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## Effects of Oral Administration of *Garcinia Kola* (Bitter Kola) On the Haematological Profile of Albino White Rats

Adeniji A.R.<sup>1</sup>, Leigh C.A.<sup>2</sup>, Taiwo A.G.<sup>3</sup>, Adeniji A.A.<sup>4</sup>, Balogun M.<sup>5</sup>

Science Laboratory Technology Department, Moshood Abiola Polytechnic Abeokuta Ogun State, Nigeria.<sup>1,3,4,5</sup>

Department of Biochemistry, Federal University of Agriculture, Abeokuta, Ogun state, Nigeria.<sup>2</sup>

Senior Lecturer Department of Science Laboratory Technology, Moshood Abiola Polytechnic Abeokuta, Ogun State, Nigeria.<sup>1</sup>

Laboratory Scientist 1 Federal University of Agriculture Abeokuta, Ogun State, Nigeria.<sup>2</sup>

Assistant Chief Technologist, Chemistry (Unit) Science Laboratory Technology Department, Moshood Abiola Polytechnic Abeokuta, Ogun State, Nigeria.<sup>3</sup>

Graduate Student Science Laboratory Technology Department, Moshood Abiola Polytechnic, Abeokuta, Ogun State, Nigeria.<sup>4,5</sup>

**ABSTRACT:** The present work deals with the haematological effects of oral administration of different graded doses of wet and dry seeds of *Garcinia kola* (Bitter kola) on Albino White rats. 25 rats were divided into five group of five rats per group and were gavaged with *Garcinia sp* seed wet and dry powdered daily for 21 days. Group I served as the control group and was fed with standard feed only. While the test groups 2,3,4,5, had in addition to the standard feed 5g,10g wet and dry *Garcinia kola* seed powder supplemented to their feed respectively. Result showed significant increase in Haemoglobin concentration, (Hb), Packed Cell Volume (PCV), Red Blood Cell (RBC), and White Blood Cell (WBC). The findings suggested that *G.kola* seed have no possible adverse effects on the Rats and has more beneficial effects as evident on the significant increase in the haematological profile investigated.

**KEYWORDS:-** *Garcinia kola* seed, Haematological parameters, Albino rats.

### I. INTRODUCTION

The Nigeria climate and its environment favours a wide variety of plant species many of which have varied medicinal and antimicrobial potential Adedeji et al (2), Adesanya et al (3), Ahumibe, and Braide (6).

In African countries many of this plants are abundant and untapped. While they are still been used in developing countries as medicinal plants for the treatment of sick individuals.

*Garcinia kola* (bitter kola) is one of the seed plant found in the moist forest areas in Nigeria. It is a medium sized tree growing up to 12m tall 1.5m wide and found usually in the rain forest of Nigeria Iwu, (21).

The seed is a brown –nut like seed used in traditional medicine Braide et al (12), Adesanya et al (3).

The seed when chewed have a bitter astringent taste. Its active phytochemical components have been shown to have a protective action against chemically induced haemolysis in deficient human red blood cell, anti-inflammatory and antipyretic activity Braide, (13), Braide et al (14). It has a complex mixture of phenolic compound such as biflavonoids, xanthenes, Benzo phenose (wu et al (20).

This phenolic compound possesses anti-microbial, anti-diabetic and antiviral properties Adedeji et al (2).

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The seed extracts and dry powdered seed of *Garcinia kola* plants have been made into various forms including tablets, cream and toothpaste Iwu (21). It serves as antidote to the effects of *strophantus gratus* a guinea worm remedy, treatment of diarrhea, hepatitis, asthma, common cold, cough, dysmenorrhoea and anti-anaemia Holmes, (19).

It is ingested in relatively large amount at various social gathering and several studies have been conducted on the possible toxicity in human vis-verse the pharmacotherapeutic effects of this plants product Ahumibe and Braide (6). There have been several scientific reports of drug resistance by pathogenic micro-organism and unprecedented undesirable side effects of certain antibiotics Akunyilli, et al (8), Anegebeh et al (10), and the need for alternatives in plant products intake as a remedy.

Further research showed that it causes histological changes in the liver, kidney and gastrointestinal tract of rats Braide and vittrotio(12).

Previous studies on rat with the use of *Garcinia kola* has been reported Oluyemi et al (22) and on poultry Adedeji et al (2) showed that the inclusion of *Garcinia kola* seed powder and methanol extracts form improved the growth performance of the animals concerned. Others are Amalu et al (9) (3), Tamuno – Emine et al (23), Dada and Ikuero (17) (1), (Udeze et al (24), Christopher et al (16).

The objective of this study was to investigate the effects of varying dietary supplementation of *Garcinia kola* seed powder (wet and dry) on the basic haematological profile in white albino rats to ascertain its usefulness to animal and man.

## II. MATERIALS AND METHODS

- 1. COLLECTION OF SAMPLE:** *Garcinia Kola* Nuts were obtained at Lafenwa Market in Abeokuta, Ogun State, Nigeria. The seeds were peeled and cut into pieces, dried and then grounded into a powder using an electric blender with a mill (Kenwood BL 430 series). This study was conducted at Science Laboratory Technology Department, Moshood Abiola polytechnic, Abeokuta and the Department of Biochemistry Federal University of Agriculture Abeokuta between the period of March, 2014.
- 2. STUDY DESIGN:** The animals used were divided into five groups, each groups consisting of five rats. Group 1 served as control and received standard feed Of 20.0mg daily and received orally 0.4ml/100g body weight of distilled water once a day for 21days. Group II received orally 5mg/100g body weight of wet *G. kola* seed powder once a day for 21 days. Group III rats received 10mg/100g body wet powder at once 10mg for 21 days.

Group IV received 5mg/100g body weight dry *G. kola* seed powder once a day for 21days. Group V received 10mg/100g dry *Garcinia kola* powder at a constant weight for 21days.

All the animals in group I – IV were allowed access to water and rat diet ad-libitum throughout the duration of the experiment.

At the inception of the experiment the animals blood samples were collected and transferred into Ethylenediamine Tetraacetic Acid EDTA so as to know the initial blood profile of the rats.

At the end of the experimental period, the animals were fasted for 6hours and then sacrificed under chloroform anaesthesia. Blood samples were collected and transferred into bottles for haematological analysis.

Haematological analysis was conducted using sysmex Automated Haematology Analyser KX-21N, Sysmex Coporation, Kobe-Japan (whole blood model) and differential WBC was determined from areas under the WBC histogram as percent of entire WBC volume at the Biochemistry Department of Federal University of Agricultural, Abeokuta.

**Statistical Analysis:** Data was collected and analyzed by ANOVA using Statistical Package for Social Science (SPSS) software for windows and post hoc testing was performed for inter-group comparison using the Least Significant Difference (LSD), All data was expressed as Mean  $\pm$  Standard error of the mean (SEM). The  $p < 0.05$ , 0.01 and 0.001 were considered significant.

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## III. RESULTS

Table 1 and 2 shows values the effect of administration of *Garcinia kola* seed powder for 21 days, initial and final on the haematological parameters of albino white rats. There were increases in PCV, HB, RBC and WBC respectively. These were significantly different from control at ( $P < 0.01$ ).

The highest mean values of Pack Cell Volume (PCV), were obtained in G.IV 10gm dry concentrate. This same is reflected in all the parameters investigated for G.IV/10gm dry concentration. While the least value was obtained in the 5gm/wet, concentration.

### Effects of *Garcinia kola* seed powder on the Initials Haematological Parameters of White Albino Rats.

TABLE 1

|      | Experiment                          | PVC %            | HB( $\text{gdi}^{-3}$ ) | RBC x $10^6$<br>UL $^{-1}$ | WBC x $10^3$<br>UL $^{-1}$ |
|------|-------------------------------------|------------------|-------------------------|----------------------------|----------------------------|
| I.   | Control                             | 38.00 $\pm$ 0.58 | 11.67 $\pm$ 0.22        | 3.74 $\pm$ 0.13            | 5345.33 $\pm$ 6.23         |
| II.  | 5mg wet G.kola powder II            | 32.22 $\pm$ 0.19 | 11.22 $\pm$ 0.18        | 3.82 $\pm$ 0.04            | 4914.10 $\pm$ 12.53        |
| III. | 10mg wet initials G.kola powder III | 38.00 $\pm$ 0.58 | 11.67 $\pm$ 0.22        | 3.74 $\pm$ 0.13            | 5345.33 $\pm$ 6.23         |
| IV.  | 5mg/kg $^{-1}$ dry G.kola           | 37.00 $\pm$ 0.58 | 11.87 $\pm$ 0.07        | 4.17 $\pm$ 0.09            | 5353.67 $\pm$ 2.73         |
| V.   | 10mg/k $^{-1}$ dry G.kola           | 38.50 $\pm$ 0.29 | 12.80 $\pm$ 0.11        | 4.60 $\pm$ 0.15            | 6940.66 $\pm$ 11.46        |

The initial RBC is low because of the diluted state of *G.kola* powder compared with dry.

### Effects of *Garcinia kola* seed powder on the Final Haematological Parameters of White Albino Rats.

TABLE 2

|      | Experiment                   | PVC %            | HB( $\text{gdi}^{-3}$ ) | RBC x $10^6$<br>UL $^{-1}$ | WBC x $10^3$<br>UL $^{-1}$ |
|------|------------------------------|------------------|-------------------------|----------------------------|----------------------------|
| I.   | CONTROL                      | 38.00 $\pm$ 0.58 | 11.67 $\pm$ 0.22        | 3.74 $\pm$ 0.13            | 5345.33 $\pm$ 6.23         |
| II.  | 5mg wet final G.kola powder  | 36.60 $\pm$ 0.15 | 12.31 $\pm$ 0.04        | 4.10 $\pm$ 0.06            | 5751.00 $\pm$ 0.55         |
| III. | 10mg wet final G.kola powder | 38.38 $\pm$ 0.17 | 12.85 $\pm$ 0.03        | 4.50 $\pm$ 0.06            | 5867 $\pm$ 0.58            |
| IV.  | 5mg/ dry final G.kola        | 41.17 $\pm$ 0.09 | 13.60 $\pm$ 0.06        | 4.73 $\pm$ 0.15            | 5651.67 $\pm$ 0.89         |
| V.   | 10mg/ dry final G.kola       | 43.63 $\pm$ 0.09 | 14.67 $\pm$ 0.02        | 4.90 $\pm$ 0.06            | 6976 $\pm$ 0.58            |

In all the parameter investigated above both the PVC, Hb and RBC and WBC are relatively higher for dry condition than wet condition.

## IV. DISCUSSION

The mechanism leading to the increase in the Red Blood Corpuscles (RBC) parameters is initiated by the anti-oxidant property of *Garcinia kola* seed powder supplement, in the diet of white albino rats. This had been demonstrated and reported by other researchers. In this work two different treatments were employed so as to ascertain which condition is most effective in the role of *Garcinia kola* on the RBC Parameters investigated.

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*Garcinia kola* dry seed powder has significant effect on the haematological profile of white albino rats as compared with wet *Garcinia kola* supplement Table 1 and 2 respectively.

Christopher et al (16) working on the haematological effect of chronic administration of ethanolic extract of *Garcinia conruana* seed on rats obtained  $43.2 \pm 2.11\%$  control for PCV and at different concentration but Group 2 – G.4 had  $46.36 \pm 0.85 - 49.39 \pm 0.85\%$ .

This is slightly in agreement with this work where the control was  $30.15 \pm 0.25\%$  and supplementation of *G. kola* ranges from  $32.27 \pm 0.19\% - 38.00 \pm 0.58\%$  (wet 5mg supplement of *G. kola* initially and  $37.00 \pm 0.58 - 38.50 \pm 0.29\%$  for dry 5mg – 10mg *G. kola*).

While final wet *G. kola* had  $36.60 \pm 0.15\% - 38.38 \pm 0.17\%$ . PCV while *G. kola* dry supplementation had  $41.17 \pm 0.09\% - 43.63 \pm 4.25\%$ ;

In all other parameters investigated dry *Garcinia kola* had higher results compared to wet treatment. The wet treatment with *G. kola* could have had a diluting effect hence the low value obtained in all haematological profile unlike the dry condition.

*Garcinia sp* seed powder gave haemopoietic protective and stimulating potential.

Past reviewed research work had shown that *G. kola* has prophylactic and therapeutic antioxidant supplement which is significant with cells of hemopoietic origin in animals Chris et al (15).

Similarly the active phytochemical component of *Garcinia kola* seed powder has been shown to have a protective action against chemical induced haemolysis in deficient human red blood cells Braide, (13).

Tamuno – Emine et al (23) had a similar result with this work in all the haematological parameters investigated. This work is also in agreement with the report of Esomonu et al (18) in which the mean Hb, percentage PCV and WBC count of rats feed with *G. kola* seed extract were found to be non-significantly from control ( $P > 0.05$ ).

The fact that *G. kola* seed exerted no negative influence on the haematological profile indicated that the test material did not adversely interfere with the functions of the haematopoietic system.

Other researches had exploited *Garcinia kola* to increase the growth and haematological parameters of catfish (*Clarias gariepinus*) brookstock Dada and Ikueromo (17).

## V. CONCLUSION

Feeding rats with *G. kola* seed powder causes a significant increase on the WBC Count and a non-significant effect on the HB, PCV and other haematological parameters.

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