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SHORT COMMUNICATION

Influence of Xylopia Aethiopica Fruits on Some Hematological and Biochemical Profile

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Abstract: The present study was carried out to evaluate the effect of some hematological and biochemical profile on Wister albino rats treated with different concentration of *Xylopia aethiopica* fruit extract for 14days. 200mg/body weight, 150mg/body weight and 100mg/body weight of the extract were given to different groups while the control group received distilled water. The result showed the increase in haematological parameters was dose dependent. This implies that haemoglobin concentration, packed cell volume, red blood cell count and platelet were significantly increased when compared with the control ($P<0.05$). While serum cholesterol, triglyceride and LDL were significantly decreased when compared with the control ($P<0.05$). Also, serum potassium and sodium were increased when compared with the control($P<0.05$). Hence, *Xylopia aesthiopica* are used in folk medicine for arresting bleeding among women that put to bed as well as treating cardiovascular and diabetic diseases. Also, this plant may be a good factor in the maintenance of electrolyte balance.
Key Word: *Xylopia aethiopica*, haematological profiles, lipid profile, electrolyte profile.

Introduction

Plants have been the companions of man since time immemorial and formed the basis of useful drugs since they are less toxic than synthetic drugs [1]. Plant based medicament had served from the outset as the most important therapeutic weapon available to man to fight various human and animal diseases [2]. Most of these plants contain many bioactive chemical substances that produce definite physiological and biochemical actions in human body [3]. These bioactive constituents are alkaloids, tannin, flavonoid; Phenolic compound etc [4] plant derived natural products have received considerable attention in recent years due to the diverse pharmacological properties including antioxidant and antitumor activity [5]. Hence, plants remain the main source and are still indispensable in the traditional medicine for treating a number of diseases [2] Mythilypriya *et al* [6] reported that traditional medicines are used by about 60% of the world population both in the developing and developed countries where modern medicines are predominantly used. The use of herbs requires good knowledge of the toxicity dosage, purity, suitable extraction solvent and adverse effects [7]. In Nigeria, as in other developing counties, many fruits, shrubs, spices and herbs and leafy vegetables are used as foods, food drinks and for medical purposes [8].

Traditional medicine accounts for more than 80% of rural populace health's needs. The medicaments are prepared most often from a combination of two or more plant products which many a times may contain active constituents with multiple physiological activities and could be used in treating various disease conditions [9]. These plants can be administered in most disease conditions over a long period of time without proper dosage monitoring and considerations of its toxic effect that might result from a prolong use. Therefore, the warning as regards to potential toxicity of these treatment implies that the practitioners should be kept abreast of the reported incidence of renal and hepatic toxicity associated with the ingestion of medicinal herbs [10].

The plant, *xylopia aethiopica* fruits locally called **"uda"** by the southern eastern part of Nigeria. (That is the Igbo's). This is highly valued plant in Igbo land. Among the Igbo's; the fruits are used as spices; and aqueous decoction is used especially after child birth probably for its antiseptic properties and to arrest bleeding. This plant has a wide spectrum of biological activities and have played a crucial role in traditional medicines because of their valuable physiological and pharmacological properties [2]. The fruit have been found to contain volatile aromatic oil, fixed oil and rutin [11]. It is used in the treatment of digestive system hypermotility (diarrohea), bronchitis, stomach aches,febrile pains and rheumatism. This fruit of *xylopia aethiopica* has been reported to act as antioxidant, hypolipidemic and hypoglycaemic agent hence, confirming to its use as an antidiabetic agent [12]. In this study, the haematological profile (Haemoglobin,packed cell volume,red cell count and platelet) as well as biochemical profile (Lipid profile and electrolyte profile) are evaluated in order to demonstrate the benefit derived from *xylopia aethiopica*

Material and Method

Plant materials: The *Xylopia aethiopica* fruits were obtained from Ekeonunwa market in Owerri Nigeria. The botanical identification and authentication was confirmed by Dr. C. Okere (Head of Department of Plant Science and Biotechnology, Imo State University,Owerri). The plant material was sun dried for seven days.The dried fruit of *Xylopia aethiopica* were milled to get a coarse powder used for the extraction of the powder were macerated in a 400g percolator with 250ml of distilled water. The mixture was allowed to stand for 48hours after which it was filtered. The filterate was then placed in an oven to evaporate and the solid residue referred to as extract.(18.4g). The appropriate concentrations of the extract were made in distilled water for the experiment. Hence,the following concentrations: 100mg, 150mg and 200mg were prepared.

Experimental Animals: The Wistar albino rats weighing between 150 and 220g (ages 8 to 10 weeks) were used in this study. These animals were obtained from the Animals House of College of Medicine and Health Science, Imo State University Owerri Nigeria. They were kept under standard laboratory conditions, fed with commercial growers mash,product of Top feeds LTD, Sapele Nigeria. Water and feeds were provided *ad libitum.* The animals were left for two weeks to acclimatize and then divided into groups for experimentation.

Experimental Design: The animals were randomly assigned to four experimental groups (n=6 x 4 group). The fourth group of animals which served as control was given distilled water. Group I, II and III were given 100mg/kg, 150mg/kg and 200mg/kg body weight for 14days. In all groups, the extract was administered through oral route. This treatment was by oral compulsion. All animals were allowed free access to food and water through out the experiment.

Blood Collection: Twenty four hours after the last doses were administered the animals were anaesthetized with chloroform vapour,quickly brought out of the jar and sacrified. Whole blood was collected by cardiac puncture from each animal into clean dry test tubes and EDTA containers. The blood in the clean dry test tubes were allowed to stand for about 15minutes to clot and further spun in a westerfuge centrifuge (Model 1384) at 10,000g for 5minues, serum was separated from the clot with Pasteur pipette into sterile sample tubes for the measurement of biochemical profile while the EDTA containing samples was for the estimation of Haematological profiles. The haemoglobin concentration, packed cell volume, red blood cell count and platelet count of each sample were determined by using standard laboratory procedure[13]. The serum sodium and potassium, done using Hi-Tech.Diagonistic kit. The serum lipid profile was measured by the colorimetric method using Biosystem Kits. Cholesterol (COD11505), triglyceride (COD11528) and HDL-C (COD 11523) while LDL-cholesterol was determined by using the Fridwald formular[14].

Statistical analysis: The results were expressed as mean ± standard deviation. The statistical evaluation of data was performed by using one-way anova (Analysis of variance) followed by Duncan's multiple range test.

Result

Table-1: Mean value of Hb, PCV,RBC and platelet counts in experimental and control groups.

Parameters	Control (N=6)	Group I (N=6)	Group II (N=6)	Group III (N=6)
Hb(g/dl)	11.10±0.56	13.26±0.62*	13.41±0.29*	14.02±0.41*
PCV (%)	39.94±1.16	44.10±2.10*	44.20±1.20*	45.01±0.39*
RBC(X 10^6/L)	5.81±0.11	7.02±0.41*	7.71±0.21*	7.96±0.64*
Platelet(x 10^9/l)	2.18±0.19	2.36±0.13	3.51±0.16*	3.66±0.10*

*Significantly different from control (P<0.05)

Table II: Shows the mean value of lipid profile in experimental and control groups

Parameters	Control (N=6)	Group I N=6)	Group II (N=6)	Group III (N=6)
Cholesterol (mmol/l)	1.54±0.019	1.52±0.14	1.28±0.116	1.08±0.011*
Triglyceride(mmol/l)	1.47±0.037	1.43±0.031	1.40±0.018	1.131±0.014*
HDL (mmol/l)	1.03±0.010	1.03±0.010	1.11±0.013*	1.10±0.011*
LDL (mmol/l)	0.22±0.002	0.16±0.013	0.11±0.099	0.15±0.002*
Glucose (mmol/l)	5.78±0.016	4.61±0.013	4.56±0.99	3.49±0.014*
Sodium (mmol/l)	132.21±0.74	132.58±0.76	134.61±1.20	140.11±0.68*
Potassium (mmol/l)	5.09±0.18	5.24±0.18	5.91±0.14	6.43±0.10*

*Significantly different from control (P<0.05)

Discussion

Researches on herbal medicine have attained an incredible global level in the recent past. The application of some plants constituents in pharmaceutical industries has gone long way in the elevation of the status of the traditional herbal medicine in Africa and in Nigeria in particular [15]. Hence herbal medicines have received greater attention as an alternative to clinical therapy leading to increasing demand [6]. The use of herbal drugs by elites and non-elites for the treatment of diseases in Imo State Nigeria is very common particularly in the rural area. Ogbonna *et al* [2] state that experimental screening method is important in order to ascertain the safety and efficacy of herbal product as well as establishing the active component of these herbal remedies. In Imo State Nigeria, the use of *Xylopia aethiopica* as spices, anti-inflamatory, worm expeller and anti-malarial is not uncommon.

The present study has shown that the extract of *Xylopia aethiopica* on haematological profile is dose dependent. There was a significant increase in RBC, Hb, PCV and platelet in the rats that received different concentration of the plant extract *X. aethiopica*. The high levels of RBC may probably be associated with the high iron content of *Xylopia aethiopica* and the ability of the iron to stimulate haemopoesis may be due to high level of RBC and PCV. The increase in the haemoglobin may be associated with the increase in the absorbtion of iron. The increase may be due to the increased immunopotientiating effect of *X. aethiopica*[12]. The elevation in the platelet function in the treated group may be associated with its role in arresting bleeding in women that put to bed [2].

The study revealed that the extract decreased the plasma glucose level in treated rats compared with the control; which was concentration dependent. This could be probably due the presence of hypoglycemic agent in the extract. This observation gives credence to the use of this plant product as a hypoglycemic agent [16]. The mechanism could be that *Xylopia aethiopica* decreases gluconeogenesis by decreasing the activities of key enzymes such as glucose-6-phosephatase, fructose-1,6-bisphosphate phosphoenolpyruvate carboxykinase and pyruvate carboxkinase [17]. Glucose-6-phosphatase is an important enzyme in homeostasis of blood glucose as it catalyzes the terminal step both in gluconeogenesis and glycogenolysis, while fructose-1,6-bisphosphatase is one of the key enzymes of gluconeogenic pathway [18]. Hence,this plant decreasing the activities of these enzymes probably makes it potentially hypoglycaemic agent. This is in line with the work of Nwanjo [19] and Edet *et al* [15] in which the plasma glucose was decreased with the treatment of herbal plants. From the study, it was observed that plasma cholesterol, triglyceride and LDL Cholesterol were decreased when compared with the control.This is in contrast to the work of Nnodim [20] in which lipid profile were increased in smokers except HDL cholesterol. This observed decreased could be associated with the presence of hypolipidemic component in the extract. On the other hand, the plasma HDL cholesterol was elevated in the treated group when compared with the control. This showed that the extract had some beneficial effects by reducing cardiovascular risk factor. The levels of serum lipids are usually elevated in cardiovascular disease,such an elevation represents a risk factor for coronary heart disease [1].

Therefore, the administration of *Xylopia aethiopica* extract caused significant decrese in lipid profile.In fact, the mechanism leading to lipid alterations in *Xylopia aethiopica* fed rats could be that there is reduction in stimulation of sympathetic adrenal system leading to decrased secretion of catecholamine resulting in decreased concentration of plasma free fatty acids which further result in decreased secretion of hepatic free fatty acids [20]. Hence, the decreased level of total cholesterol, triglyceride and LDL-cholesterol.

Also, it was observed that plasma levels of sodium and potassium significantly increased in the rats treated with *Xylopia aethiopica* when compared with the control. This finding is suggestive of a mild hypernatriemic and hyperkalaemic effect. Hence, it probably may favour an improvement in renal function by increasing sodium and potassium reabsorption. The findings in this research work,have revealed that the application of *Xylopia aethiopica* extract in the treatment of platelet disorder and cardiovascular disease may have significant effects in moderating such conditions.

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