

## Effect of Ethanol Leaf-Extract of *Annona muricata* on Serum Total Protein and Albumin Concentrations in Albino Rats

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**Abstract:** *Annona muricata* has been reported to treat several ailments such as headaches, insomnia, cystitis, liver problems, diabetes, hypertension, inflammation, dysentery, among others. The present study investigated the effect of ethanol leaf-extract of *Annona muricata* on serum total protein and albumin concentrations in albino rats using spectrophotometric methods. Twenty albino rats were randomly assigned into four groups (A, B, C and D) with five rats in each. Doses of 200mg/kg, 400mg/kg and 600mg/kg body weight of the extract were administered to animals in groups B, C and D respectively via oral intubation twice daily for fourteen consecutive days while group A served as control and received no extract. Blood of the animals were collected on the 15<sup>th</sup> day following the last day of administration through heart puncture. There was no significant effect ( $p > 0.05$ ) on serum total protein and albumin concentrations except at the dose of 600mg/kg.

**Key words:** *Annona muricata* • Serum total protein • Albumin concentrations and albino rats

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### INTRODUCTION

Plants have been used as medicines for many centuries because they contain phytochemicals. The components function as antibiotics, help to make cell walls impermeable to gas and water, act as structural materials to give plants stability and provide protection against ultraviolet light. Plant foods are rich sources of phenolics, which are molecules that can act as antioxidants to prevent heart disease, reduce inflammation, lower the incidence of cancers and diabetes, as well as reduce the rates of mutagenesis in human cells [1].

The use of medicinal plants in the industrialized societies has been traced as from traditionally used folk medicine. There are several reasons why medicinal plants should be subjected to scientific scrutiny. First and foremost, many herbal remedies have recognizable therapeutic effects [2] but they may also have toxic side-effects [3].

*Annona muricata* has a long history of usage in herbal medicine in the tropical areas of South and North America as well as in West Africa, especially in Western Nigeria. *Annona muricata L.* is one of the tropical fruits that demonstrate antioxidant properties. This plant contains chemical compounds which display antitumor, pesticidal, antiviral and antimicrobial

effects, thus suggesting many potentially useful applications. Ripe *Annona muricata L.* pulp extract contains three prominent acetogenins: asimicin, bullatacin and bullatalicin. Traditionally, the leaves are used for headaches, insomnia, cystitis, liver problems, diabetes, hypertension and as an anti-inflammatory, antispasmodic and antidiarrheal. *Annona muricata* has medicinal uses lowering elevated blood pressure [4].

Serum total protein is a biochemical test for measuring the total amount of protein in serum or a test that measures the total amount of two classes of proteins found in the fluid portion of blood, usually albumin and globulin [5]. Proteins are important building blocks of all cells and tissues. Proteins are necessary for body's growth, development and health. Albumin constitutes about half of the blood serum protein. It is soluble and monomeric. Albumin transports hormones, fatty acids and other compounds, buffers pH and maintains osmotic pressure, among other functions. Albumin is synthesized in the liver [6].

Serum total protein and albumin levels in animals are affected by intake of different plant extracts such as that of *Gmelina* leaves [7]. The present investigation was carried out to examine the effects of ethanol leaf-extract of *Annona muricata* on serum total protein and albumin concentrations in albino rats.

## MATERIALS AND METHODS

**Materials:** Twenty (20) albino rats were purchased from the University of Nigeria, Nsukka (UNN), Nigeria. Fresh leaves of *Annona muricata* were collected from Onueke, Ezza South L.G.A of Ebonyi State, South-East region of Nigeria in December. All chemicals and reagents were of analytical standard.

### Methods

**Extraction of Plant Material:** Fresh leaves of *Annona muricata* were dried at room temperature for one week. The leaves were ground into powder. 400g of the powdered *Annona muricata* leaves was soaked in 1000ml of ethanol and left for 48hours. 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 [8].

**Administration of Plant Extract:** Twenty healthy adult male albino rats were used for the experiment. They were acclimatized for one week on rats chow before commencement of the experiment. The animals were randomly assigned into four groups (A, B, C and D) of five rats in each. Group A which was the control was fed on the rat chow and was not administered the ethanol extract of *Annona muricata* leaves. Groups B, C and D were administered with 200mg/kg, 400mg/kg and 600mg/kg body weight of the extract respectively via oral intubation twice a day for two weeks. The animals were fed *ad libitum* with water and rat chow.

**Collection of Blood Samples:** The blood samples of the animal were collected through heart puncture into labeled plane bottles.

**Determination of Total Protein (TP) and Albumin Concentrations (ALB):** The methods of Cheesbrough [8] were used.

**Measurement of Body Weights:** The body weights of rats were measured on daily basis using weighing balance.

**Statistical Analysis:** Results are expressed as mean  $\pm$  standard deviation. The differences among means were analyzed by one-way ANOVA to check the level of relationship between the treated and control variables. A value of ( $p < 0.05$ ) was considered as statistically significant [9].

## RESULTS DISCUSSION AND CONCLUSION

There was no significant effect ( $P > 0.05$ ) on serum total protein concentrations in the albino rats treated with the ethanol extract of *Annona muricata* except at the dose of 600mg/kg (Figure 2). Similarly Iyang *et al.* [10] showed that the levels of total protein were decreased in *Clarias gariepinus* exposed to diazinon. There was a significant dose-dependent decrease ( $P < 0.05$ ) in total protein concentrations in the albino rats that received the ethanol extract of *Gmelina arborea* leaves [11].

There was also no significant ( $P > 0.05$ ) effect in albumin concentrations at 200 and 400mg/kg body weight in albino rats administered with extract of *Annona muricata* leaves, but the extract significantly decreased the albumin concentrations at the dose of 600mg/kg (Figure 1). The decrease in albumin level may be due to impaired protein synthesis or enhanced loss of protein via excretion and is also suggestive of some problems in the kidney and possibly the liver [12]. There was also a significant dose-dependent decrease ( $p < 0.05$ ) in albumin concentrations in the albino rats administered with

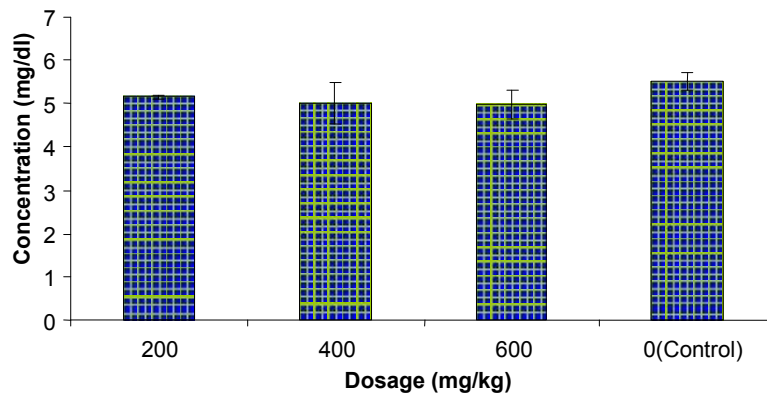


Fig. 1: Bar chart representation of albumin concentrations in albino rats administered with ethanol leaf-extract of *Annona muricata*.

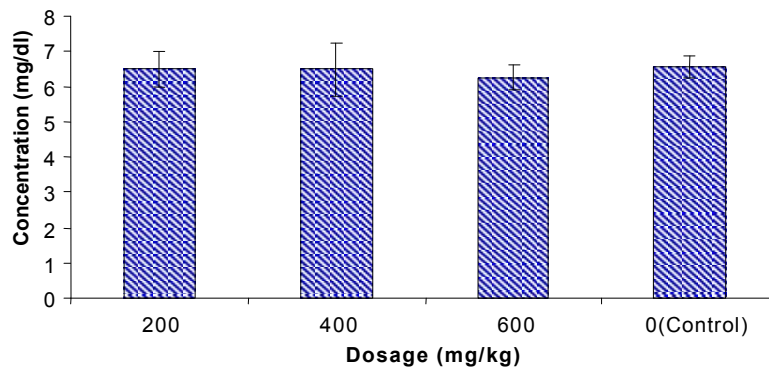


Fig. 2: Bar chart representation of Serum Total Protein concentrations in albino rats administered with ethanol leaf-extract of *Annona muricata*.

the ethanol leaf-extract of *Gmelina arborea* [13]. Saidu *et al.* [12] revealed that treatment of albino rats with *Gmelina arborea* aqueous leaf-extract significantly reduced the elevated levels of albumin towards the respective normal values indicating stabilization of plasma membrane as well as repair of hepatic tissue damage induced by paracetamol or other medications Vijah *et al.*[13]

In conclusion, the ethanol leaf-extract of *Annona muricata* had no significant effect on the serum total protein and the albumin concentrations at 200 and 400mg/kg, but could reduce their concentrations at 600mg/kg body weight.

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