Effects of *Monodora myristica* Seed on Lipid Profiles, and Mineral Concentrations of Male, Female, Pregnant and Lactating Albino Rats

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ABSTRACT

Effects of *Monodora myristica* seed on lipid profiles, and mineral concentrations of male, female, pregnant and lactating albino rats. Lipid profile results revealed that cholesterol reduction in male and female rats become significantly (p<0.05) affected when compared with their controls after one week. Those of pregnant and lactating rats became significantly (p<0.05) affected against their controls after two weeks. HDL-cholesterol and LDL-cholesterol were significantly (p<0.05) affected in all the status of rats used when compared to their controls. The levels of the mineral ions as observed in the present study were insignificantly (p>0.05) affected in all the status of rats used against their controls. Hence *Monodora myristica* was not able to influence the levels of the mineral ions investigated in all the status of rats used. This study has shown the effects of *Monodora myristica* seed on lipid profiles and mineral concentrations of male, female, pregnant and lactating albino rats.

(Keywords: lipid profiles, medicinal plants, mineral concentration, spices)

INTRODUCTION

Plants have a long history of being effective against disease conditions (Osai, 1998). The early man recognized their importance and used them to remedy different diseases (Okpuzor et al., 2008). Such plants according to Safowora (1982) are called medicinal plants. The same author also defined a medicinal plant as one whose one or more of its organs contains substances that can be used for therapeutic purpose or which are precursors for the synthesis of useful drugs. With the renewed interest on medicinal plants at the close of the 20th century, the practice of medicinal plants therapy also known as phytomedicine, alternative medicine, or herbal medicine has been on the increase. The practice has been used in healthcare delivery in many parts of Africa and the rest of the world (Edem, 2009; Okigbo and Mmeka, 2006). Akpanabi et al. (2005) noted that the use of herbal in third world countries is high.

*Monodora myristica* is among such plants used in the practice of medicinal plant therapy. *Monodora myristica* commonly called calabash nutmeg, is found in tropic Africa and belongs to Annonaceae family (Barwick, 2004; Burkhill, 1985). It bears fruits with brown-oval seeds which have mint smell. The seed is used as spice. Arocin, saponins, resin, terpene, lactose, flavonoids, etc are among the chemical constituents found in *Monodora myristica* (Iwu, 1993). Different tribes in Nigeria have different names for the plant. For instance, *Monodora myristica* is called “ehuru”, “lakosin” and, “uyenghen” among the Igbo, Yoruba, and Edo tribes respectively (Burkill, 1983). The seeds of *Monodora myristica* are used to remedy disease conditions such as constipation, lice, guinea worm, headache, anaemia, impotence, wounds, and arthritis (Tolu, 2008).

Studies have revealed the physiological effects of some medicinal plants in the body using rats models (Edem, 2009; Nworgu et al., 2008; Odula et al., 2007a; Odula et al., 2007b; Ojowole and Adewole, 2007; Ojowole, 2005; Salehdeen et al., 2004; Nimenibo-Uadie, 2003) but that of *Monodora myristica* is scare. The present study therefore aimed at ascertaining the effects of *Monodora myristica* (using its seed) on lipid profiles and mineral concentrations using different rat status. The rat statuses considered in the present study were male, female, pregnant and lactating Wistar albino rats.

MATERIALS AND METHODS

Sample collection and preparation: Seeds of *Monodora myristica* used in this study were purchased from Ngwa Road Market in Aba, Abia State, Nigeria. The seeds were properly identified and authenticated by Dr. F.N. Mgbagwu of Department of Plant Science and Biotechnology, Imo State University, Owerri, Imo State Nigeria. The identified seeds were air dried for two days and crushed using laboratory blender. The ground sample was stored in a glass bottles with a plastic screw caps till required for further studies.
Experimental animals: A total of one hundred and sixty albino rats of wistar strain, forty each for each status considered were used in this study. The rats weighed between 100g -120g and were obtained from the colony of Department of Biochemistry, University of Port-Harcourt, Rivers State, Nigeria. The animals were housed in a well-ventilated experimental animal house and were given standard pelleted diets and portable water ad libitum. The rats were left to acclimatize for four days. After acclimatization period, the rats were separated into two major groups. One group was used as the control while the other served as test group. Test group was further subdivided into four groups to accommodate the different status (male, female, pregnant, and lactating) of rats used in the present study. Each status had thirty-two test rats and eight rats as control. The weights of the rats were equalised as nearly as possible. Aside the control group, the test groups were given compounded rat feed (5% (w/w) supplementation of the diet) for twenty-eight days. The treatment of the animals were as follows

The control group: normal rat feed + portable water; Group A1 (male), A2 (female), A3 (pregnant) and A4 (lactating) were placed on 5% ground Monodora myristica seed+ portable water;

All animals were treated in accordance with recommendations from the declaration of Helsinki on guiding principles in the care and use of animals.

Blood sample collection: The experimental animals were sacrificed weekly for four weeks. At the end of each week, rats from each group were sacrificed by making incisions at their cervical regions with sterile blades after being anaesthetized with chloroform (CHCl3) vapour. Blood was collected by direct heart puncture with help of syringes into anticoagulant free tubes for lipid profiles and mineral analysis. The tubes were subsequently used for analysis.

Assay of lipid profiles: Total cholesterol was estimated by an enzymatic reaction of (Allain et al., 1974). HDL cholesterol was estimated as for total cholesterol after precipitation of the other lipoproteins. Triglyceride was also estimated by enzymatic reaction (Buccolo and H. David 1973). LDL-cholesterol was calculated using the formula of (Friedwald et al., 1972) as follows LDL-cholesterol (mg/dl) = Total cholesterol (mg/dl) - (HDL-cholesterol (mg/dl) + TG/5) (mg/dl).

Blood mineral analysis: Inorganic phosphate, calcium, sodium and potassium concentrations were estimated using colorimetric methods while chloride was estimated using titrimetric method.

Statistical analysis: The differences among experimental and control groups were determined using SPSS for Window XP Software Programme (version 13.0). Group comparisons were done using the analysis of variance (ANOVA) test. Significant differences between control and experimental were assessed by least significant difference (LSD) at 5% level. All data were expressed as mean ± deviations.

RESULTS AND DISCUSSION

High blood lipids are associated with hypertension (Udoh, 1998; Udoh et al., 1990; Recknagel et al., 1983). Triglycerides are fat or lipid that combine with cholesterol to form plasma lipids and gets deposited in the vessels (Sharon and David, 2008). They are also sources of energy in the body (Rodriquez-Cruz et al., 2005). High triglycerides are associated with high cholesterol levels. High cholesterol levels could imply high risk of disease conditions such as heart attack, stroke, etc (Duru et al., 2002; Satia et al., 2002). Triglyceride levels in male (Fig.1) and female (Fig.2) rats were insignificantly (p<0.05) affected against their controls in this study. Triglycerides of pregnant rats increased significantly (p<0.05) against the control but had a sharp significant decrease (p<0.05) against the control from the first week to the fourth week. That of lactating rats decreased significantly (p<0.05) against the control from week one to the fourth week. Cholesterol levels of male (Fig.1), female (Fig. 2), pregnant (Fig.3) and lactating (Fig. 4) rats were on the reducing trend against their control. The observed reduction in cholesterol levels of male and female rats became significant (p<0.05) after one week while those of pregnant and lactating rats became significant after two weeks. HDL-cholesterol transports excess cholesterol to the liver where they are excreted (Sharon and David, 2008). The HDL levels in all the status of rats were significantly (p<0.05) on the increase against the control after each week throughout the four week of the study. The observed increase could be that the seeds of Monodora myristica can induce the production of HDL-cholesterol. LDL-cholesterol is termed bad cholesterol because of its role in depositing excess cholesterol from the liver to the vessels where they increase the risk of high blood pressure and other diseases (Sanjay and Maulik, 2002). The observed LDL-cholesterol levels in male (Fig. 1), female (Fig. 2), pregnant (Fig. 3), and lactating (Fig. 4) rats reduced significantly.
(p<0.05) against their controls after each week. The observed reduced levels of LDL-cholesterol in the present study could imply that the studied seeds influenced the levels of LDL in the system.

RESULTS AND DISCUSSION

Figure 1: Lipid profiles of male rats placed on *Monodora myristica*.

Figure 2: Lipid profiles of female rats placed on *Monodora myristica*. 
Figure 3: Lipid profiles of pregnant rats placed on *Monodora myristica*.

Figure 4: Lipid profiles of lactating rats placed on *Monodora myristica*. 
When calcium and sodium ions are altered, organs such as the heart may be affected (Olusanya, 2008; Schneider and Woliling, 2004). For instance sodium ion calcium ion anti-porter relationship is known to strengthen the cardiac muscles (Schneider and Woliling, 2004). Observed sodium ion levels in male (Fig. 5), female (Fig.6), pregnant (Fig.7) and lactating rats (Fig.8) increased insignificantly (p>0.05) when compared to their controls. High levels of sodium have been linked with hypertension (Akpanabiatu et al., 2005). Potassium ion is among the protective electrolytes against hypertension (Akpanabiatu et al., 2005). Potassium and calcium ion levels in rats placed on Monodora myristica in the present study were insignificantly affected (p>0.05) against their controls. Chloride and phosphate ion levels were insignificantly increased (p>0.05) against their control as observed in Fig. 5 to Fig. 8. The observed insignificant increase of these ions in the present study could be that the Monodora myristica was not able to influence their mechanisms in the rats used.

CONCLUSION

Conclusively, the present study has shown the effect of Monodora myristica seed on lipid profiles, and mineral concentrations of different status of albino rats.

REFERENCES


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