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Research Article

COMPARATIVE EFFECT OF ETHANOL LEAF-EXTRACTS OF *FICUS CAPENSIS* AND *MORINGA OLEIFERA* ON SOME HAEMATOLOGICAL INDICES IN NORMAL ALBINO RATS

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Abstract:

This study was designed to evaluate the effect of ethanol leaf-extracts of Ficus capensis and Moringa oleifera on some haematological indices in normal albino rats. Forty albino rats were randomly assigned to four experimental groups A, B, C and D. Group A with 5 rats received water and feed only and served as the positive control. Group B with five rats received feed, water and astyfer (multivitamin) and served as standard control. Groups C and D were sub divided into 3 groups designated as C1, C2, C3, D1, D2 and D3 with 5 rats each. The two sub-groups were administered twice daily of the ethanol leaf-extracts of Ficus capensis and Moringa oleifera at the doses of 200, 400 and 800 mg/kg. Haematological indices were determined by standard methods. The result of the study showed a significant (P<0.05) increase in the mean body weight of the albino rats in groups that received the extracts and multivitamin. The result also revealed a significant (P <0.05) increments in the levels of haemoglobin(Hb), packed cell volume (PCV), red blood cell (RBC) and white blood cell counts in the groups administered with ethanol leaf-extracts of Ficus capensis and Moringa oleifera relative to positive control. A significant (p<0.05) increase in PCV and Hb levels in albino rats administered ethanol leaf-extract of Moringa oleifera in a dose dependent manner relative to groups administered ethanol leaf extract of Ficus capensis except in WBC and RBC where a significant (p<0.05) increase was recorded in those groups administered Ficus capensis ethanol leaf extract relative to groups administered Moringa oleifera extract. Generally there was no significant (p<0.05) effect on the haematological indices in rats administered ethanol leaf extract of Ficus capensis relative to rats administered Moringa oleifera extract. This confirms the use of Ficus capensis and Moringa oleifera in ethno-medicine to boost blood for anaemic patient and pregnant women.

Key Words: Hematological indices, Ficus capensis, Moringa oleifera, Albino rats, Weight and Ethanol leaf- extract

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INTRODUCTION:

Herbal medicine is the oldest form of health care known to mankind, as it widely used in all parts of the world [1]. The use of medicinal plants in the treatment of diseases has been in practice since ancient time from different parts of the world especially in Africa [2]. Plants have always been the most vital sources of drugs because their chemical constituents and ability to synthesize large variety of basic biochemical and organic substances such as proteins, carbohydrates, steroids, alkaloids, strychnin and glycosides [2].

Ficus capensis popularly known as fig tree is a medicinal plant whose parts: seeds, leaves, barks and roots are extracted and used in African traditional medicine to treat various diseases. It is known to possess anti-bacterial properties and treatment of eye problem, general body pains, sore throat, cough, gonorrhoea, diarrhea, chest pain, peptic ulceration, infertility, uterine pain and oedema [3]. The cape fig or broom cluster fig (*Ficus capensis*) is a widespread Afro-tropical species of cauliflorous fig. This fast growing, deciduous [3] (Von-Breitenbach, 2005) or evergreen tree usually reaches (Palgrave, 21988) large specimen, develop a massive spreading crown [4] (Hankey, 2003) fluted trunks and buttress root. The heavily clustered figs suggest fecundity and some trees in East Africa have been venerated as sacred shrines in animist practices [5] (Palgrave, 198804). *Moringa oleifera* popularly known as drum stick or horse radish tree is a medicinal plant whose various parts are extracted and used in African traditional medicine to treat various diseases. It is known to possess antioxidant properties, hepatoprotective, hypocholesteromic and CNS depressant activities [6,7].

Haematology is the study of blood and blood forming tissue and the disorders associated with them. Haematological parameters/indices are therefore the different components and constituents of blood in a living system [8](Savage *et al.*, 2012). Haematological parameters include white blood cell (WBC), red blood cell (RBC), platelets, white blood cell differential count (WDC) erythrocyte sedimentation rate (ESR), haemoglobin (Hb) and packed cell volume (PCV). Malnutrition, protein deficiency and hunger are on the increase in Nigeria and world at large mainly due to climate change, insurgency, militancy and lack of environmental impact assessment studies before embarking on projects. The case at hand are Boko Haram insurgency in the northeast as well as Fulani herdsmen attack on farmers have driven farmers out of their farmland with resultant negative effect on food production and security. Equally, lack of scientific information/data on medicinal potentials of

these native vegetables species with which Nigeria is richly endowed is partly responsible for their under-exploitation especially in areas beyond the traditional localities where they are found and consumed. Among these vegetables and medicinal plants are *Ficus capensis* and *Moringa oleifera*. The study therefore evaluates comparative effect of ethanol leaf-extracts of *Ficus capensis* and *Moringa oleifera* on some haematological indices in normal albino rats

MATERIALS AND METHODS:

Collection and Preparation of *Ficus capensis*

Fresh leaves of *Ficus capensis* and *Moringa oleifera* were collected from Umuakuma village at Okposi in Ohaozara Local Government Area of Ebonyi State, Nigeria. The plant was authenticated and identified by Prof., S. S. Onyekwelu of the Applied Biology Department, Ebonyi State University, Abakaliki, Nigeria. A part of the plant was also deposited in the herbarium for reference purposes. The fresh leaves of *Ficus capensis* were washed thoroughly under running tap water, shade dried and grinded into powdered form using mortar and pestle. Exactly 161g of powdered leaves of the two samples were soaked each in 600 ml of ethanol at room temperature for 48 hours. The mixtures were sieved and the ethanol was allowed to evaporate to obtain the crude extracts.

Chemicals and Reagents: Chemicals and reagents used were of analytical grades.

Experimental Animals

Male albino rats of about 8-12 weeks old weighing (75-160g) were used for the study. They were purchased from animal house at Nnamdi Azikiwe University, Anambra State, Nigeria and were kept in animal house at Ebonyi State University, Abakaliki, Nigeria in the Department of Biochemistry. They were feed with clean water and poultry growers mash and were acclimatized for seven days.

Experimental Design

A total of forty (40) albino rats were used for the study. The rats were randomly assigned to four experimental groups A, B, C and D. Group A with 5 rats received only water and food and served as the positive control. Group B with 5 rats received ferrous fumarate (astyfer) and served as the standard control. Group C and D were further sub-divided into three experimental groups C₁, C₂, C₃, D₁, D₂ and D₃ with 5 rats each. Group C₁, C₂, C₃, D₁, D₂ and D₃ received ethanol leaf-extract of *Ficus capensis* and *Moringa oleifera* at the graded doses of 100, 200 and 400 mg/kg body weight of the albino rats respectively for seven days. Oral routes of administration were used.

Collection of Blood Sample

After seven days of administration, the rats were starved overnight. They were sacrificed and blood

samples were collected through ocular puncture into sterile anti-coagulated specimen bottle for analysis.

Statistical analysis: Data obtained were subjected to a one way analysis of variance ANOVA using the General Linear Model procedure of SAS (version 6.04).

RESULTS:

Percentage Yield of *Ficus capensis* and *Moringa oleifera* leaves Extracts

Ethanol leaf-extract of *Ficus capensis* and *Moringa oleifera* gave 31 and 34 % crude extracts as the percentage yield as shown in Table 1.

Table 1: Percentage Yield of the Ethanol Leaf Extract of *Ficus capensis* and *Moringa oleifera*

Solvent used	Plant part	Mass of leaves before extraction (g)	Mass of leaves after extraction (g)	Volume of solvent used (ml)	Mass of crude extract (g)	% age yield
Ethanol	<i>Ficus capensis</i> Leaves	161	111	600	50	31%
Ethanol	<i>Moringa oleifera</i> Leaves	161	111	600	54	34%

Weight of Albino Rats Administered with Ethanol Leaf-Extracts of *Ficus capensis* and *Moringa oleifera*

The result revealed a significant ($P < 0.05$) increase in the mean body weight of the rats administered ethanol leaf-extract of *Ficus capensis* and *Moringa oleifera* as shown in Figure 2.

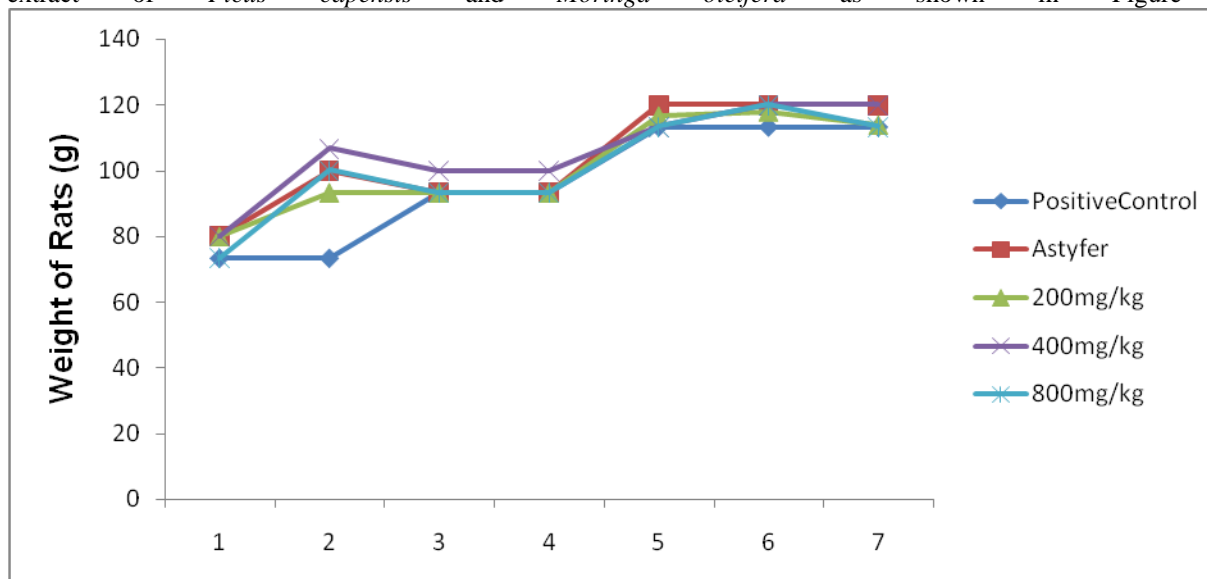


Fig 2: Weight of Albino rats Administered Ethanol Leaf Extract of *Ficus capensis* and *Moringa oleifera* for seven days.

Data are shown as mean S.D (n=5) and significant difference at $P < 0.05$.

Effect of Ethanol Leaf-Extract of *Ficus capensis* and *Moringa oleifera* on some haematological Indices

The result also revealed a significant ($P < 0.05$) increments in the levels of haemoglobin(Hb), packed cell volume (PCV), red blood cell (RBC) and white blood cell counts in the groups administered with ethanol leaf-extracts of *Ficus capensis* and *Moringa oleifera* relative to positive control as shown in

Figure 3-6. A significant ($p < 0.05$) increase in PCV and Hb levels in albino rats administered ethanol leaf-extract of *Moringa oleifera* in a dose dependent manner relative to groups administered ethanol leaf extract of *Ficus capensis* except in WBC and RBC where a significant ($p < 0.05$) increase was recorded in those groups administered *Ficus capensis* ethanol leaf extract relative to groups administered *Moringa oleifera* extract as shown in Figure 3-6.

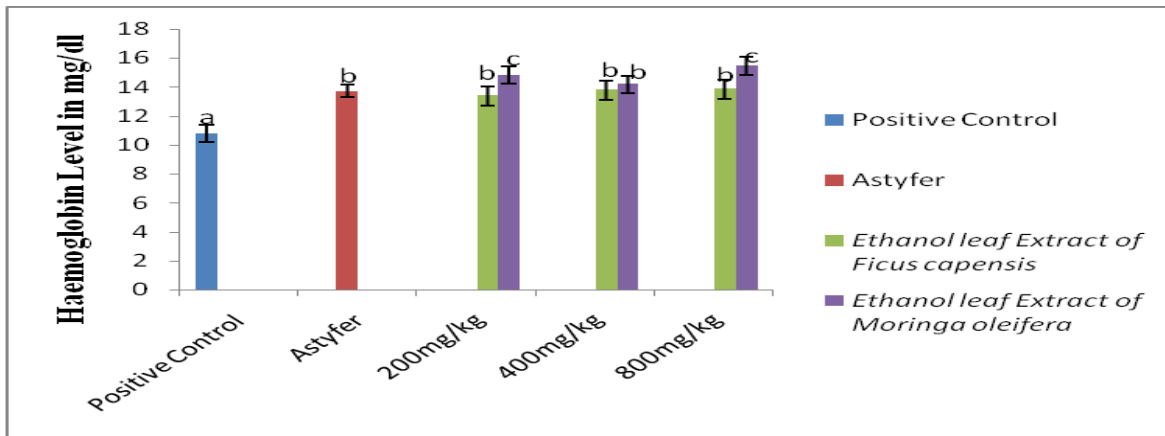


Fig 3: Haemoglobin levels in albino rat administered ethanol leaf-extract of *Ficus capensis* and *Moringa oleifera*. Data are shown as mean \pm S.D (n=5). Mean values in bars with different alphabets showed significant different at $P<0.05$.

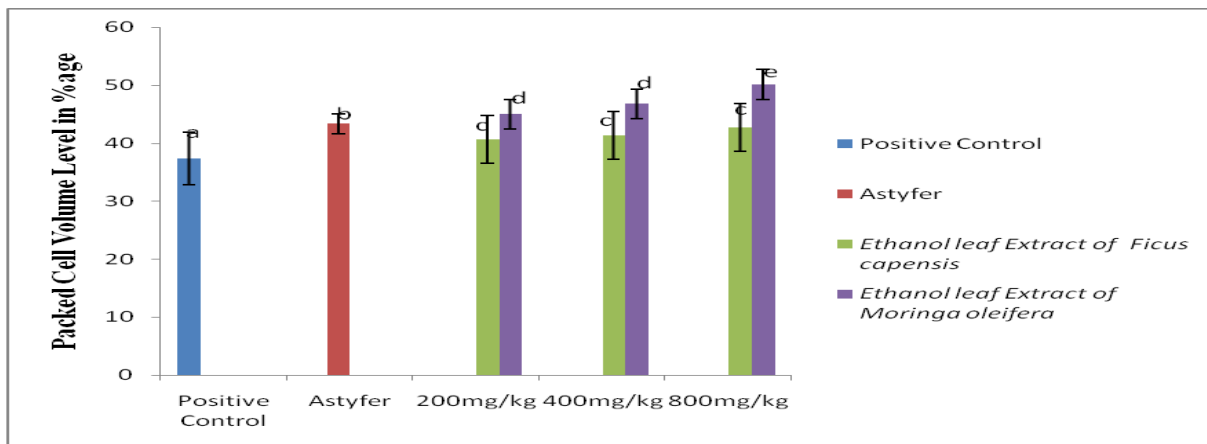


Fig 4: Packed Cell Volume level in albino rat administered ethanol leaf-extract of *Ficus capensis* and *Moringa oleifera*. Data are shown as mean \pm S.D (n=5). Mean values in bars with different alphabets showed significant different at $P<0.05$.

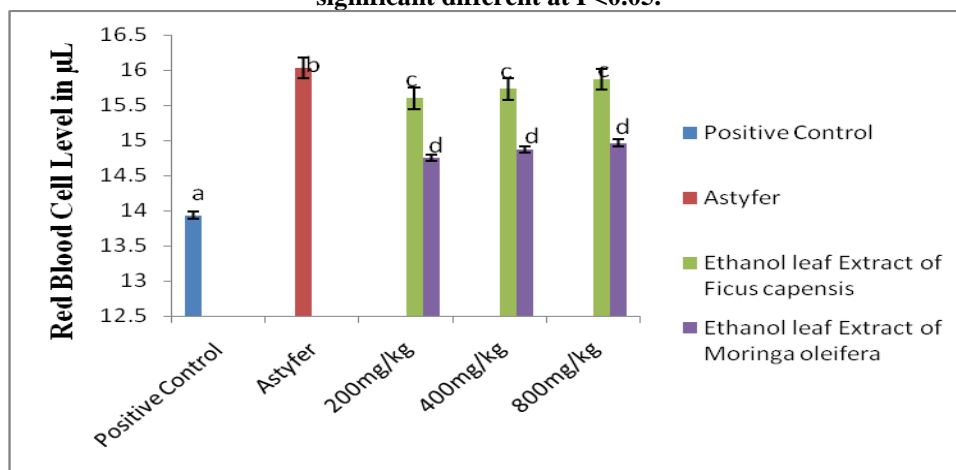


Fig 5: Red Blood Cell levels in albino rat administered ethanol leaf-extract of *Ficus capensis* and *Moringa oleifera*. Data are shown as mean \pm S.D (n=5). Mean values in bars with different alphabets showed significant different at $P<0.05$.

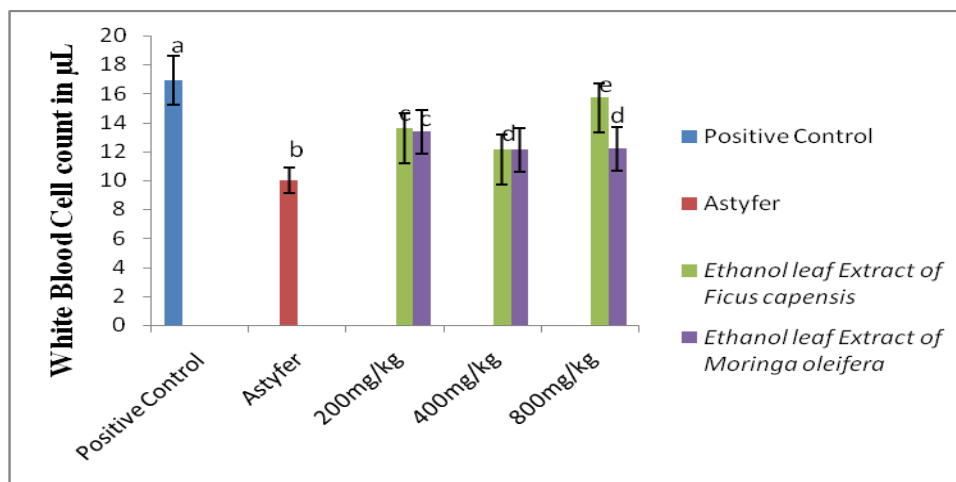


Fig 6: White Blood Cell Count in albino rat administered ethanol leaf-extract of *Ficus capensis* and *Moringa oleifera* Data are shown as mean \pm S.D (n=5). Mean values in bars with different alphabets showed significant different at $P < 0.05$.

DISCUSSION:

The result showed an increase in the mean body weight of the animals administered ethanol extract of *Ficus capensis* and *Moringa oleifera* leaves. Rats administered *Ficus capensis* and *Moringa oleifera* ethanol leaf extract showed a significant ($p < 0.05$) increase in mean body weight in the groups administered the extracts relative to positive control. This means that the plant extract is not toxic and could be used to manage malnutrition. The improvement in body weight gain achieved with the administration of these extracts in rats suggests the positive beneficial growth enhancing effects of these herbs. It could be that these extracts may have contained some essential nutrients that are responsible for growth and development. The enhanced body weight observed in this study strengthens the findings of Ahmed and Sharma (1997) and Ademola *et al.*, (2009)[8,11] who reported significant increase in body weight gain of rats and broilers fed a mixture of garlic and ginger.

The result also showed that *Ficus capensis* and *Moringa oleifera* leaves extracts increased white blood cell count, packed cell volume (pcv), haemoglobin(Hb) and red blood cell (rbc) levels significantly($p < 0.05$) as shown in Figure 3-6. This result supported the report of Onu and Aja (2011) [12] which reported that garlic and ginger supplemented diet significantly ($p < 0.05$) enhanced haematological parameters in rabbit. The general increase in PCV, RBC and Hb of rats administered ethanol extract of *Ficus capensis* and *Moringa oleifera* leaves indicates that *Ficus capensis* and *Moringa oleifera* leaves may contain blood forming

factors that may have stimulated more blood production by the rats that received the extracts than the group that did not received the extracts. This also suggests that these herbs may have helped in boosting the immune system of the rats. This result is correlation with Hisham *et al.* (2012) [13], which reported a significant ($P < 0.05$) increase in haemoglobin and packed cell volume level in rats treated with ethanol leaf extract of *Moringa oleifera*. Ujah *et al.* (2013) [14] also reported a significant ($P < 0.05$) increase in white blood cell counts in albino rats treated with ethanol leaf extract *Moringa oleifera* leaf. The result also supported the report of Sani *et al.* (2009) [15] which reported a significant increase in packed cell volume and red blood cell levels in rats administered aqueous stem extract of *Anisopos manii*.

CONCLUSION:

The ethanol leaf extract of *Ficus capensis* and *Moringa oleifera* showed significant ($p < 0.05$) increase in Hb, PCV, wbc and rbc in the studied graded doses. In general no significant ($p < 0.05$) effect was recorded on the haematological indices in rats administered ethanol leaf extract of *Ficus capensis* relative to rats administered *Moringa oleifera* extract .

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