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Short Communication

Effect of *Cola Nitida* (Kolanut) Extract on Some Haematological Indices of Albino Rats

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Abstract

In this study, the effect of aqueous extract of *Cola nitida* on haemoglobin (Hb), packed cell volume (PCV) and total white blood cell count (tWBC) of albino rats was investigated. Twenty albino rats were used in the study; these were randomly distributed into five groups of four rats per group. Group 1 which served as control was administered with distilled water while groups 2, 3, 4 and 5 received 200, 400, 600 and 800 mg/kg body weight respectively of extract. These treatments were given for seven consecutive days. On the eight day, all animals were sacrificed and blood samples collected for haematological analysis. Results showed that at doses of 600mg/kg body weight and 800mg/kg body weight significant reductions (p< 0.05) in Hb were recorded (88.75±5.56 and 86.50 ± 4. 84 respectively). At these doses PCV values of 26.63± 1.67 and 25.98±1.44respectively were recorded. These were all significantly lower (P< 0.05) than value for the control. Only mild changes were observed in the case of WBC count. The study shows that at high doses kola nut has some deleterious effects on the haematology of mammals. Excess consumption of kola nut is therefore discouraged.

Keywords: Albino rats, *Cola nitida,* Haematological, Indices

INTRODUCTION

The kola nut is the fruit of the kola tree, a genus (*Cola*) of trees that are native to the tropical rainforests of Africa. The caffeine- containing fruit of the tree is used as a flavouring ingredient in beverages, and is the origin of the term "cola". Kola nuts comprise about 2% caffeine, as well as containing kolanin and theobromine. All three chemicals function as stimulants (Erbe, 2014). The kola nut has a bitter flavour. It is chewed in many West African cultures, individually or in a group setting. It is often used ceremonially, presented to chiefs or presented to guests (igboguide.org)

Kola nuts are perhaps best known to Western culture as a flavouring ingredient and one of the sources of caffeine in cola and other similarly flavoured, although the use of kola (or kola flavouring) in commercial cola drinks has become common (thisamerican.org)

Haemoglobin (Hb) is the iron-containing oxygen-transport metalloprotein in the red blood cells of all vertebrates (Maton *et al.,* 1993) (with the exception of the fish family channichthyidae (Sidel and Kristin, 2006) as well as the tissues of some invertebrates. Haemoglobin in the blood carries oxygen from the respiratory organs (lungs or gills) to the rest of the body (ie the tissues). There it releases the oxygen to permit aerobic respiration to provide energy to power the functions of the organism.

The haematocrit also known as packed cell volume (PCV) or erythrocyte volume fraction (EVF) is the volume percentage (%) of red blood cells in blood. It is considered an integral part of a person's complete blood count results, along with haemoglobin concentration, white blood cell count and platelet count.

White blood cells (WBC) also called leukocytes are the cells of the immune system that are involved in protecting the body against both infectious diseases and

foreign invaders. A WBC count is a blood test to measure the number of white blood cells (WBC) in the blood.

Kola nut enjoys wide acceptability among almost all the tribes in Nigeria. The rate of consumption of kola nut has always been on the increase, probably resulting from the acclaimed stimulatory effect. This study aims at investigating the effect of aqueous extract of *Cola nitida* (kola nut) on haemoglobin, packed cell volume and white blood cell count in albino rats.

MATERIALS AND METHODS

Sample Collection and Preparation

30 seeds of kola nut were purchased from Ekeonunwa market in Owerri, Imo State, Nigeria. The seeds were washed and ground using mechanical blender. The ground material was soaked in water and filtration was carried out using filter paper. The filtrate was concentrated in a rotary evaporator and stored in a refrigerator until required for use.

Animals and Administration Of Extract

A total number of 20 Wistar albino rats were used for this study; the animals were randomly distributed into 5 groups of 4 animals per group. The animals had free access to food and water. Each group of rats was kept in a cage placed in the animal house. Administration of extract was as shown in table 1 below.

Table 1. Treatment Regimen

Group	Treatment/Dosage of Extract
1	0.3ml distilled water
2	200mg/kg body weight
3	400mg/kg body weight
4	600mg/kg body weight
5	800mg/kg body weight

These treatments were given orally once daily for a period of 7 days.

Animal Sacrifice and Collection Of Blood Samples

On the 8^{th} day the rats were sacrificed by chloroform anesthesia. The animals were dissected and blood samples were collected by cardiac puncture into heparinized bottles.

Hematological Analysis

Haemaglobin(Hb) concentration was determined using the cyanomethamoglobin method described by Jain, 1986, Packed cell volume was determine by the use of micro heamatocrit method (Dacie and Lewis, 1991). Total White blood cell count was determined according to the bulk dilution method (Dacie and Lewis, 1991).

Statistical Analysis

The data generated were subjected to analysis of variance using statistics package for social science (SPSS).
Significant difference between groups was determined at 95%confidence level, using Duncan's multiple range test.

RESULTS AND DISCUSSION

The table 2. below shows the results obtained. The results show that when *Colanitida* was administered to the rats at a dose of 200mg/kg,the Hb level was observed to be 99.50±1.56g/l.

There was a further decrease when the dosage increased to 400mg/kg body weight

There was no significant difference ($p>0.05$) between the Hb level of the control animals and those treated with 200mg/kg and 400mg/kg

doses respectively. However, there was a significant difference ($p<0.005$) between the Hb level of the control and those of 600mg/kg and 800mg/kg. This shows that *Cola nitida* had significant effect on the Hb level of the rats treated with doses of 600mg/kg body weight and 800mg/kg body weight respectively ($p<0.05$).

The significant reductions recorded ($p<0.05$) for Hb levels at 600mg/kg and 800mg/kg dosage may suggest that the extract contain some bioactive constituent or phytoconstituent which suppressed the heamatopoietic activities.

The PCV level of 31.58±0.50% was obtained in the control group. When kola nut extract of 200mg/kg was administrated to the rats the PVC level became 29.80±0.5%. Upon increasing the dosage to 400mg/kg the PCV level decreased to 28.15±1.99%.

On further increase of the dosage to 600mg/kg and 800mg/kg the PCV level dropped to 26.65 ± 1.67% and 25.98± 1.44% respectively. From the results obtained there was no significant difference between the PCV level of the control and those of 200mg/kg and 400mg/kg dosage. On the other hand there is a significant difference ($p< 0.05$) in PCV levels between the control and animals treated with 600 and 800mg/kg dose respectively. The reductions recorded at these doses may suggest that kola nut contains some erythropoietric depressant properties, hence there were marked reductions in the PCV level at high doses.

In the case of white blood cells count the control group had 5.00± 0.06. At doses of 200mg/kg, 400 mg/kg, 600mg/kg and 800mg/kg the WBC count was found to be

Table 2. The Effect of *Cola nitida*(kolanuts) on Hb, PCVand WBCC

Group	Dosage	Hb (g/L)	PCV (%)	WBC (X10^9/L)
1	0.3ml dist. water	105.25±1.65^a	31.58±0.5^a	5.00±0.06^a
2	200mg/kg bwt	99.50±1. 56^a	29.80±0.45^a	5.03±0.09^a
3	400mg/kg bwt	94.00±6.68^a	28.15±1.99^a	5.07±0.06^a
4	4600mg/kgbwt	88.75±5.56^b	26.63±1.67^b	5.05±0.055^a
5	800mg/kgbwt	86.50±4.80b^b	25.98±1.44^b	5.00±0.04^a

Values represent Mean ± SEM (n=4)
^{ab}Values with different superscripts differ significantly ($p<0.05$).

5.03± 0.09, 5.07±0.06. 5.05± 0.05 and 5.00±0.04 respectively. These values when compared with the control showed no significant difference ($p >0.05$).

CONCLUSION AND RECOMMENDATION

Kola nut elicited significant reductions in haemaglobin and packed cell volume of albino rats. Thus kola nut consumption has some deleterious effects on the red blood cells of rats. By extrapolation, the case will also be the same in humans. Excess consumption of kola nut is therefore discouraged.

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