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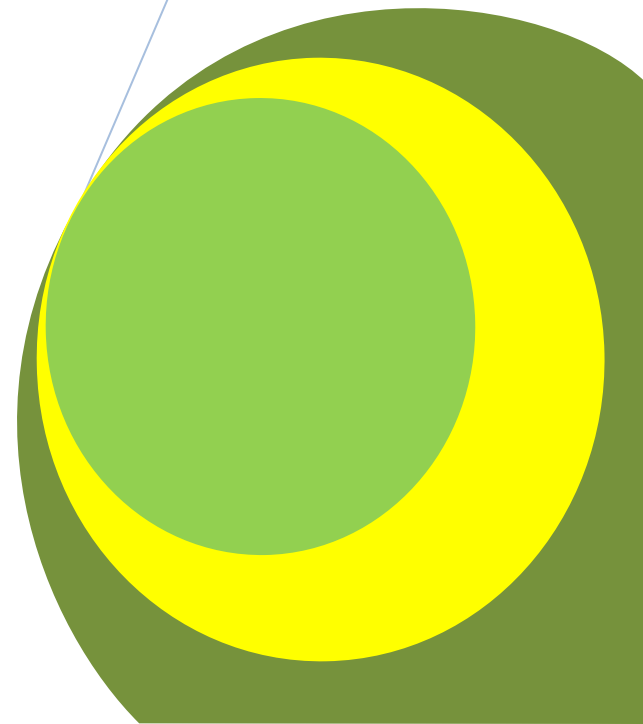
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## Research Article

# Effect of *Leptadenia Hastata* Leaf Extract on Embryo-Foetal Development in White Albino Rats

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## Abstract

Effect of *Leptadenia hastata* leaf extract on embryo-foetal development in white albino rats was investigated. A total of 25 nulliparous female and 5 male rats of approximate age of 57-60 days old were used and grouped into A-E in this study. Female rats were cohabited in a ratio of 5:1 male and allowed to acclimatize for one week. Pregnancy was determined by seeing vaginal plug each morning. Pregnant females in each group A, B, C, and D were administered orally with 200mg, 300mg, 400mg and 500mg/ kg b.wt of the leaf extract of *Leptadenia hastata* on days 1-20 of the pregnancy. Group E served as the control and were given only normal saline per os. All the groups were sacrificed on day 20 of pregnancy and observed for changes. The results revealed that there were sites of implantation which degenerated and some foetal resorptions seen with treated groups as compared with the control which showed normal litter. The outcome suggests abortifacient effect of the plant.

**Keywords:** Embryo-foetal development, *Leptadenia hastata* extract, White Albino rats.

## INTRODUCTION

Different herbs have been used for traditional healing process both in animal and human subjects across the globe. *Leptadenia hastata* (Pers.) Decne, is a perennial plant of the family of Asclepiadaceae which pushes in cattle-breeding areas of Burkina Faso and some other parts of West Africa. *L. hastata* is described as a climber or crawling plant (Plate 1) with white soft grooved stem, simple green paired dehiscent leaves with pale under surface latex white and grows at riverine areas (Hutchinson and Dalziel, 1937). The breeders commonly used the leaf stems for their parasitic activity and against placental retention when animals gave birth (Kerharo and Adam, 1974; Arbonnier, 2000). Literature survey and ethno botanical investigations with the traditional healers revealed that the consumption of the leaf stems of *L. hastata* by the donkeys, the horses and the dromedaries had anti-fertility effect (Bayala et al., 2011). In the North region of Burkina Faso, it was arisen that the consumption of *L. hastata* had harmful effects on fertility of the sheep and goats. In certain areas of West Africa, breeders claimed the anti-fertility effect of their animals after consumption of *L. hastata* leaf stems (Berhaut, 1979; Arbonnier, 2000). It is commonly used as a vegetable and is considered as a famine food in Niger republic due to its high content of valuable nutrients rich in various types of amino acids, fatty acids, terpenes, carotenes, luteines and poly-oxy pregnane (Aquino et al., 1996; Freiberger et al., 1998; Nikiema et al., 2001; Sena et al., 1998). In a study, *Leptadenia reticulata* (same family member with *Leptadenia hastata*) has been reported to have anti-implantation activity in female albino rats at 300mg/Kg b.wt (Rani et al., 2009). Other study showed significant reproduction rates reduction in groups fed with 25 p. 100 and 50 p. 100 of *Leptadenia hastata* than in control group (Lapo et al. 2003). Recently, male anti-fertility effect has been carried out on *L. hastata* leaf stems extracts (Bayala et al., 2011). In Nigeria, report has supported the use of *L. hastata* as antimicrobial agent (Aleiro and Wara, 2009). In a report some compounds like tannins, saponins,

volatile oils, saponin glycosides and alkaloids were detected in fresh and dried samples of *L. hastata* (Hassan et al., 2007). In Northern part of Nigeria, traditional women use the leaf of this plant to cause anti-fertility or abortion on their rival mate. This study was designed to validate this claim of abortifacient effect of the plant using white albino rat as experimental model.



**PLATE 1: *Leptadenia hastata* (Asclepiadaceae) (Adapted from Gorée Archaeology, Dakar)**

## **MATERIALS AND METHODS**

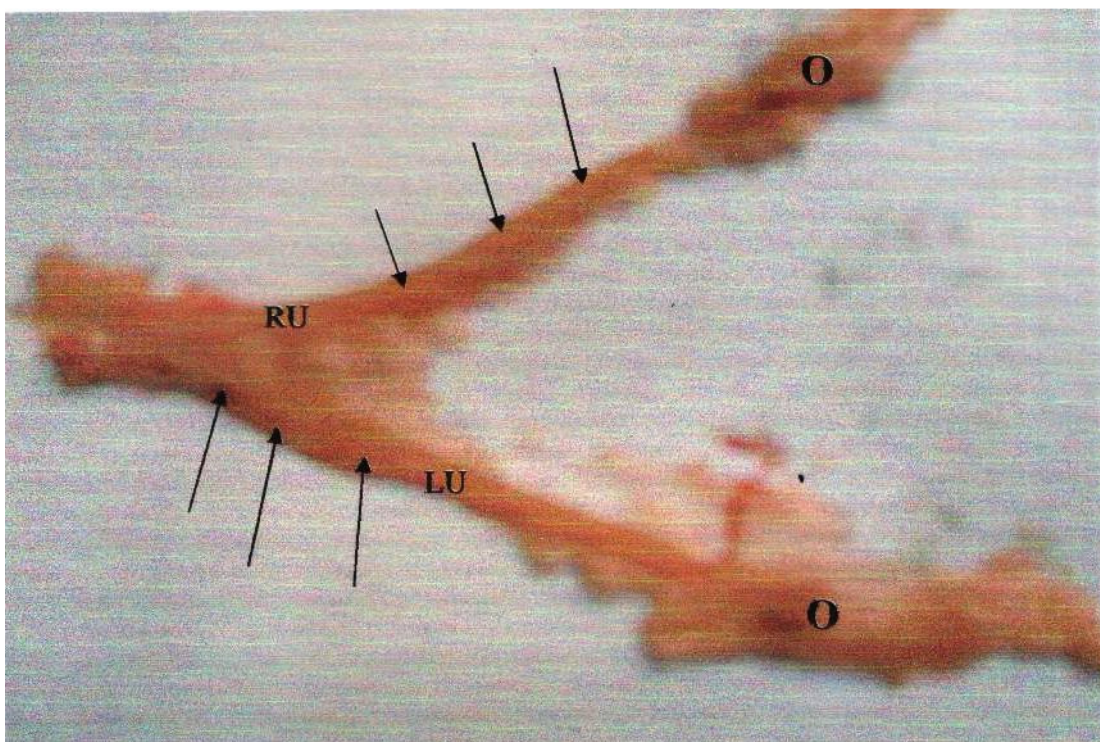
Fresh leaves of *Leptadenia hastata* were collected at the water treatment plant, Maiduguri, Borno State (Plate 1). These were washed at the Theriogenology laboratory of the faculty of Veterinary Medicine, University of Maiduguri-Nigeria and air-dried at room temperature until it attains a constant weight. The dried leaves were then powdered using mortar and wooden pestle. It has a characteristic dark green color with relatively neutral taste (neither bitter nor sweet). The LD<sub>50</sub> of the leaf extract of *Leptadenia hastata* on white albino rat was earlier found and reported to be 2320mg/kg.bwt as described by Maurice et al. (2011), and was used in this experiment.

Three hundred and fifty grams of the powdered leaf was exhaustively extracted using Soxhlet method as modified by Aliyu and Nwude (1982) using ethanol as solvent for the extraction, the extract was concentrated using rotary evaporator and stored at 4<sup>o</sup> C until used. White albino rats were obtained from small animal unit of the National Veterinary Research Institute, Vom and allowed to acclimatize for 1 week before commencement of the treatment. A total of 25 nulliparous female and 5 male rats of approximate age of 57-60 days old were used and grouped into A-E in this study. Female rats were cohabited in a ratio of 5:1 male, and females were considered pregnant when vaginal smear performed each morning following cohabitation contained sperm or vaginal plug. Pregnant females in each group A, B, C, and D were administered orally with 200mg, 300mg, 400mg and 500mg/ kg body weight of the aqueous extract of *Leptadenia hastata* on days 1-20 of the pregnancy, while group E served as the control which

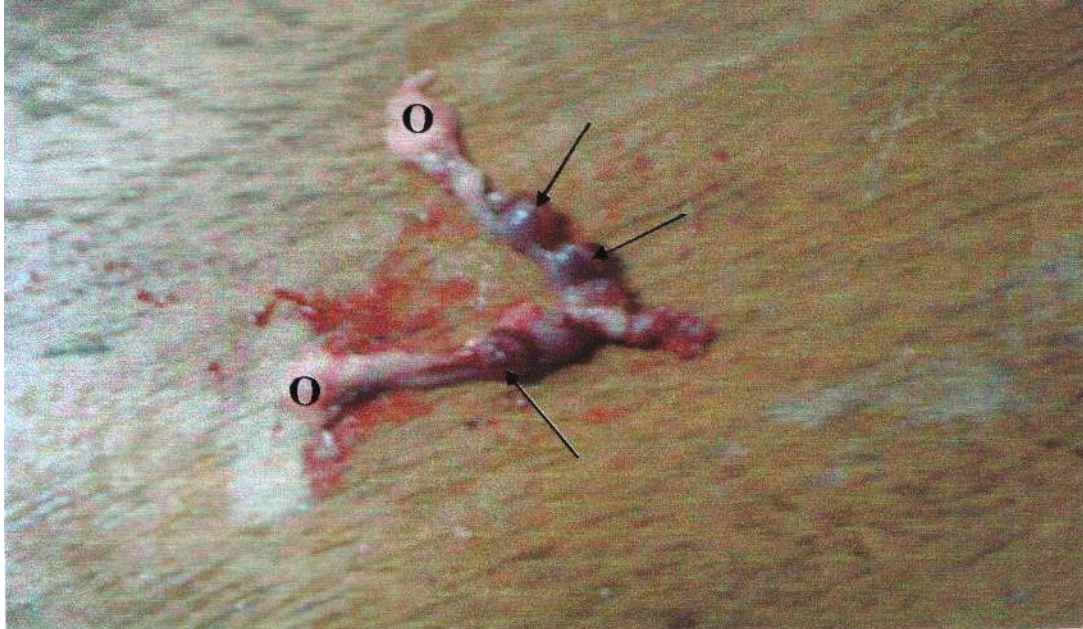
were administered with only normal saline per os. All the groups were sacrificed at day 20 of pregnancy and observed for changes.

## RESULTS

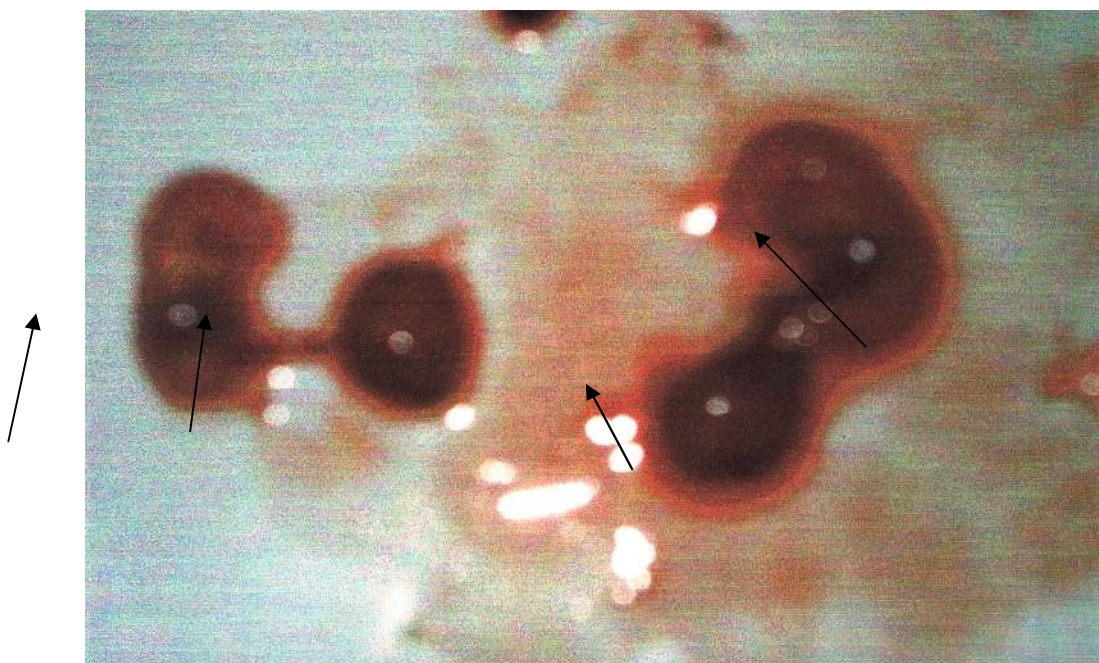
The results showed that the reproductive organ of female albino rat has a short uterine body, long left and right uterine horns (indicating large area for implantation) and two ovaries (plate2). The results further revealed that there were sites of implantation which degenerated or failed to develop further with 200mg, 300mg and 400mg/ kg.bwt treated groups (A, B and C) (plate 3). Members of Group D which were administered 500mg/kg.bwt of the extract showed retarded or stunted growth of their fetuses and some were reabsorbed (plate 4). In other words all the treated groups A to D had sites of implantation which failed to develop and foetal resorptions/death were observed in all the treated groups as compared with the control group (E) which showed normal litter following sacrifice on day 20 (plate 5).



**PLATE 2: Normal reproductive organ of female albino rat indicating left uterine horn (LU), right uterine horn (RU), implantation sites (thin arrows) and the ovaries (O)**



**PLATE 3: Reproductive organ of *Leptadenia hastata* treated female albino rat indicating areas which failed to develop (thick arrows) and areas where embryonic development/resorption has occurred (thin black arrows)**



**PLATE 4: Stunted developed/resorbed fetuses of female albino rats treated with 500mg/kg.bwt of *Leptadenia hastata*, thick arrow (before excision) and thin arrow (after excision).**



**PLATE 5: Control group (E) female albino rats that expressed normal litter at term, day 20**

## DISCUSSION

The intraperitoneal median Lethal Dose (LD<sub>50</sub>) of the aqueous extract of 2320 mg/Kg body weight for *L. hastata* obtained in the previous study (Maurice et al., 2011) is 12 times greater than the minimum effective dose of 200mg/Kg body weight employed in this study. Earlier reports have shown that if the LD<sub>50</sub> of a test plant extract is three times more than the minimum effective dose (200mg as in this case), then the extract is a good candidate for further studies (Madara et al., 2010). However, in the results obtained in this study, in spite of the wide safety margin of the leaf extract of *L. hastata*, there is some level of anti-implantation/abortifacient effect of the plant on white albino rats (figures 2-4). This outcome may be due to a toxic effect of the components of the plant leading to abortion and resorption of the embryo/foetuses particularly with the 500mg/Kg.bwt (Plate 4) seen in this study. These similar findings were earlier reported in Dakar in mice using the same plant *Leptadenia hastata* (Lapo et al., 2003).

In another report, anti-spermatogenic activity of *Leptadenia hastata* leaf stems aqueous extracts was documented in male Wistar rats (Bayala et al., 2011b). This further elucidates the anti-reproductive effects of *L. hastata* on mice which may invariably show similar outcome in humans and other animals. It is not surprising that in certain areas of West Africa, breeders claimed the anti-fertility effect of their animals after consumption of *L. hastata* leaf stems (Berhaut, 1979, Arbonnier, 2000). It has further been observed in this study that the higher the quantity of the extract consumed the more the anti-implantation/abortifacient effect and foetal resorption seen.

This may not be unconnected to the effect of continuous and quantitative accumulation of the active components of the extract (not determined in this study) on the reproductive tissues. The presence of tannins, saponins, volatile oils, saponins glycosides and alkaloids in fresh and dried samples of *L. hastata* (Hassan et al., 2007) may be culprits for this outcome.

The presence of these compounds particularly tannin, which has astringent properties (pore-closing substance), could interfere with embryo/foetal development and may account for foetal resorptions observed. The normal parturition and normal appearance of the kittens in the control group (Plate 5) substantiate the possible toxic and partial anti-fertility effect of *L. hastata* on the treatment groups (figure 2-4). The results obtained from this study have provided a scientific support for the claimed anti-implantation/abortifacient effect of *L. hastata* used in women in Borno State of Nigeria. Furthermore, domestic animals grazing on this wild plant at the riverine areas as they came for water could fall victims as environmental hazard to them. It should however be noted that, the active components of the extract responsible for these outcomes is not known in this study. It is the recommendations of this paper that this aspect as well effect of the extract on some body organs be investigated further.

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