

Antifertility Activity of Different Extracts of Mimosa Pudica Linn Leaves in Female Rats

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Abstract: *Alcoholic, water and petroleum ether extracts of Mimosa pudica Linn leaves was screened for their antifertility activity at the doses of 50,100,150mg/KG body weight in female rats. Oral administration of 150mg/kg body weight of all extracts for 1-7 days of post coitum was found to be optimum and most effective dose for antifertility activity. At 50mg/kg body weight implantation sites were observed with water, alcoholic and petroleum ether treated group showing 40,80 and 40% antifertility activity. Maximum antifertility was observed after administration of the extract group at a dose of 150mg/kg body wt. From day 1-7 of pregnancy showing 80,100% antifertility activity. It is well established that the inhibition of implantation in albino rats is due to imbalance of progesterone, estrogen ratio.*

Keywords: Antifertility, Mimosa pudica, Female rats, Implantation, Pregnancy

1. Introduction

The human population has been increasing at a greater extent than exponential rate, it has become more important than ever before to understand the process of human reproduction in order to control them. One objective of reproductive research is therefore the achievement of control of means of reproduction. With the development of science and technology, various artificial contraceptive methods were used with advancing scientific knowledge the traditional folklore based methods have given way to programmatically proven methods of preventing fertility.

Mimosa pudica known as sensitive plant and Lajwanti in English and Hindi respectively, Kangphal Ekaithabi in Manipuri (family Mimosaceae) is straggling prickly under shrub found throughout the wasteland, roadside and pastures. This plant enjoys wide reputation for the use of hydrocele, sinus and boils. Boiled decoction of leaves is also used in various uterine pains after delivery. The powdered of the leaves and roots is prescribe in piles, boils and skin diseases.[1,2] Among rural population of Manipur leaf extracts of this plant (leaves boiling with water) were taken by the women as post coital oral medicine to prevent early pregnancy. Administration of this plant material for one day during menstruation is considered as preventing conception. (personal communication with local women) The aim of the present study was to evaluate the antifertility activity of different extracts of Mimosa pudica Linn leaves in female rats.

2. Materials & Methods

2.1 Plant material

The leaves of Mimosa pudica was collected and air dried. The air dried powdered plant material was subjected to Soxhlet extraction successively with petroleum ether, 95 P.C. alcohol and distilled water. The extract was evaporated to dryness under reduced pressure and the different doses were prepared by suspension in gum acacia.

2.2 Animal

Albino rats weighing 150-200 gm were used for the experiment. They were procured from a local farm and were reared in the animal house of Life Sciences Department, Manipur University for a period of two years in standard diet and water supplied ad libitum before they were subjected to experimental procedure.

2.3 Antifertility activity

Female rats of proven fertility weighing 150 to 180gm and in prooestrous phase of oestrous cycle were kept overnight with males. The females were examined in the next morning for evidence of copulation and those showing vaginal plug and spermatozoa in the vaginal smear were separated for experiment. The day on which spermatozoa were detected taken as first day of pregnancy. The experiments were carried out 4 sets each consisting of 12 animals. The first set was kept as control with standard diet and gum acacia suspension only. In the set 2 to 4 animals the aqueous, alcoholic and petroleum ether extracts of Mimosa pudica were administered orally by means of intragastric catheter at the dose of 50,100,150mg/kg body weight from 1 to 7 days of pregnancy. The animals were sacrificed on 14th day. Reproductive organs were removed weighed and process for biochemical and histological study.

2.4 Histological study

The changes in the uterus were studied histologically by taking sections of uterus following the general procedure by Gurr (1953) [3] The uterus was fixed immediately in Bouin's fluid and followed by the usual procedure of dehydration with increasing concentration of aqueous, ethanol clearing with xylol embedding in paraffin wax and the cutting of sections 4micron thickness. The tissue section were stained with Ehrlich's haematoxyline and eosine for nucleocytoplasmic changes. Photomicrograph was taken with the help of Olympus microphotographic apparatus.

2.5 Biochemical study

Biochemical parameters as the quantitative estimation of glycogen, protein, Acid & Alkaline phosphatase were done to evaluate the antifertility activity of the different extracts of plant in female rats. Estimation of glycogen was done by the method of Seifter et.al (1950)[4], protein estimation was done by the method of Lowry et.al(1951)[5], Acid and Alkaline phosphatase was done by the modified method of Kind and King,s method (1954)[6].

3. Results

Antifertility activity in rats

Antifertility activity of aqueous, alcoholic and petroleum ether extracts of *Mimosa pudica* Linn in rats is shown in Table.1. The table shows cent per cent antifertility activity of the extracts when oral administration extracts at a dose of 150mg/kg for 1-7 days were given to rats and sacrificed after a period of 14 days. While in control animals exhibited intact implantation sites of normal size, the uterine horns of the extract treated animals did not show any implantation sites.

Marked morphological changes were observed in the different extract treated animals in contrast to controlled one. The weight of the body and organ ((uterus & ovary) of control animal were increased as compared to the treated animals.

Histological Changes

The present result demonstrated that drastic changes took place in the ovary and uterus of the experimental animals due to the treatment of the different extracts of aqueous, alcoholic and petroleum ether of *Mimosa pudica* Linn in extract to control.

Histological changes in the uterus of controlled animals showed cytotrophoblast, syncytotrophoblast and chorionic ville. Administration of aqueous, alcoholic and petroleum ether extract treated animals showed degenerative changes in epithelium and myometrium of the uterus when compared to that of controlled as shown in Fig.

Biochemical Changes

The findings of the present experiment clearly revealed that uterus encounters many biochemical changes such as content of protein, glycogen, acid and alkaline phosphatase in order to prepare itself for the conception of the fertilised eggs. However oral administration of aqueous, alcoholic and petroleum ether extracts to the animals after post coitum produced a significant decrease in these biochemical constituents indicating the interference of the extracts with the destructive changes due to pregnancy as shown in Table 2.

4. Discussion

In the present investigation, plants have been used as an agent for preventing fertility in rats because plants have been used for this purpose since ancient times. Anti-implantation activity of aqueous, alcoholic and Petroleum ether extracts at

the dose 150 mg/kg for 1-7 days of oral administration was found to be the optimum and convenient dose. Higher dose was found to be toxic while doses less than i.e. 100, 50 mg/kg body weight were found to be less effective. Such findings indicated that the extracts were dose dependent on its anti-implantation activity. Norton, (1978)[7]. reported that the antifertility of the leaves of *Mimosa pudica* in early pregnancy of albino rats was also dose dependent. The anti-implantation effect of various extracts (aqueous, alcoholic and P.E.) of different plants viz *Butea monosperma*, *Carica papaya*, *Daccus carrota* etc were also reported to be dose dependent (Khanna and Chaudhary,(1968) [8].

In the present investigation the different extract of *Mimosa pudica* produced marked changes in the uterine histoarchitecture in contrast to that of pregnant rats indicating a typical pro-oestrous condition. Presence of degenerating uterine glands and lining of uterine lumen with low columnar atrophied epithelium as observed in aqueous, petroleum ether treated animals also indicated the interference of the extracts in the metabolism of implantation. Similar findings had been reported by Arya and Lohiya (1977)[9] in rats and mice after methallibere treatment. Increased number of uterine glands with dilated lumen, leucocytic infiltration showing estrogenic nature of the treatment of *E. ribes* extracts on the uterus of rat had been reported by Prakash (1978, 1979)[10,11].

The present investigation indicated that the genital tract undergoes cyclic alteration in their morphological and physiological aspects with respect to various reproductive phases. The decreased content of protein in the uterus of extract treated rats points out the possibility of the inhibiting estrogen production by the different extractsof *Mimosa pudica*. Glycogen plays an important role during pregnancy for enhanced uterine contraction Prasad et.al.(1966) reported that estrogen caused an increased in the uterine glycogen ,acid and alkaline phosphatase plays an important role in disintegration of complex organelles. Administration of the extract inhibited the uterus from undergoing any preparative changes to welcome the fertilized egg. It might be due to the low enzymatic activity, the different extracts fail to trigger any physiological transformation to induce the formation of deciduoma and the endometrial bed. Such findings are reported by Prakash et.al.(1988)[1988] in the *Moringa olifera* extract treated rat.

5. Conclusion

The present study indicates the active role of the aqueous, alcoholic and petroleum ether extract of the leaves of *Mimosa pudica* Linn in the inhibition of implantation in rats. Further investigation and isolation of active principle and detailed antifertility studies are needed.

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Table 1: Effect of different extracts of *Mimosa Pudica* Linn on implantation in female rats when fed orally for days 1 – 7 days of Pregnancy [values are mean±S.E.]

Group	Treatment	Dose mg/Kg	Days of drug administration	No. of rats Showing implantation sites on 14 th day	No. of implantation in individual rats	P.C. of antifertility activity
I	Control	Vehicle	1 -7 days	5/5	9, 8, 8, 9, 9.	Nil
II	Aqueous extract	50	1 – 7 days	3/5	4, 0, 0, 2, 1.	40%
		100	1 – 7 days	2/5	0, 2, 0, 0, 3.	60%
		150	1 – 7 days	1/5	0, 0, 3, 0, 0.	80%
III	Alcoholic extract	50	1 – 7 days	1/5	2, 0, 0, 0, 0.	80%
		100	1 – 7 days	0/5	0, 0, 0, 0, 0.	100%
		150	1 – 7 days	0/5	0, 0, 0, 0, 0.	100%
IV	Petroleum ethr extract	50	1 – 7 days	3/5	2, 0, 3, 0, 4.	40%
		100	1 – 7 days	1/5	0, 4, 0, 0, 0.	80%
		150	1 – 7 days	0/5	0, 0, 0, 0, 0.	100%

50% and above encouraging activity, 100% significant activity.

Table 2: Effect of different extracts of *Mimosa Pudica* Linn on the Biochemical Constituents of the uterus of rat [values are mean ±S.E. 5 rats are used in each set]

Group	Treatment	Dose Mg/Kg	Protein Mg/100g	Glycogen Mg/100g	Acid Phosphatase Mg/100g	Alkaline Phosphatase Mg/100g
I	Control	Vehicle only	275.15±25	149.8±2.5	101.58±2.0	534.4±1.5
II	Aqueous extract	150	175.25±1.5 ^a	80.95±3.5 ^a	131.24±3.5 ^a	356.2±2.5 ^a
III	Alcoholic extract	150	170.30±3.0 ^b	78.21±2.5 ^b	130.12±2.5 ^a	354.12±2.0 ^b
IV	Petroleum ether	150	168.20±3.5 ^b	85.71±4.5 ^a	132.71±3.0 ^a	350.24±3.5 ^b

Pvalues Vs Control a < 0.001 b < 0.0001



Figure 2: Microphotograph of aqueous extract treated rat uterus showing degenerative changes in the epithelium and myometrium.



Figure 2: Microphotograph of alcoholic extract treated rat uterus showing reduced size with small lumen with normal endometrium.



Figure 3: Microphotograph of petroleum ether extract treated rat uterus showing long, thick endometrium

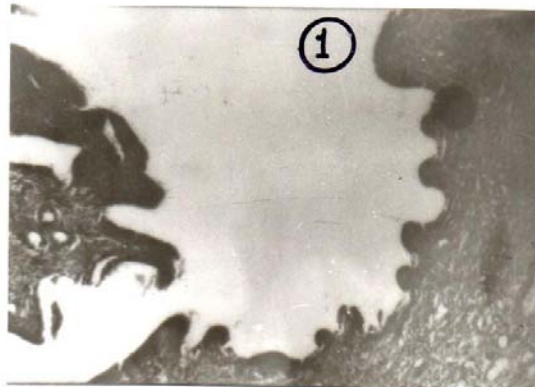


Figure 1: Microphotograph of control rat uterus showing the site of syncytium and cytotrophoblast as well as primitive villi.

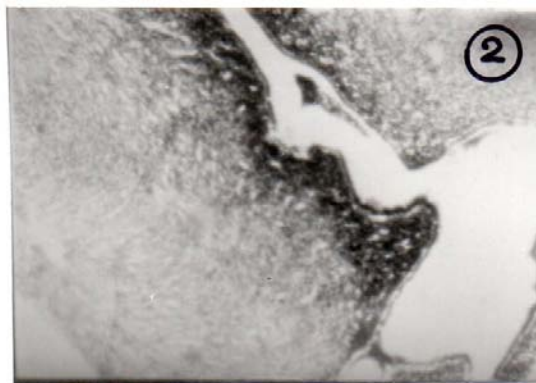


Figure 2: Microphotograph of control rat uterus showing the well differentiated portion of cytotrophoblast and syncytoblast.

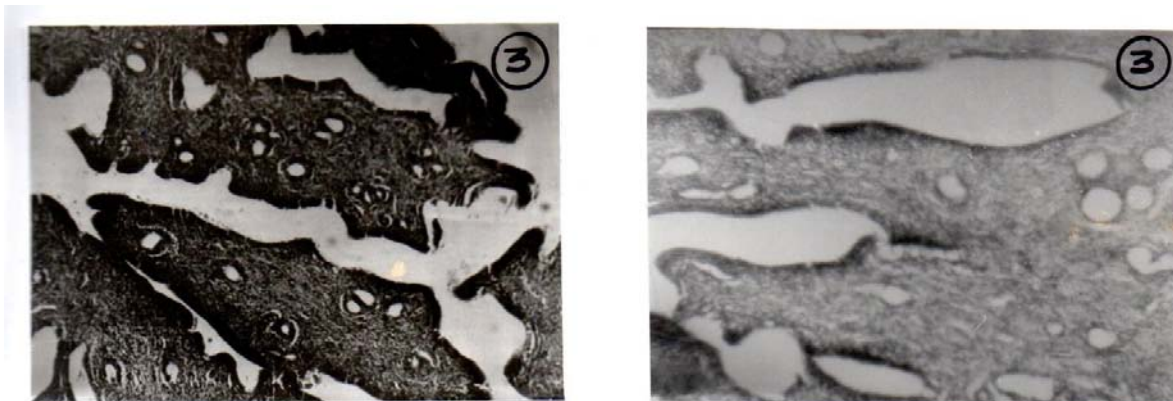


Figure 3: Microphotograph of control rat uterus showing development of chorionic villi and intercommunicating lacunae containing material blood corpuscles.

