada and Ikuerowo (2009). In addition, result on differential WBC counts revealed a significantly increased lymphocytes counts, significantly decreased neutrophil and eosinophil counts and unchanged monocyte and basophil counts. The significantly increased lymphocytes signified immune effect of G. kola. Supporting this finding is the study of Okoko and Oruambo (2008) and Dada and Ikuerowo (2009). Interestingly, other studies has reported its anti-bacteria (Iwu, 1998), anti-viral (Chen, 1996), anti-fungal (Mackeen *et al*, 2000), antimicrobial (BBC News, 1999), anti-inflammatory, and anti parasitic properties (Braide and Grill, 1990; Akintonwa and Essien, 1990; Matsumoto et al, 2003). In addition, the seed have been reported to have anti-diabetic, antiulcer potentials and bronchioles dilator (Iwu, 1990; Orie and Ekon, 1992; Ibironke et al, 1997) and traditionally used for ailments such as laryngitis, liver diseases, head, chest colds and cough (Ayensu, 1978; Iwu, 1993).

Conclusively, the marked decrease in the levels of erythrocytes observed in experimental group suggests that the seed of *G. kola* may possess RBC destroyer and as such agent of anemia. Thus, an unregulated consumption of *G. kola* has it implication on health and wellbeing considering the clinical significance of PCV and Hb. Evidently; the elevation in the levels of leucocytes (total WBC counts and lymphocytes) shows its anti-infection significant. Should we because of this importance in immune-protection over looked the effect it can cause to RBC? It is our opinion therefore that its regulation be a thing of concern. However, further investigation is required in this respect. Till then, *G. Kola* at high doses is capable of causing crashes to well-being.

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REFERENCES

Adesanya, Q.A., Oluyemi, K.A., Ofusori, D.A., Omoruyi, I.O., Okwuonu, C.U., Ukwenya, V.O. and Adesanya, R.A. (2007). Micromorphometric and strereological effects of ethanolic extracts of Garcinia cambogia seeds on the tests and epididymides of adult wistar rats. *The Internet Journal of Alternative medicines;* Vol 5, Num 1. (5)

Ahumibe, A.A. and Braide, V.B. (2009). Effect of gavage treatment with pulverised *garcinia kola* seeds on erythrocyte membrane integrity and selected haematological indices in male albino wistar rats. *Nigerian Journal of Physiological Sciences*; 24 (1): 47-52.

Akintonwa, A. and Essien, A.R. (1990). Protective effect of Garcinia kola seed extract against parancetamol-induced hepatotoxicity in rats. *J. Elhnopharmocol;* 29 (2): 207-211.

Aniche, G.N. and Uwakwe, G.U. (1990). Potential use of Garcinia kola as hop substitute in lager beer brewing. *World Journal of Microbiology and Biotechnology;* 6: 3, 323-32.

Ayensu, E.S. (1978). Medicinal plants of West Africa, Reference Publ. Inc; Algonac, Michigan. P. 162.

Banergee, S.K., Patra, B.C., Bandoypahyay, P. and Teway, A. (2002). Changes of blood parameters in Carp, *Catla catta*. *J. Aquatic Biol;* 17(11):79 –84.

BBC (1999). Garcinia-Antioxidant and more. News bulletin on Thursday August 5, 1999. Published at 14: 37 GMT.

Braide, V.B. and Grill, V. (1990). Histological alteralanos by a diet containing seeds of Garcinia kola: effect on liver, kidney, intestine in the rat. *Gegenbaurs Morphol. Jahrb;* 136 (1): 95-101.

Braide V, Agabe CA, Essien GE and Udoh FV (2003). Effect of Garcinia kola seed alkaloid extracts on levels of gonadal hormone and pituitary gonadotrophins in rat serum. *Nig J. Phy. Sci.* 18(1-2):59-64.

Chen, S.X., Min, W. and Boon-Nee, L. (1996). Active Constituents Against HIV- 1 Protease From Garcinia Mangostana. *Planta Med;* 62 (4):381-382

Dacie, J.V. and Lewis, S.M. (1991). Practical hematology, Churchill Living Stone, Edinburgh Pp. 41-57.

Dada, A.A. and Ikuerowo, M. (2009). Effects of ethanolic extracts of *Garcinia kola* seeds on growth and haematology of catfish (*Clarias gariepinus*) broodstock. *African Journal of Agricultural Research*; Vol. 4 (4). 344-347.

Ejebe, D.E., Siminialayi, I.M., Emudainohwo, J.O.T., Ovuakporaye, S.I., Ojieh, A. E., Akonoghrere, R., Odokuma, I. E. and Ahatty, G.C. (2009). An improved technique for oral administration of solutions of test substances to experimental rats using Mediflon/Medicut intravenous cannula. African Journal of Biotechnology Vol. 8 (6): 960-964.

Esomonu, G.U.I., El-Taalu, A.B., Aunka, J.A., Ndodo, N.D., Salim, A.M. and Kabiru, M. (2005). Effect of ingestion of extract of Garcinia kola seed on erythrocytes in Wistar Rats. *Nig. J. Physiol. Sci;* 20 (1 – 2): 30 – 32.

Hutchson, J. and Dalziel, J.M. (1956). Flora of West Tropical Africa. 2nd Ed. H.M.S.O London, Vol. 11 pp 295

Ibironke, G.F., Olaleye, S.B., Balogun, O. and Aremu, A. (1997). Effects of diets containing seeds of Garcinia kola (Heckel) on gastric acidity and experimental ulceration in rats. *Phytotherapy research.* 11: 4, 312-313.

Iwu, M.M. (1985): Antihepatotoxic constituents of *Garcinia kola* seeds. *Experimentia;* 41, 699-700.

Iwu, M.M. (1989). Food for medicine (E.d) M. Iwu. In: Dietary plants and masticatories as source of biologically active substances. University of Ife, Nigeria. Ife Press, PP: 303-310.

Iwu, M.M. (1993): Handbook of African medical plants. *Bola Raton: CRC Press Inc.* PP 223-224. (s).

Iwu, M.M., Igboko, O.A., Okunji, C.O. and Tempesta, M.S. (1990): Antidiabetic and aldose reductase activities of flavones of Garginia Kola. *J. pharm. Pharmacol;* 42: 290 – 292.

Mackeen, M.M., Ali, A.M., Lagis, N.H., Kowazu, K., Kikuzaki, H. and Nakatami, N. (2002): Antifugal Garcinia acids esters from the frusits of Garcinia Atroviridis. Z. *Naturforch*; 57 (34): 291 – 295.

Matsumoto, K., Akao, Y., Kobayashi, E., Ito, T., Ohguchi, K., Tanaka, T., Iinuma, M. and Nozawa, Y. (2003). Cytotoxic benzophenone derivatives from Garcinia species display a strong apoptosis-inducing effect against human leukemia cell lines. *Biol Pharm Bull.* 26:569–71.

Masopust, J. (2000): Clinical Biochemistry (in Czech). Karolinium, Prague. Pp. 832.

Okoko T. and Oruambo FI. (2008). *Garcinia kola* extract reduced lipopolysaccharide activation of macrophages using U937 cells as a model. *African Journal of Biotechnology*; Vol. 7 (6), pp. 792-795.

Oluyemi KA, Jimoh OR, Adesanya OA, Omotuyi IO, Josiah SJ. and Oyesola TO. (2007). Effects of crude ethanolic extract of Garcinia Cambogia on the reproductive system of male Wistar rats (Rattus novergicus), *African Journal of Biotechnology*, 6(10):1236-1238.

Orie, N.N. and Ekon, E.U. (1993). the bronchodilator effect of Garcinia kola. *East Afri. Med J. 70:1*43 – 145.

Uko, O.J., Usman, A. Ataja, A.M. (2001). Some biological activities of *Garcinia kola* in growing rats. *Vet. Arhiv.* 71, 287-297.