International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 3 Number 1 (2014) pp. 724-729**
http://www.ijcmas.com

Original Research Article

The effects of aqueous leaf extract of *Mucuna pruriens* (agbala) on some selected biochemical indices of wister albino rats

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A B S T R A C T

The effects of aqueous leaf extract of *Mucuna pruriens* on some selected biochemical parameters of aspartate amino transferase (ALT), alanine amino transferase (ALT) and some trace elements on wister albino rats were assayed. The results showed a significant ($p<0.05$) increase in the liver enzymes of ALT and AST of the heated and raw extracts when compared with their corresponding controls. The iron and copper concentrations of the rats increased significantly ($p<0.05$) in the raw and heated extract groups when compared with the controls. The zinc concentration increased significantly ($p<0.05$) in the raw extract group but decreased significantly ($p<0.05$) in the heated extract group when compared with the control. There was a progressive change in the relative body weights of the rats after 11 days of feeding. The results of this study showed that aqueous leaf extract of (Agbala) *Mucuna pruriens* are rich in iron and copper and could be dangerous to the liver as shown from the elevated levels of AST and ALT liver markers of the heated and raw extract groups.

Keywords

Mucuna pruriens;
Agbala Leaf;
Alanine amino-transferase;
Aspartate amino transferase;
Trace elements.

Introduction

Plant extracts have been used in folk medicinal practices for the treatment of various ailments since antiquity. A medicinal plant as defined by the world health organization (WHO) is a plant which one or more parts of it contain substances that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs (Ogamba *et al*., 2011). *Mucuna pruriens* is thought to have originated from India. It is one of the popular medicinal plants of India and it constitutes more than 200 indigenous drug formulations. All parts of *Mucuna pruriens* posses valuable medicinal properties.

In the eastern part of Nigeria *Mucuna*

pruriens popularly known as agbala leaf in Igbo populace is used as a blood tonic traditionally (Katzenshlager *et al*., 2004; Akindele and Busavo, 2011 and Ogamba *et al*., 2011). Among the natives of eastern part, the use of *Mucuna pruriens* (agbala leaves) extract is a very common remedy for the treatment of anemia. The fresh leaves are collected from the farm, garden or bush manually, the leaves are washed with clean water and then squeeze to remove the liquid content of the leaves (Katzenshlager *et al*., 2004). This liquid extract is then boiled for about five minutes and is taken orally as blood tonic to boost blood production.

Aims and objectives of the research

The aim of this research was to determine the effects of aqueous leaf extract of *Mucuna pruriens* on some selected biochemical parameters of aspartate amino transferase (ALT), alanine amino transferase (ALT) and some trace elements on wister albino rats in order to determine the efficiency of this extract in African traditional medicine.

Materials and Methods

Preparation of the aqueous plant extract

The leaves of *Mucuna pruriens* were washed and weighed. 100g of the leaves were extracted with 100ml of distilled water with the aid of a manual (cheese cloth) sieve. 60ml of *Mucuna pruriens* was measured and heated for 5mins. The heated extract was allowed to cool at room temperature while the remaining 60ml (raw extract) was used like that. 60mls of raw and heated extracts were measured and given to the rats daily.

Plant materials

The leaves of *Mucuna pruriens* were collected from Umuoma and were authenticated by Mr. C.J Onyirioha of the Department of Biochemistry Anambra State University, Uli.

Experimental animals

The animals used for this study were both male and female wister albino rats with average weight of 45-66g. They were purchased from animal house of the Faculty of Pharmaceutical Sciences, University of Nigeria Nsukka. The animals were housed in locally fabricated cages in the animal house of Department of Biochemistry, Anambra State University, Uli for 4 weeks. They were allowed to acclimatize to the new environment for seven days before the commencement of the experiment. They were fed with animal feed water *ad labitum*.

Experimental design

Nine wister albino rats were used in this study. The rats were randomly divided into three groups made of three animals each as shown below. The animals were fed for three weeks. They were given extract to drink at their own will which served as their water.

Group A: served as the control and received only water and normal guinea feed.

Group B: 60ml of raw extracts

Group C: 60ml of heated extracts

Body weights

Initial and final body weights of the animals were recorded at the end of the treatments period (3 weeks), the animals

were sacrificed and blood sample collected.

Sample collection

Blood sample was collected from the rats fed with aqueous extracts using orbital technique. Blood sample was collected from the retro –bulbar plexus of the medial canthus of the eye to puncture the retro-bulbar plexus out flow of blood into bottle containing ethylene-diamine-tetra-acetic acid (EDTA). The sample was stored at 4°C before analysis.

Determination of liver markers

Liver markers of ALT and AST were assayed using Reitman and Frankel (1957) methods as outlined in the Randox kit.

Determination of trace elements

Iron, copper and Zinc concentrations of the experimental rats were assayed using AOAC, 1990 methods.

Results and Discussion

The data showed that ALT and AST concentrations of the rats increased ($p<0.05$) significantly in both raw and heated extracts when compared to their respective controls (Table.1).

The results showed that copper and iron concentrations of the experimental rats also increased significantly ($p<0.05$) in both copper and iron levels of raw and heated extract groups when compared with that of their respective control groups. But zinc decreased in heated extract group when compared with the control (Table.2).

There was a progressive change in the relative body weight of the rats after eleven days of feeding. There was also, a relatively body weight change after twenty one days of feeding, but the change was not progressive like that of eleven days of feeding .

The results of this analysis carried out on the effects of aqueous leaf extract of *Mucuna pruriens* on some selected liver markers of AST, ALT and some trace elements on wister albino rats revealed an elevation in ALT, AST and some trace elements of copper and iron. These results showed that *Mucuna pruriens* raw and heated leaf extracts could be deleterious to the liver in high concentration and at the same time increase the production of blood.

Zinc is always in close association with proteins, it occurs wherever protein is and enhances protein function (Ezeokonkwo, 2004). Iron is an essential component of haemoglobin, therefore its high amounts in the extract indicates that the extract plays a role in the synthesis of blood.

The results in table 3 showed a progressive change in the relative body weight of the rats after 11 days of feeding. There was also a relatively body weight change after twenty one days of feeding, but not as progressive as that for 11 days of feeding. This shows that as the extract was serving as water to the rats, they did not actually drink it as water and they became dehydrated and did not gain much weight. Meanwhile, their nutritional status was also affected and they drank heated extract more than raw extract. Also, the heated extract rats gained more weights than that of the raw extract rats.

In conclusion, the results of this study suggest that the raw and heated extracts of *Mucuna pruriens* could be used in the

Table.1 The results of some selected biochemical parameters of rats fed with *Mucuna pruriens*

Sample	Aspartate amino transaminase (AST)	Alanine amino transaminase (ALT)
Raw extracts	41.67±0.015	52.65±0.0208
Heated extracts	41.35±0.015	51.35±0.305
Control	40.52±0.208	50.48±0.029

Table.2 The results of some selected trace elements of rats fed with *Mucuna pruriens*

Sample	Zinc (mg/l)	Copper (mg/l)	Iron (mg/l)
Raw extracts	6.67±0.005	1.21±0.015	112.95±0.029
Heated extracts	4.42±0.028	0.99±0.015	81.32±0.028
Control	5.73±0.028	0.52±0.028	76.23±0.028

Table.3 The results of the mean body weights (g) of rats fed with *Mucuna pruriens*

Sample	Mean body weight in (g) before feeding	Mean body weight in (g) after eleven days of feeding	Mean body weight in (g) after twenty one days of feeding.
Raw extracts	53.85	70.48	78.45
Heated extracts	50.62	71.32	81.82
Control	63.53	96.99	120.44

synthesis of blood when consumed because of its high contents of iron, copper and zinc. The results also showed that heated and raw leaf extracts of *Mucuna pruriens* could be deleterious to the liver in high concentration.

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