

Effects of Ethanolic Leave Extract of *Calotropis procera* on the Histology of the Liver of Adult Male Rabbits (*Oryctolagus cuniculus*)

A.A. Buraimoh, T. Murdakai and J. Soni

Department of Human Anatomy, Faculty of Medicine, Ahmadu Bello University, Zaria, Kaduna, Nigeria

Abstract: *Calotropis procera* (*C. procera*) has been reported to be medicinal and toxic in animals. This research work was designed to evaluate the effects of ethanolic leave extract of *C. procera* on the liver of adult male rabbits (*Oryctolagus cuniculus*). Group A served as the control, which received distilled water only; Group B and Group C were treated with ethanolic extracts of *C. procera* at 250 and 500 mg/kg body weight respectively for two weeks (14 days). The rabbits were all humanely sacrificed on the 14th day. The liver was harvested and fixed immediately in formalin. The liver tissues were processed, stained in Haematoxylin and Eosin (H&E) and then viewed under a light microscope. Histological observations of the liver showed that ethanolic leave extract of *C. procera* caused damage to the liver tissues of male rabbits at a high dose as evident in necrotic tissue seen in treated groups. Therefore, caution should be taken in its usage.

Key words: Adult, *Calotropis procera*, effects, liver, male rabbits

INTRODUCTION

The liver is found in all vertebrates, and is typically the largest visceral organ. Its form varies considerably in different species, and is largely determined by the shape and arrangement of the surrounding organs. Nonetheless, in most species it is divided into right and left lobes; exceptions to this general rule include snakes, where the shape of the body necessitates a simple cigar-like form. The internal structure of the liver is broadly similar in all vertebrates. It neutralizes toxins, and manufactures bile which aids fat digestion and removes toxins through the bowels (Maton *et al.*, 1993) (Romer and Parsons, 1977). *Calotropis procera* (*C. procera*) belongs to the family *Asclepiadaceae* and is a soft wooded, evergreen perennial shrub having few stems, few branches and relatively few leaves concentrated near the growing tip. A copious white sap referred to as the latex flows whenever the stems or leaves are cut. The plant is commonly found in Asian temperate region (Arabian Peninsula), Asia-tropical (Indian subcontinent and Indo-China) and Africa (North, Northeast, East tropical, West Central and West tropical), particularly the semi-arid regions of Bauchi, Borno, Kano, Kaduna and most parts of Northern Nigeria (Adams, 1995; Ahmed *et al.*, 2005; Liogier, 1995; Sharma *et al.*, 1997; Howard, 1989).

C. procera is often found growing in open habitat with little competition and it also grows favorably in dry habitat (Parrotta, 2001). The giant milkweed has been found to be effective in the treatment of leprosy, fever,

menorrhagia, malaria and snake bites (Parrotta, 2001). Traditionally, *C. procera* is used to treat common household diseases like fever and diarrhea (Sofowora, 1984). Mahmoud *et al.* (1979) also reports larvicidal activity of the latex. The leaves have also been boiled together with fresh milk to obtain cheese.

Traditionally, *C. procera* is used to treat common household diseases like fever and diarrhea (Sofowora, 1984). Mahmoud *et al.* (1979) also reports larvicidal activity of the latex. The leaves have also been boiled together with fresh milk to obtain cheese. Saha *et al.* (1961) described the plant to be an abortifacient while Malhi and Trivedi (1972) observed it to be an anti-fertility agent. In Nigeria, the Fulani nomads are known for using the leaves in production of *Wara* which is a highly nutritional locally made cheese. Almost all parts of *C. procera* have been documented to possess medicinal virtues in ethnobotanical surveys conducted by researchers. Some African and Indian tribes are using leaves for the cure of cold, cough, and latex for toothache and scorpion bite (Maheshwari *et al.*, 1986), latex of the plant for the treatment of dropsy, rheumatism, leprosy and taeniasis while roots for elephantiasis (Bhalla *et al.*, 1982). Further Taxo-ethnobotanical studies of some rural areas have reported that the native villagers are using latex for application on wounds and as a masticatory (Vir *et al.*, 1984). Despite these uses, *C. procera* poses varying toxic effects in animals through air borne allergies, touch and consumption in livestock. The widespread loss of livestock and low animal production are attributed to the

existence of *C. procera* in the arid Northern regions of Nigeria (Burkill, 1985).

Aim and objective: This research is aimed at investigating the effects of ethanolic leaves extract of *Calotropis procera* on the liver of adult male rabbits.

MATERIALS AND METHODS

This experiment was conducted in the Department of Human Anatomy, Faculty of Medicine, Ahmadu Bello University, Zaria, and Kaduna State, Nigeria in the year 2010.

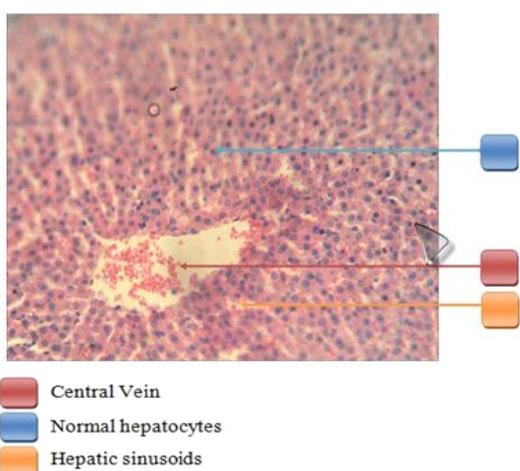


Fig. 1: Photomicrograph of section of liver of male in rabbit in group A showing normal histology of liver tissue (X250)

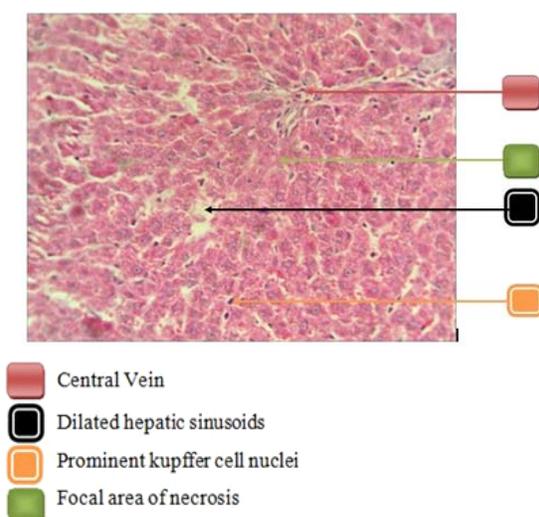


Fig. 2: Photomicrograph of section of liver of male rabbit in group B showing necrotic liver tissue (X250)

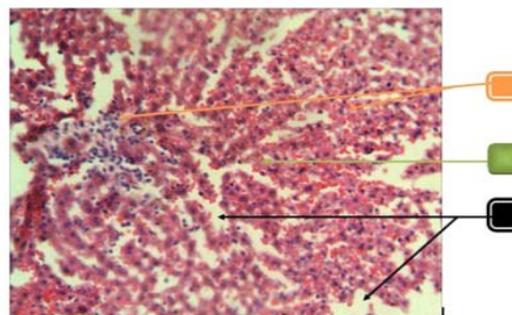


Fig. 3: Photomicrograph of section of liver of male rabbit in group C showing necrotic liver tissue dilated sinusoids(X 250)

Plant materials: The leaves of *Calotropis procera* were obtained from Mil-goma community, opposite Ahmadu Bello University Teaching Hospital (ABUTH), Shika, Zaria, Nigeria. The leaves were taken to the herbarium of Department of Biological Sciences, Faculty of Sciences, Ahmadu Bello University, Zaria; for identification with voucher number 1706.

Preparation of extract: The leaves of *Calotropis procera* was shade-dried and pounded to a powdery form and then taken for extraction in the Department of Pharmacognosy, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria. The powder was poured in to a separation funnel blocked with a cotton wool and the reagent (absolute ethanol) was poured into it and was allowed to drain down, the filtrate was collected in a conical flask and concentrated using evaporating dish over boiling water. The extract was collected in a bottle weighing 88.3 g.

Experimental animals: Twelve (12) adult male rabbits were used in this study. They were procured from the Samaru market, Zaria. They were kept in cages in the animal house of Department of Human Anatomy, Ahmadu Bello University, Zaria. The rabbits were fed with grower mash, vegetables and grasses, under good ventilation and adequate drinking water. The male rabbits were adapted to the laboratory environment in the Department of Human Anatomy for two weeks in order to acclimatize before the commencement of the experiment.

Experimental design: Group A served as the control group while group B and C are the experimental groups. The following doses were administered orally on a daily bases:

- Group A was the control group which received distilled water

- Group B was administered with 250 mg/kg of body weight of ethanolic extract of *Calotropis Procera* leaves.
- Group C was administered with 500 mg/kg of body weight of ethanolic extract of *Calotropis Procera* leaves. The route of administration was orally and the duration of administration was fourteen (14) days.

Tissue processing and staining: The male rabbits were humanly sacrificed after fourteen (14) days administration of *Calotropis procera* by anesthetizing them in chamber containing chloroform. They were then dissected and the liver tissues were removed, and immediately inserted into formalin in order for the liver tissues to be properly fixed. The tissues were transferred into an automatic processor where they went through a process of dehydration in ascending grades of alcohol (ethanol) 70, 80, 95% and absolute alcohol for 2 changes each. The tissues were then cleared in Xylene and embedded in paraffin wax. Serial sections of 5 micron thick were obtained using a rotary microtome. The tissue sections were de-paraffinised, hydrated and stained using the routine haematoxylin and eosin staining method (H&E). The stained sections were examined under the light microscope.

RESULTS AND DISCUSSION

The liver is a vital organ present in vertebrates and some other animals. It has a wide range of functions, including detoxification, protein synthesis, and production of biochemicals necessary for digestion. The liver is necessary for survival; there is currently no way to compensate for the absence of liver function long term, although liver dialysis can be used short term.

This organ plays a major role in metabolism and has a number of functions in the body, including glycogen storage, decomposition of red blood cells, plasma protein synthesis, hormone production, and detoxification. (Cotran *et al.*, 2005, Maton *et al.*, 1993). The results of this study showed that the ethanolic leaves extract of *Calotropis procera* is detrimental to the integrity of the liver tissues as evident in the necrotic nature of liver observed in Fig. 2 and 3 above when compared with the control group (Fig. 1), where the tissue was intact with no sign of damage. Based on the histological observations in this study, we therefore inferred that the ethanolic leave extract of *C. procera* caused damage to the liver tissues of male rabbits at a high dose. Therefore, caution should be taken in its usage.

ACKNOWLEDGMENT

The authors wish to acknowledge the management of Ahmadu Bello University, Zaria for providing a conducive environment and support for this research study.

REFERENCES

- Adams, H.R., 1995. Digitalis and Vasodilator Drugs in Veterinary Pharmacology and Therapeutics. 7th Edn., Iowa State University Press, pp: 1138-1147.
- Ahmed, K.K., A.C. Rana and V.K. Dixit, 2005. *Calotropis* Species (Asclepidaceae)-A comprehensive review. *Pharma. Mag.*, 1(2): 48-51.
- Bhalla, N.P, T.R. Sahu, G.P. Mishra and R.N. Dakwale, 1982. Traditional plant medicines of Sagar district, Madhya Pradesh. *J. Econ. Tax. Bot.*, 3: 23-32.
- Burkill, H.M., 1985. *The Useful Plants of West Tropical Africa* 2nd Edn., Royal Botanical Garden, Kew.
- Cotran, R.S., V. Kumar, N. Fausto, F. Nelso, S.L. Robbins and A.K., Abbas, 2005. Robbins and Cotran pathologic basis of disease. St. Louis, MO: Elsevier Saunders. pp:878. ISBN0-7216-0187-1.
- Howard, R.A., 1989. Flora of the Lesser Antilles, Leeward and Windward Islands. Dicotyledoneae. Arnold Arboretum, Harvard University, Jamaica Plain, MA. 3(6): 658.
- Liogier, H.A., 1995. Descriptive flora of Puerto Rico and Adjacent Islands. Editorial de la Universidad de Puerto Rico, San Juan, PR. 4: 617.
- Maheshwari, J.K., K.K. Singh and S. Saha, 1986. Ethnobotany of tribals of Mirzapur district, UP. *Nation. Bot. Res.*, 3: 123-126.
- Mahmoud, O.M., S.E.I. Adam and G. Tartour, 1979. The Effect of *calotropis procera* on small ruminants. *J. Comp. Path.*, 89: 251-263.
- Malhi, B.S. and V.P. Trivedi, 1972. Vegetable antifertility drugs of India. *Q. J. Crude. Res.*, 12: 1922-1972.
- Maton, A., H. Jean, C.W. McLaughlin, M.Q. Warner, D. Lattart and J.D. Wright, 1993. *Human Biology and Health*. Eaglewood Cliffs, New Jersey, Prentice hall, USA.
- Parrotta, J.A., 2001. *Healing Plants of Peninsular India*. CAB International, Wallingford, UK and New York, pp: 944.
- Romer, A.S. and T.S. Parsons, 1977. *The Vertebrate Body* Philadelphia, Holt-Saunders International, PA, pp:354-355.
- Saha, J.C., E.C. Savini and S. Kasinathan, 1961. Ecobolic properties of Indian medicinal plants. Part 1. *Indian J. Med. Res.*, 49: 130-151.
- Sharma, D.K., M. Tiwari, M. Arora and B.K. Behera, 1997. Microbial transformation and biodegradation of *calotropis procera* latex towards obtaining value added chemicals, pharmaceuticals and fuels petroleum science and technology. *Marcel Dekker Inc.*, 15(2): 137-169.
- Sofowora, A., 1984. *Medicinal Plants and Traditional Medicine in Africa*. 2nd Edn., Spectrum Books Ltd, Ibadan, Owerri, Kaduna, Lagos.
- Vir, J., G.H. Dar, P. Kachroo and G.M. Bhat, 1984. Taxo-ethnobotanical studies of the rural in district Rajouri (Jammu). *J. Econ. Tax. Bot.*, 5: 831-838.