

Effects of Ethanol Extract of *Psidium guajava* Leaves on Electrolyte Concentrations in Albino Rats

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Abstract: The effects of ethanol leaf- extract of *Psidium guajava* on electrolyte concentrations in albino rats were evaluated using spectrophotometric and titration methods. Twenty albino rats were grouped into four (A, B, C and D) containing five rats each. Ethanol leaf- extract of *Psidium guajava* was administered through oral intubation to the animals in groups A, B, C and D at the doses (mg/kg) of 200, 400, 600 and 0 respectively for two weeks. Blood samples were collected through the optical vein on the 15th day following the last day of administration. There was no significant ($p > 0.05$) effect in serum electrolyte concentrations.

Key word: Leaf-extract • *Psidium guajava* • Electrolytes and albino rats

INTRODUCTION

The use of herbs to treat diseases is almost universal among non industrialized societies [1]. Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies including opium, aspirin, digitalis and quinine. The world health organization (WHO) estimated that 80 percent of the populations of some Asian and African countries presently use herbal medicines for some aspects of primary health care. Pharmaceutics are expensive for most of the world's population. In comparison, herbal medicines can be grown from seed or gathered from nature for little or no cost [2].

Psidium guajava belongs to the family myrtaceae. It has spread widely throughout the tropics because it thrives in variety of soils, propagated easily and bears fruits relatively quickly. The fruits contain numerous seeds that grow within four years. It is an important food crop and medicinal plant in tropical and subtropical countries where it is widely used as food and folk medicine. The fruit, as well as its juice, is freely consumed for its great test and nutritional benefits. In many parts of African, the leaves, bark and roots of *Psidium guajava* are used traditionally for the management, control and treatment of an array of human disorder [3].

Electrolytes are charged low molecular mass molecules present in plasma and cytosol, usually ions of sodium, potassium, calcium, magnesium, chloride, bicarbonate, phosphate and lactate. They are classified as either anions, negatively charged ions that move towards an anode, or cations, positively charged ions that move towards a cathode. The major cations in the body include sodium, potassium, calcium and magnesium; while the major anions include chloride, bicarbonate, sulphur, phosphate etc. In mammals, the maintenance of osmotic pressure and water distribution in the various body fluid compartments is primarily a function of the four main electrolytes: sodium ion (Na^+), potassium (K^+), chloride ion (Cl^-) and bicarbonate (HCO_3^-) [4-5]. There are reported cases of diverse effects on the use of many medicinal plants. Most of these medicinal plants exert their effects on targeted sites, liver, kidney and often vital organs. Thus, there is need to investigate the effect of ethanol-leaf extract of *Psidium guajava* on electrolyte concentrations [6].

MATERIALS AND METHODS

Materials: The leaves of *Psidium guajava* were collected from Ikom, Cross River state, Nigeria in the month of April, while albino rats were gotten from University of Nigeria Nsukka (UNN). All chemicals and reagents were of analytical standard.

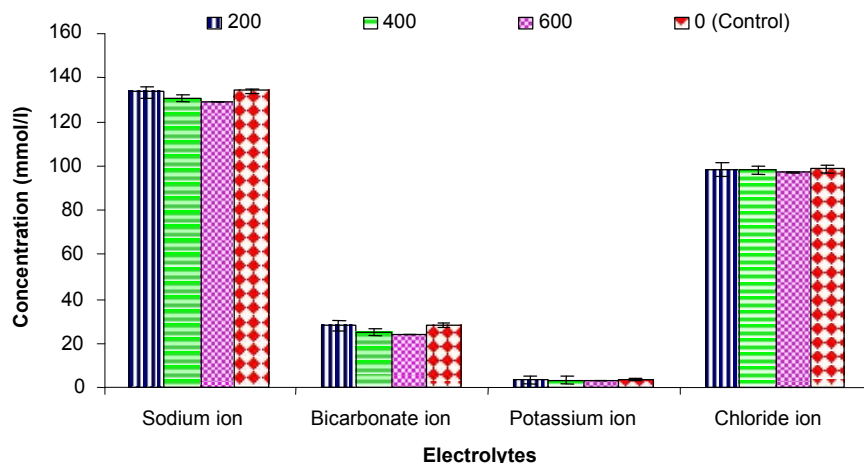


Fig. 1: Effect of ethanol-leaf extract of *Psidium guajava* on serum electrolyte concentrations

Methods

Extraction of Plant Material: *Psidium guajava* leaves were collected and dried in a mild sunlight. The dried leaves were ground into powder. 100g was soaked in 2litres of ethanol for 24 hours. The solution was filtered and the filtrate was dried under mild sunlight.

Administration of Plant Extract: Twenty albino rats were grouped into four (A, B, C and D). The rats in groups A, B, C and D received ethanol leaf-extract of *Psidium guajava* at the doses of 200mg/kg, 400mg/kg, 600mg/kg and 0mg/kg body weights respectively through oral intubation for 14 days.

Collection of Blood Sample: The blood samples were collected through cardiac puncture into sterile labeled tubes.

Determination of Electrolyte Concentrations: The sodium and potassium ion concentrations were determined by the spectrophotometric methods of Tietz (1970) [7]. The bicarbonate ion concentration was done using Titration method of Van Slyke (1922) [8] while the chloride ion concentration was investigated using titration method of Schales and Schales (1941) [6].

RESULTS, DISCUSSION AND CONCLUSION

There was no significant ($p > 0.05$) effect in electrolyte concentrations (Fig. 1). The serum levels of sodium, bicarbonate, potassium and chloride ions were not significantly ($p > 0.05$) altered. This is in accordance with the observation made by Oluoyomi

and Musbau (2012) [4] when they investigated the chronic daily administration of ethanol leaf extract of *Psidium guajava* on rat serum homeostasis for seven days. It is already known that sodium ion and potassium ion work and operate inversely as a result of the activity of sodium potassium pump (Davidson, 2010) [1]. Increased excretion of potassium ion would have resulted in concomitant re-absorption of sodium ion from the renal tubules.

In conclusion, the ethanol leaf- extract of *Psidium guajava* exerted no significant ($p > 0.05$) effect on serum electrolyte concentrations.

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