

Effects of Ethanol Leaf - Extract Of *Pterocarpus Santalinoides* On Haemoglobin, Packed Cell Volume And Platelets

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Abstract: Effects of ethanol leaf-extract of *Pterocarpus santalinoides* on some haematological parameters were investigated in rats using spectrophotometric and centrifugation methods. Sixteen Wister albino rats were grouped into four (A, B, C and D). Groups A, B, C and D were administered the extract through oral intubation at the doses (mg/kg body weight) of 0, 200, 400 and 600 respectively for two weeks. The blood samples were collected on the fifteen day following the last day of administration. The Haemoglobin (Hb) levels (g/dl) recorded 12.30 ± 0.69 , 14.17 ± 1.25 , 15.63 ± 1.19 and 15.07 ± 0.93 for the animals in groups A, B, C and D respectively with corresponding levels (%) of packed cell volume (PCV) as 35.67 ± 2.08 , 43.00 ± 1.61 , 43.3 ± 1.53 and 45.00 ± 1.65 . Platelet (PLT) levels ($\times 10^9/l$) recorded 211.60 ± 5.09 , 347.67 ± 3.91 , 364.6 ± 5.15 and 435 ± 5.86 for groups A, B, C and D respectively. Hence, the results showed significant ($p < 0.05$) increase in the levels of haemoglobin, packed cell volume and platelets.

Key words: *Pterocarpus santalinoides* leaves, haemoglobin, packed cell volume, platelets and albino rats.

I. Introduction

Blood acts as a pathological reflector of the status of exposed animals to toxicants and other conditions (Olafedehan *et al.*, 2010). The examination of blood gives the opportunity to investigate the presence of several metabolites and other constituents in the body of animals and it plays a vital role in the physiological, nutrition and pathological status of an organism (Aderemi, 2004; Doyle, 2006). Examining blood for their constituents can provide important information for the diagnosis and prognosis of diseases in animals (Olafedehan *et al.*, 2010). Blood constituents change in relation to the physiological conditions of health. These changes are of value in assessing response of animals to various physiological situations (Khan and Zafar, 2005). Changes in haematological parameters are often used to determine various status of the body and to determine stresses due to environmental, nutritional and/or pathological factors (Afolabi *et al.*, 2010).

Haematological parameters such as haematocrit, haemoglobin, erythrocytes and white blood cells can be used as indicators of toxicity and have a broad potential application in environmental and occupational monitoring (Sancho *et al.*, 2000; Barcellos *et al.*, 2003). They are those parameters that are related to the blood and blood forming organs (Waugh *et al.*, 2001).

Plants are primary sources of medicines, food, shelters and other items used by humans every day. Their roots, stems, leaves, flowers, fruits and seeds provide food for humans (Amaechi, 2009; Hemingsway, 2004). They not only provided food and shelter but also serve the humanity to cure different dysfunctions. It is now believed that nature has given the cure of every disease in one way or another (Tiwari *et al.*, 2011). Plants have been known to relieve various diseases in Nigeria. One of such plant species used for the management and treatment of ailment is *Pterocarpus santalinoides* (Iwu, 1993; Dieye *et al.*, 2008).

Pterocarpus santalinoids, commonly called red sandal wood in English, "uturukpa" in Igbo. It is classified under the kingdom Plantae, Order (fabales), family (faboideae), Genus (*Pterocarpus*) and Species (*santalinoides*) (Prado, 2000; Anowi *et al.*, 2012). Various morphological parts of *Pterocarpus santalinoides* are used in traditional medicine, in many African countries, to treat an array of human ailments. The ethno-medical use of leaves of *Pterocarpus santalinoides* in the treatment of diarrhoea and other gastrointestinal disorders has been scientifically proven with its triglyceride and glucose lowering properties (Prado, 2000; Okpo *et al.*, 2011).

This work was aimed at examining the effects of ethanol leaf-extract of *Pterocarpus santalinoides* on haematological parameters of albino rats.



Figure 1: *Pterocarpus Santalinoides* (Anowi *et al.*, 2012).

II. Materials And Methods

Materials

Fresh leaves of fully grown *Pterocarpus santalinoides* were collected from Mgbabor village in Abakaliki local government area of Ebonyi State. Sixteen albino rats were purchased from animal house of the Faculty of Veterinary Medicine, University of Nigeria, Nsukka. All chemicals and reagents were of analytical grade.

METHODS

Extraction of Plant Materials

Pterocarpus santalinoides leaves were collected and dried under room temperature before being ground into power. The dried sample was ground with electric blender to powdery form. 500g of the ground sample was soaked with 1200ml of ethanol and left for 48hours. Muslin cloth was used to filter the solution and the filtrate was then allowed to evaporate under room temperature to obtain the sticky extract of *Pterocarpus santalinoides*.

Administration of Plant Extract

Sixteen albino rats were used for this study. They were distributed randomly into four groups (A, B, C and D). Groups A, B, C and D were administered the extract by oral intubation at the doses of 0mg/kg, 200mg/kg, 400mg/kg and 600mg/kg body weight respectively for two weeks.

Determination of Haematological Parameters

The haemoglobin concentration, PCV level and platelet count were done by the methods of Cheesbrough (2006).

Statistical Analysis

All the tested parameters were subjected to statistical analysis using T-test. Differences between means were regarded significant at $p < 0.05$ (Oyeka, 1996).

III. Results

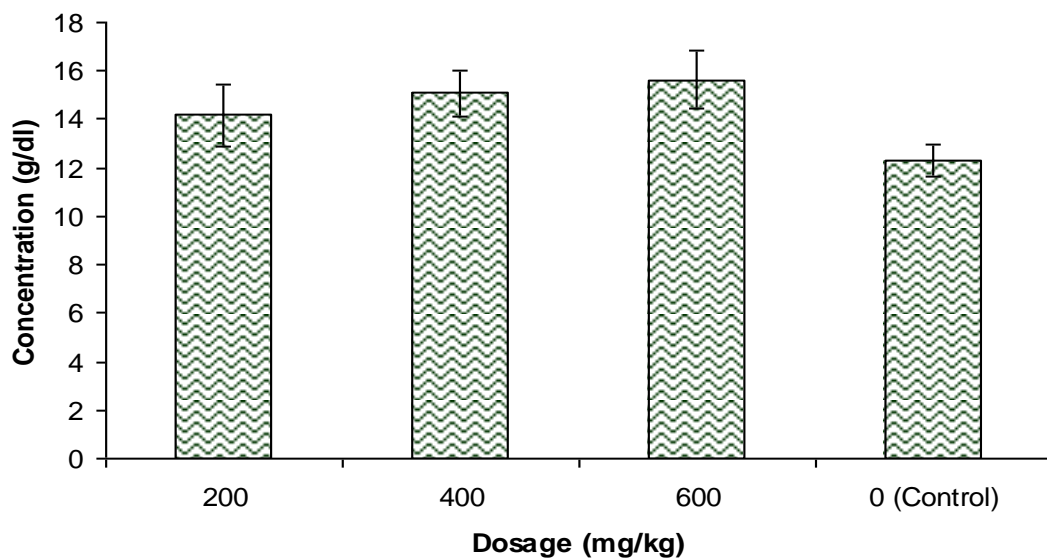


Figure 2: Haemoglobin levels (g/dl) in the albino rats administered with ethanol leaf-extract of *Pterocarpus santalinoides*

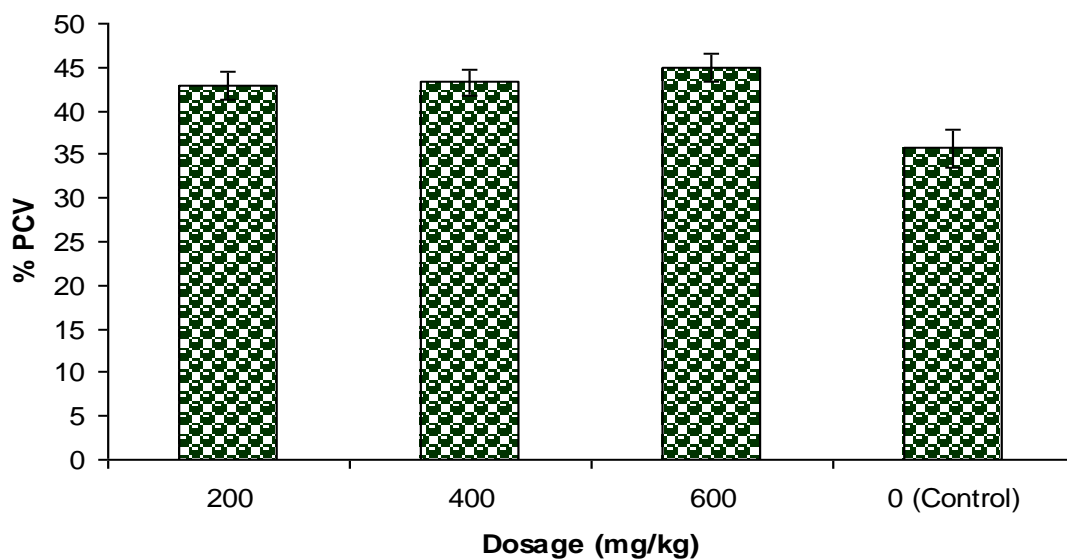


Figure 3: Packed cell volume (%) of the albino rats administered with ethanol leaf-extract of *Pterocarpus santalinoides*

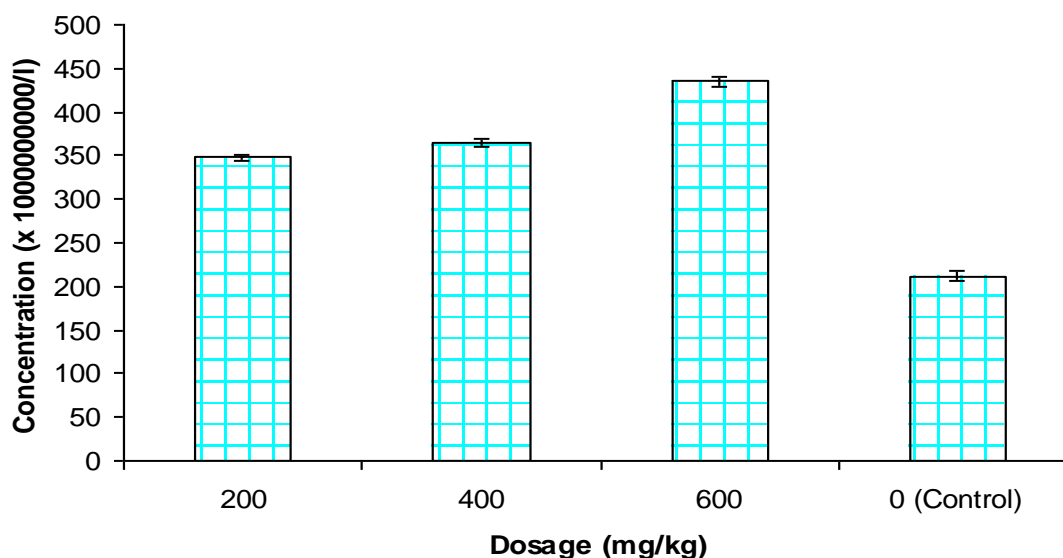


Figure 4: Platelet levels ($\times 10^9/l$) of the albino rats administered with ethanol leaf-extract of *Pterocarpus santalinoides*.

IV. Discussion And Conclusion

The levels of haemoglobin in the animals administered the ethanol leaf-extract of *Pterocarpus santalinoides* increased significantly ($p < 0.05$) and dose-dependently (Fig. 2). Similar result was reported by Okagbare *et al.* (2011) in which ethanol leaf-extract of *Pterocarpus santalinoides* recorded a progressive increase in the haemoglobin. Ajayi *et al.* (2010) reported that the inclusion of *Pterocarpus santalinoides* powder has effect on iron absorption. Aqueous extract of *Cucurbita pepo* increased the level of haemoglobin in animals treated with aqueous extract of *Cucurbita pepo* (Grantham and Anic 2001). Aqueous leaf-extract of *Vernonia amygdalina* produced no significant changes in PCV levels (Amole *et al.*, 2006). A decrease in PCV and Hb levels below normal values translates to anaemia and reduced oxygen carrying capacity. The findings are of nutritional, clinical and veterinary relevance considering the diverse applications of the plant in almost all African populations (Ojiako and Nwanjo, 2006).

The extract of *Pterocarpus santalinoides* also significantly ($p < 0.05$) increased the percentage levels of packed cell volume (PCV) of the albino rats (Fig. 3). The ethanol leaf- extract showed markedly a significant increase ($p < 0.05$) in the platelet index in the administered groups (Fig. 4). Report from Okagbare *et al.* (2011) indicates that the ethanol leaf-extract of *Pterocarpus santalinoides* has significant effect on the packed cell volume.

In conclusion, the ethanol leaf-extract of *Pterocarpus santalinoides* exerted significant ($p < 0.05$) and dose-dependent increase in the concentrations of haematological indices such as haemoglobin, packed cell volume and platelets.

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