The Effects of Ethanol Leaf-Extract of
Pterocarpus santalinoides on Liver Enzymes of Albino Rats

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Abstract: The effects of ethanol leaf-extract of Pterocarpus santalinoides on liver enzymes were investigated in albino rats using spectrophotometric methods. Sixteen albino rats were grouped into four (A, B, C and D). Animals were administered the extract through oral intubation at the doses (mg/kg) of 0, 200, 400 and 600 respectively for two weeks. The blood samples were collected on the fifteenth day following the last day of administration. The alanine aminotransferase (ALT) activities (u/l) recorded 28.77±1.39, 27.72±1.52, 25.92±1.34 and 23.83±1.57 for the animals in groups A, B, C and D respectively with corresponding activities (u/l) of aspartate aminotransferase (AST) as 76.57±2.58, 74.99±1.62, 71.61±2.01 and 70.23±1.34. The alkaline phosphatase (ALP) activities (u/l) recorded 70.14±2.27, 67.04±2.32, 65.17±1.87 and 59.19±2.04 for the animals in groups A, B, C and D respectively. The results recorded a significant (p<0.05) dose-dependent decrease in the activities of aspartate aminotransferase, alanine aminotransferase and alkaline phosphatase of the animals that received the ethanol leaf-extract of Pterocarpus santalinoides. Thus ethanol leaf-extract of Pterocarpus santalinoides could be hepato-protective.

Key words: Pterocarpus santalinoides Leaves • Liver Enzymes • Albino Rats

INTRODUCTION

Plants have been used as medicine since prehistoric times. Many of the herbs and spices used by humans to season foods also yield useful medicinal compounds [1]. In developing countries where modern western medicine is expensive, most of the indigenes rely on indigenous plants for the treatment of various ailments [2]. In Nigeria, different medicinal plants are implicated in some herbal recipes for the treatment of several diseases. Garlic is used as diuretic and vasodilator while Carica papaya is used as a remedy for hypertension. Digitalis lanata for cardiac diseases, Lola nitida used for the treatment of piles, Allium salivium as a cure for malaria and many more [3].

Pterocarpus santalinoides, 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) [4]. Various morphological parts of Pterocarpus santalinoides are used in ethno-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 diarrhea and other gastrointestinal disorders has been scientifically proven with its triglyceride and glucose lowering properties [5].

Liver is an organ of paramount importance, which plays a pivotal role in regulating various biochemical, physiological and biological processes such as storage, metabolism, secretion and control in the body. So it has a surprising role in the maintenance and regulation of homeostasis of the body system. It is evidently crucial in almost all the biochemical pathways to growth, fight against diseases, nutrient supply, energy provision and reproduction [6]. A liver enzyme is a protein that helps to speed up the rate of chemical reactions in the liver. Liver function tests are tests that are carried to critically evaluate and investigate essential and crucial functions of the liver for example metabolism, storage, filtration and excretion. However, not all liver function tests are measures of enzyme function [7].

Some of the medicinal plants and consumed leafy vegetables are hepatotoxic, [8]. Pterocarpus santalinoides leaves are among the commonly consumed leafy vegetables in Africa especially in Nigeria. This work was designed to evaluate the effect of ethanol leaf-extract of this plant on the liver enzymes of albino rats.
MATERIALS AND METHODS

Materials: All chemicals and reagents were of analytical standard. Fresh leaves of *Pterocarpus santalinoides* were obtained from Abakaliki, Ebonyi State. The albino rats were obtained from the animal house in the Veterinary department, University of Nigeria, Nsukka, Enugu State, Nigeria.

Methods

Extraction of Plant Material: The fresh leaves of *Pterocarpus santalinoides* were washed, air-dried and ground into powdered form. 700g of the powdered leaves was soaked in 1000ml of ethanol and left for 24 hours. The solution was squeezed and filtered with a muslin cloth and the filtrate was poured into an evaporation dish. It was then exposed to air and mild heat of the sun until a semi-solid extract was gotten [10].

Administration of Plant Extract: Twenty albino rats were grouped into four labeled A, B, C and D, each containing five albino rats. The rats were fed with grower’s feed and water for two weeks (14 days) for acclimatization before administration commenced. The animals in groups A, B and C were administered with the ethanol leaf-extract of *Pterocarpus santalinoides* by oral intubation at the doses of 200mg/kg, 400mg/kg and 600mg/kg of body weight respectively twice daily for two weeks, while group D (Control) was not given the extract, but was receiving 0.1ml of normal saline.

Collection of Blood Samples: The blood samples of the animals were collected through heart puncture and put in well labeled sterile test tubes.

Determination of Liver Enzymes: The methods of Reitman and Frankel [11] were used to determine aspartate aminotransferase (AST), alanine aminotransferase (ALT) and alkaline phosphatase (ALP) activities.

RESULTS AND DISCUSSION

There was a significant (p<0.05) decrease in alanine aminotransferase activity in the albino rats administered with ethanol leaf-extract of *Pterocarpus santalinoides* (Fig. 2). Kim and Wycoff [14] recorded normal activity of ALT in the liver of the rats that received the ethanol leaf-
extract of *Pterocarpus santalinoides*. Jones [15] recorded an increase in alanine aminotransferase activity of rats treated with *Gmelina arborea*. ALT is present in tissues throughout the entire body of the animal, but is particularly concentrated in the liver. The increase in activity is probably because there was damage to the organ [15].

The activities of AST also decreased in the sera of the rats administered the ethanol leaf-extract of *Pterocarpus santalinoides* (Fig. 3). Dial [16] recorded a normal activity of AST in the muscles and livers of the rats that received the ethanol leaf-extract of *Pterocarpus santalinoides*. There are other medicinal plants that increase or decrease the AST activity such as *Gmelina arboria* [17] and *Cocos nucifera* water (Nwangwa and Aloamaka, 2012) respectively. The ethanol leaf-extract of *Gmelina arborea* in rats significantly (p<0.05) and dose-dependently increased the activities of aspartate aminotransferase (AST) [10].

There was a dose-dependent significant (p<0.05) decrease in the activities of alkaline phosphatase (ALP) in the albino rats administered with the ethanol leaf-extract of *Pterocarpus santalinoides* (Fig. 4). Extract of *Pterocarpus santalinoides* provides significant protection against CCl₄-induced hepatotoxicity in rats [10]. Amadi *et al.* [3] also reported on the hepatoprotective ability of *Pterocarpus santalinoides*. In this view, the decreased activities of transaminases are an indication of stabilization of plasma membrane [8].

In conclusion, the ethanol leaf-extract of *Pterocarpus santalinoides* may be hepato-protective.

**REFERENCES**