

Effects of Ethanol Leaf-Extract of *Albizia ferruginea* on Selected Haematological Indices in Wistar Albino Rats

¹Ukpabi S. E. N., ¹Offor C. E., ²Udeozor P. A. and ³Obiudu I. K.

¹Department of Biochemistry, Ebonyi State University, Abakaliki, Ebonyi State, Nigeria.

²Department of Biochemistry, Evangel University, Akaeze, Ebonyi State, Nigeria.

³Department of Biochemistry, Godfrey Okoye University, Enugu, Enugu State, Nigeria.

ABSTRACT

The effects of ethanol leaf-extract of *Albizia ferruginea* on haematological indices were investigated in albino rats using standard methods. Twenty four albino rats were randomly placed into four experimental groups (A, B, C and D) after seven days of acclimatization with six rats in each group. Animals in groups A, B, C and D were administered the ethanol leaf-extract of *Albizia ferruginea* at the doses of 0, 200, 400 and 600 mg/kg body weight respectively twice daily for fourteen days through oral intubation. The results showed that haemoglobin (Hb) level, Packed Cell Volume (PCV), red blood cell (RBC) count and white blood cell (WBC) count increased significantly ($p < 0.05$) and dose-dependently. The results suggest that the ethanol leaf-extract of *Albizia ferruginea* could be effective in the management of anaemia.

Key words: *Albizia ferruginea*, leaf-extract, haematological indices, albino rats.

INTRODUCTION

Plants of various origins have been exploited effectively over many generations for therapeutic purposes [1] and have long been the principal tools of traditional medicinal system as medicinal plants are part of human society to combat diseases since civilization evolved [2]. World Health Organization has found that about 80% of the developing countries' populations are handicapped to affording pharmaceutical drugs; rely on traditional medicines, mainly from plants, to sustain their primary health care needs [2]. Traditional systems of medicine are popular in developing countries and up to 80% of population relies on traditional medicines or folk remedies for their primary health care needs [3]. The use of herbs to treat diseases is almost universal among non-industrialized societies [4]. Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including opium, aspirin, digitalis and quinine [4]

Albizia ferruginea is a perennial tree with about 45m high and 3m girth. The leaves are bipinnate with pinnae exceeding sometimes seven pairs. It is a species of plant in the Fabaceae family, found in Angola, Benin, Cameroon, Republic of Congo, Nigeria, Senegal, Togo, Uganda among others [5]. This species threatened by deforestation is widespread in west and central Africa [6]. It is called 'Evouvous' by Ewondo tribe in the central region of Cameroon, the decoction of its barks mixed with those of *Ongokea gore* and *Piptadeniastrum africanum* is used as traditional remedy to cure infertility [6]. It is also called "Uge-ehu" in Abakaliki dialect of Ebonyi State, Nigeria [7]. The genus *Albizia* comprises approximately 150 species, mostly trees and shrubs native to tropical and subtropical regions of Asia and Africa. Stamens elongate and are usually white. Corolla (petals) is funnel-shaped, connate beyond the middle. Its fruit is broadly

linear indehiscent or 2-valved, valves not twisted [8].

[9] stated that certain haematological factors such as packed cell volume, red blood cell, haemoglobin, etc., can be associated with certain production traits and serve as means of assessing clinical and nutritional health status of animals. It has also been documented that high packed cell volume (PCV) and high haemoglobin (Hb) content are associated with high feed conversion ratio, while high percentage of white blood cells are associated with the ability of the animals to perform well under very stressful conditions [10]. Anaemia is one of the clinical conditions that constitute a serious health problem in many tropical countries as a result of the prevalence of different forms of parasitic infections, including malaria [11]. The determination of

haematological indices provides physiological information on a proper blood assessment. The major concern of the scientific communities with regard to medicinal plants and haematological studies focuses on the measures that can maintain a normal haematological state of being and reverse any negative haematological status associated with various anaemic conditions [11].

There are pieces of information on the pharmacological properties of most *Albizia* species, including anti-anaemic properties, treatment of rheumatism, stomach ache among others [8]. Considerable information now exists on the use of many *Albizia* species in the management of some disorders and ailments; hence the need to evaluate the effect of the ethanol leaf-extract of *Albizia ferruginea* on haematological indices.



Figure 1: *Albizia ferruginea* [8].

MATERIALS AND METHODS

Materials

The fresh leaves of *Albizia ferruginea* were collected from Umuezeoka, Ezza North L.G.A. of Ebonyi State in the

month of February while the adult male albino rats were gotten from the animal house of Department of Veterinary Medicine, University of Nigeria, Nsukka.

METHODS

Extraction of Plant Material

The leaves of the plant were rinsed in tap water and dried. The dried leaves were ground using a milling machine.

Exactly 300g of the powdered sample was soaked in 1200l of ethanol and allowed to stand for 48 hours. It was then filtered using a muslin cloth and concentrated by evaporation to dryness using rotary evaporator

Administration of the Extract

The experimental animals were placed into four (4) groups (A, B, C and D) of six (6) albino rats each. Group A was the normal control given 0.1 ml of normal saline only while animals in groups B, C and D were given the ethanol leaf-extract at different doses of 200, 400 and 600 mg/kg body weight respectively. This administration was done twice daily through oral intubation for 14 days. Feed and water were given *ad libitum*.

Collection of Blood Samples

The blood samples were collected through the femoral vein.

Determination of Haematological Indices

The haemoglobin level, PCV, WBC and RBC counts were determined according to the methods of [12].

Data Analysis

Data were treated by analysis of variance (ANOVA), and the level of significance was set at $P < 0.05$.

RESULTS

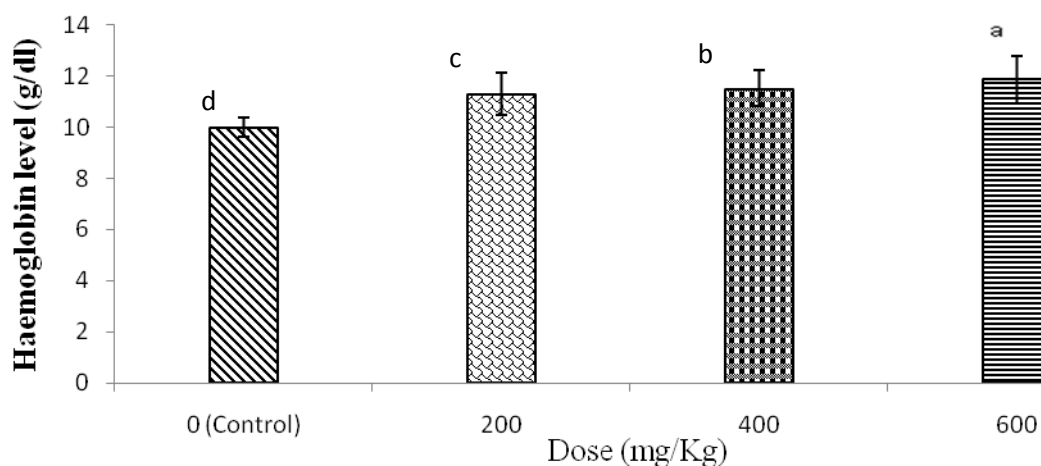


Figure 2: Haemoglobin levels of albino rats administered ethanol leaf-extract of *Albizia ferruginea*. Data are shown as mean \pm standard deviation (n=6). Mean

values with different alphabets show significant difference at $p < 0.05$.

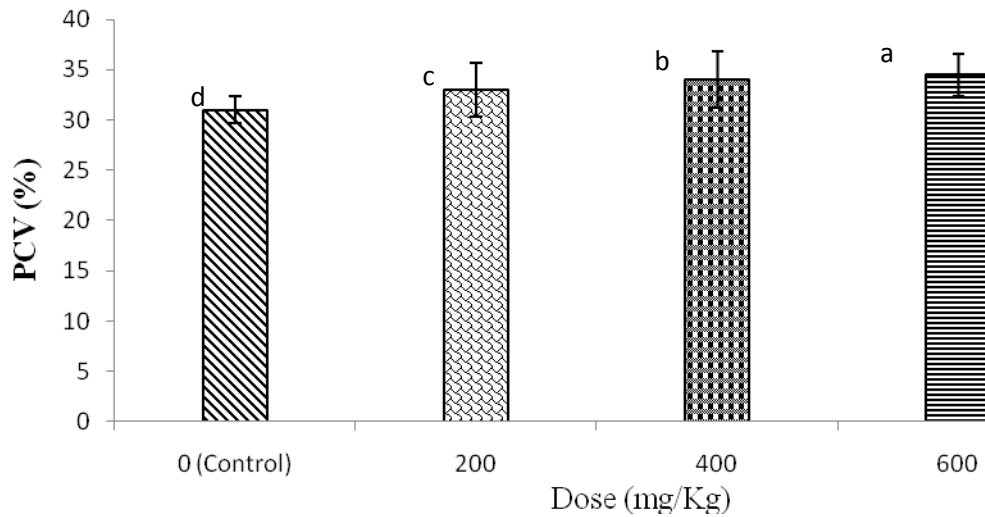


Figure 3: Packed cell volumes of albino rats administered ethanol leaf-extract of *Albizia ferruginea*. Data are shown as mean \pm standard deviation (n=6). Mean

values with different alphabets show significant difference at $p < 0.05$.

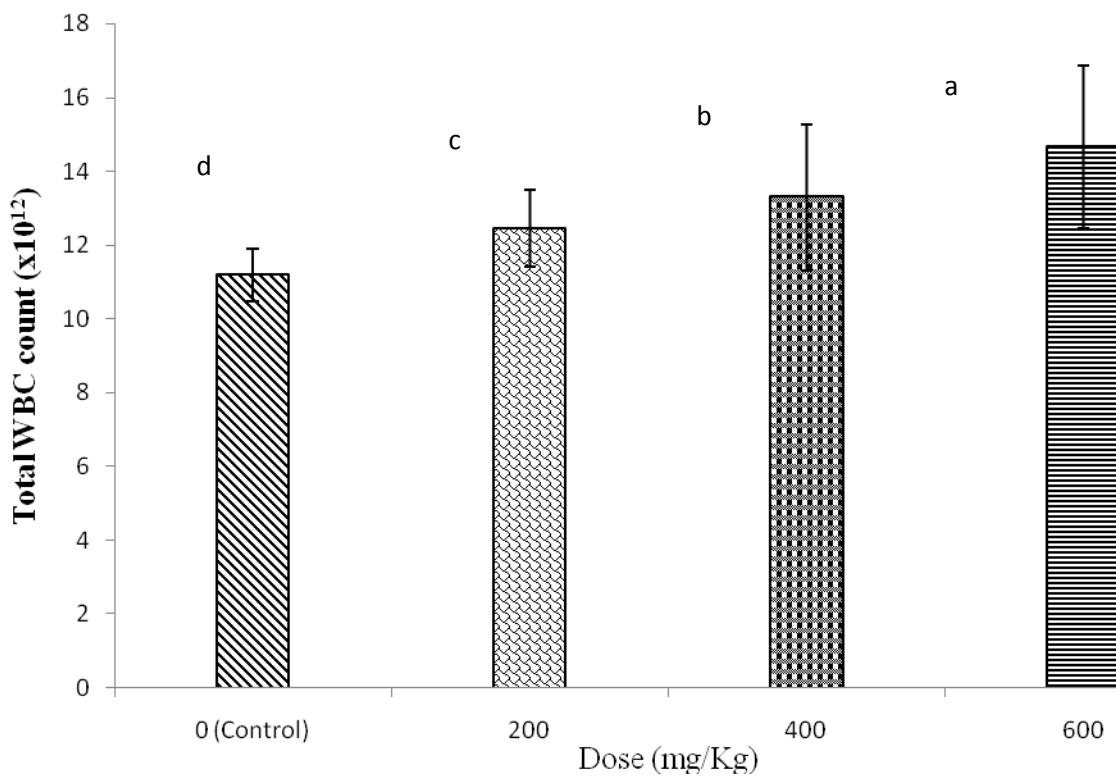


Figure 4: Total WBC counts of albino rats administered ethanol leaf-extract of *Albizia ferruginea*. Data are shown as mean \pm standard deviation (n=6). Mean

values with different alphabets show significant difference at $p < 0.05$.

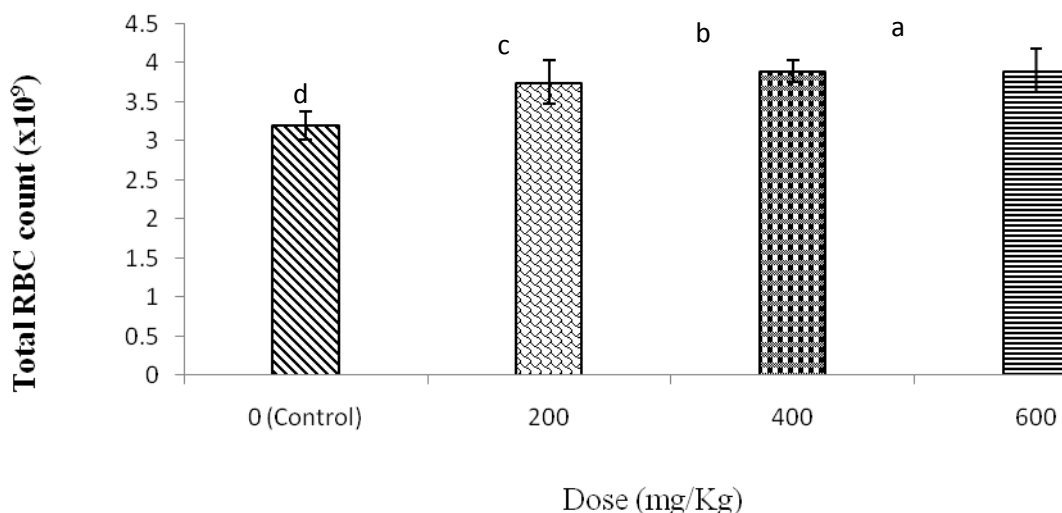


Figure 5: Total RBC count of albino rats administered ethanol leaf-extract of *Albizia ferruginea*. Data are shown as

mean± standard deviation (n=6). Mean values with different alphabets show significant difference at p<0.05.

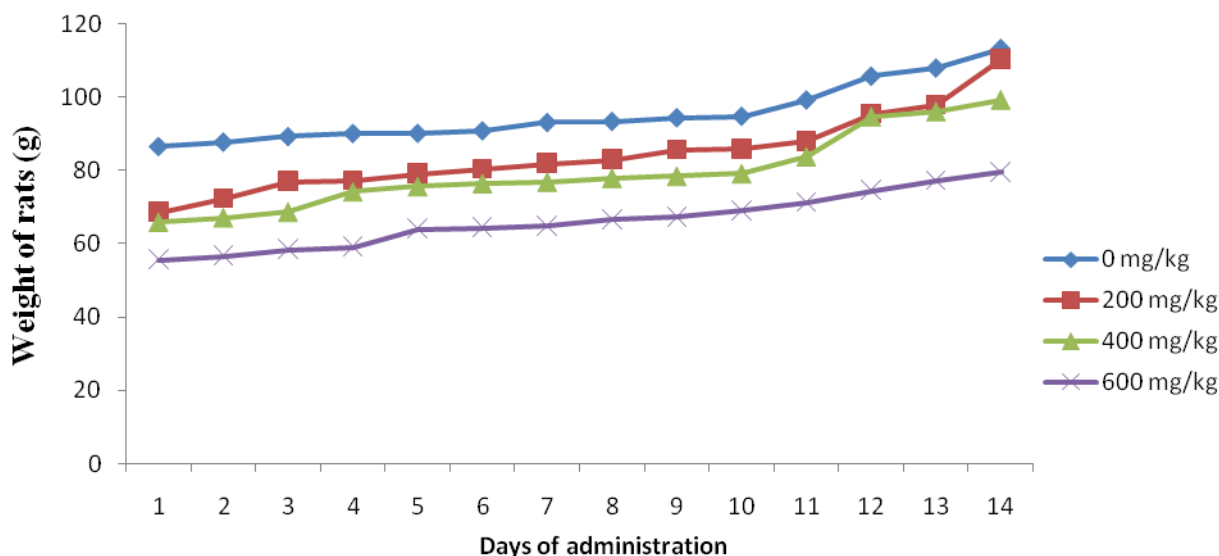


Figure 6: Body weights of albino rats administered ethanol leaf-extract of *Albizia ferruginea* for fourteen days.

Data are shown as mean± standard deviation (n=6).

DISCUSSION AND CONCLUSION

The ethanol leaf-extract of *Albizia ferruginea* significantly (p<0.05) and dose-dependently increased the haemoglobin levels, PCV (%), WBC count and RBC count as shown in figures 2, 3, 4 and 5 respectively. [13] reported an

elevation in haemoglobin, PCV, WBC and RBC in rats administered with ethanol leaf-extract of *Moringa oleifera*. [14] observed a significant increase in PCV, RBC counts, and WBC counts of the test rats treated with the extract of

Mangifera indica. [15] recorded a significant increase in the haemoglobin levels and percentage PCV in rats administered ethanol leaf- extract of *Milletia aboensis*. [1] recorded significantly dose-dependent elevations in haemoglobin levels and PCV of the animals administered with leaf-extract of *Mucuna pruriens*. [16] showed the potency of *Moringa oleifera* leaf - extract in increasing white blood cell counts in rats. [11] reported that the red blood cell counts and haemoglobin concentrations increased significantly ($P < 0.05$) on administration of the aqueous extract of *Psidium guajava* leaves to rats and no significant effect ($P > 0.05$) on the white blood cell counts was observed on the administration with aqueous extract of *Psidium guajava* leaves. Variations in altitude, carbon dioxide levels, insect and pathogenic presences are all known to affect the composition of the metabolite constituents [17].

There was a significant ($P < 0.05$) increase in the body weights of the rats administered the ethanol leaf-extract of

Albizia ferruginea (Figure 6). [18] reported that there was a body weight increase in albino rats that received aqueous extracts of *Cnidocolous acotifolius*. [19] also recorded that there was a significant increase in the weights of hypercholesterolemic rats after two - week intake of high-cholesterol diet. [1] reported that the ethanol extract of *Anacardium occidentale* exerted a significant decrease in the weights and physical activities of the albino rats treated with the extract. [20] reported a significant weight gain in the animals treated with extract of *Sphenocentrum jollyanum* leaves. [21] reported that the body weights of both the treated and control groups increased with increasing duration of administration. The weight gain in animals administered with the ethanol leaf-extract of *Albizia ferruginea* may be attributed to the presence of some metabolites found in the plant.

In conclusion, the leaf-extract of *Albizia ferruginea* holds great potential for development of anti-anaemic drugs.

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