

ANTIFERTILITY ACTIVITY STUDIES OF *MIMOSA HAMATA* (WILLD.) IN RATSKhan N.I.*¹, Hatapakki B.C.²¹Department of Pharmacology, Sahyadri College of Pharmacy, Methwade, Maharashtra, India.²Department of Pharmacognosy, P.S.P.S.'s Indira Institute of Pharmacy, Sadavali (Devrukh), Maharashtra, India*Corresponding author: naziya.aara@gmail.com

ABSTRACT

The plant kingdom is a rich source of biologically active agents, revealing various types of pharmacological activities. India has a rich heritage, use of medicinal plants for contraceptive activities in female as well as in male. The present study on antifertility activity using ethanolic extract of *Mimosa hamata* shows anti-implantation and abortifacient activity in dose dependent manner in female Wistar Albino rats. The phytochemical screening shows presence of flavonoids, carbohydrate, glycoside and tannins etc. The present work was a preliminary effort to prove the claimed antifertility activity of the plant.

Keywords: Abortifacient activity, ant-implantation activity, *Mimosa hamata*

1. INTRODUCTION

Population explosion has created a grave setback in the economic growth and all-round human development in developing countries. Current pandemic population explosion demands an immediate betterment of new potential contraceptives [1]. Studies of many years have highlighted the unmet demand for safe, inexpensive, and acceptable contraceptives to avoid unwanted pregnancies and resultant abortions. The quest for the oral contraceptive agent that can control human fertility is as old as recorded history. Although a wide variety of synthetic contraceptive agents [2, 3] are available, these cannot be used continuously due to their severe side effects. Hence, people are looking back to age-old tradition of using herbal medicines, which have minimum side effects. India in general and Western Ghats region in particular have enormous wealth of medicinal plants [4, 5].

India harbors several medicinal plants associated with traditional antifertility activity. These plants cause antifertility in females by acting as (a) Estrous Cycle Disruptors, (b) Anti-estrogenic agents, (c) Anti-Implantation agents or (d) Abortifacient agents [6].

Ethanomedical literature contains thousands of references to the use of plants for variety of reproduction related purposes. The global search for an effective, safe and reversible anti-fertility agent is being envisaged to tackle the problem of population explosion that may lead to

affect drastically the economic growth and health impact of family especially in developing countries like India.

A large number of medicinal plants/herbal decoctions have been used by the women of rural natives, especially by the tribes, to prevent conception as recorded in ancient Indian literatures [1]. Considering the marked serious side effects produced by continuous use of synthetic contraceptive agents [2], an approach was pursued to identify the new potent anti-fertility molecules from natural sources with minimal side effects and reversible contraceptive effect.

Genus *Mimosa* (family: Mimosaceae) has about 400 species which are mainly shrubs & small trees in tropics. About 8 species are found in India, with medicinal importance [7] while some are of ornamental use. *Mimosa hamata* (Willd) is a flowering shrub. It is a common weed scattered in open sandy places, occurring in tropics and widely distributed in Indian sub-continent. The plant *Mimosa hamata* (Willd.) belonging to the family Mimosaceae is being selected for phytochemical investigations to pin point the pharmacological activity. The said plant has been reported to possess antibacterial, antiviral & antioxidant properties. The decoction of this plant is used as tonic against weakness and in urinary complaints [8]. As described *M.(Pudicae) pudica* occurs in armed and unarmed forms, and the armed form of the first and both armed and unarmed ones of the latter may have either one or to three or four pairs of pinnae per leaf.

Mimosa pudica the curious plant in the genus is a creeping form. Because of the way it folds its leaves when touched, it is known as touch-me-not plant. *Mimosa hamata* also folds its leaves when touched [9]. *Mimosa hamata* is a much straggling shrub occurring in tropics & widely distributed in India & Pakistan [10]. The plant is used for urinary complaints & as a tonic against general weakness. A paste of leaves is applied over glandular swellings & is used in dressing for sinus, sores & piles [11]. Its roots possess contraceptive efficacy while seeds are used as blood purifier [12]. Various bioefficacies viz., antifungal activity of deprotenized leaf extract have been reported [13, 14]. Antibacterial activity of alcoholic extract of aerial parts, antiviral activity of methanolic extract of roots [8] and Antioxidant activity [15] have been reported.

The major phytoconstituents present in *Mimosa hamata* (Willd.) include 4-ethylgallic acid from fresh flowers, triterpene saponin B (3-O-Larabinosyl-D-glucosyl morolic acid), mimonoside A, B, C and saponin A (3-O-D-glucosyl-L-rhamnosyl morolic acid) from the roots, ethylgallate and gallic acid from leaves [16].

The plant *Mimosa hamata* (Willd.) belonging to the family Mimosaceae is being selected for phytochemical investigations to pin point the pharmacological activity. The said plant has been reported to possess antibacterial, antiviral & antioxidant properties [8, 13-15].

A literature survey reveals that no systematic approach has been made to study the reproductive toxicity of this plant. In the present work, we have investigated the reproductive toxicity of the ethanolic extract of *Mimosa hamata* (Willd.) leaves, stem and roots against ethinyl estradiol.

2. MATERIAL AND METHODS

2.1. Plant material

For the present study roots, stems and leaves of *M. hamata* plant was collected from Methwade, Tal. Sangola, Dist. Solapur (Maharashtra) and was authenticated at Botanical Survey of India, Pune. The voucher specimen will be deposited in the institution and in 'Herbarium' Department of Botany, Solapur University, Solapur during the month of September 2015. The plant material was dried under shade at room temperature for about 15 days. The dried plant samples were powdered by mechanical grinder and sieved to give particle size 40-100 μ m. The powder was stored in polythene bags at room temperature before extraction.

2.2. Preparation of Alcoholic extract

The collected roots, stems and leaves were shade dried, reduced to a coarse powder in a mechanical grinder to obtain of desired particle size (40# sieve). About 200 gm of powdered material was subjected to exhaustive extraction with 90% alcohol in a soxhlet extractor at a temperature of 60-70°C, concentrated on a rotary flash evaporator at 50°C (Superfit, India), and finally to dry powder. Some part of the total extract was reserved for phytochemical investigation and rest of the extract was used for biological activity.

2.3. Preliminary phytochemical analysis

The ethanolic extract was then subjected to preliminary phytochemical analysis to assess the presence of various phytoconstituents, it revealed the presence of flavonoids, carbohydrate, glycosides, tannins. Preliminary Thin layer chromatography studies also confirmed these constituents [17].

2.4. Animals

Wistar albino rats weighing 175-225g of either sex maintained under standard husbandary conditions (temp 23 \pm 2°C, relative humidity 55 \pm 10% and 12 hours light dark cycle) were used for the screening. Animals were fed with standard laboratory food and ad libitum during the study period. The experiments were performed after the experimental protocols approved by the institutional animal ethics committee, India 2009.

2.5. Acute oral toxicity studies

Acute oral toxicity [18] study was performed to ascertain safe dose of the extract by the acute oral toxic class method by the Organization of Economic Cooperation and Development (OECD) 423 guidelines.

2.6. Monitoring of estrous cycle in female Wistar rats

Female wistar rats, weighing 200-250 g were used. The animals were housed in group of 6 animals per cage, in a controlled temperature room (22°C), with food and water available *ad libitum*. Every morning between 8:00 and 9:00 a.m. vaginal smear was collected with a plastic dropper (blunt head) filled with 1-2 ml of normal saline (NaCl 0.9%) by inserting the tip of dropper into the rat vagina. Vaginal fluid was placed on glass slides. A separate glass slide was used for each of animal. One drop was collected with a clean tip from each rat. Unstained material was observed under a light microscope, without the use of the condenser lens, with 10 x and 40 x objective lenses.

The vaginal smear was collected by a sterile cotton swab inserted into the vagina gently, for a continuous period of 30 days after administration of the extract. The vaginal smear was prepared in glass slides using Leishman's stain and observed under microscope under high power. The total length or duration of Proestrus, Estrus, Metaestrus and Diestrus was observed, tabulated and analysed statistically. Three types of cells could be recognized: round and nucleated ones are epithelial cells; irregular ones without nucleus are the cornified cells; and the little round ones are the leukocytes. The proportion among them was used for the determination of the estrous cycle phases [19].

2.7. Stages of Oestrus Cycle of female albino rat [12]

Metestrus-The presence of mixture of leukocytes and epithelial cells.

Diestrus phase-Mainly leukocytes with few epithelial cells.

Proestrus phase-The presence of nucleated or nucleated plus cornified cells.

Estrus phase-The presence of cornified cells only.

2.8. Method of testing stages of estrous cycle and its duration in female Wistar rats

Adult female rat of proven fertility weighing between 150-200 gm. were selected. Vaginal smear of these female rats were examined daily. The rats which were found in prooestrous phase of oestrous cycle were caged

overnight for mating with adult male rat of known fertility. A vaginal smear of these female rats was examined the following morning for evidence of copulation; the presence of thick clump of spermatozoa in vaginal smear indicated pregnancy and the when spermatozoa were observed designated day 1 of pregnancy. The pregnant rats were separated out for testing extract for antifertility activity. The pregnant number of animals per group was six.

Animals were divided into eight groups consisting of six animals in each group.

Group I: Served as Control and received vehicle orally.

Group II: Served as Standard 0.1 mg estradiol benzoate in olive oil (s/c) once daily

Group III: Received 200 mg /kg ethanolic extract of leaves of *Mimosa hamata*

Group IV: Received 400 mg /kg ethanolic extract of leaves of *Mimosa hamata*

Group V: Received 200 mg /kg ethanolic extract of stems of *Mimosa hamata*

Group VI: Received 400 mg /kg ethanolic extract of stems of *Mimosa hamata*

Group VII: Received 200 mg /kg ethanolic extract of roots of *Mimosa hamata*

Group VIII: Received 400 mg /kg ethanolic extract of roots of *Mimosa hamata*

The estrous cycle was studied by stained preparation of vaginal smear of the animals. The stages of estrous cycle and its duration were determined.

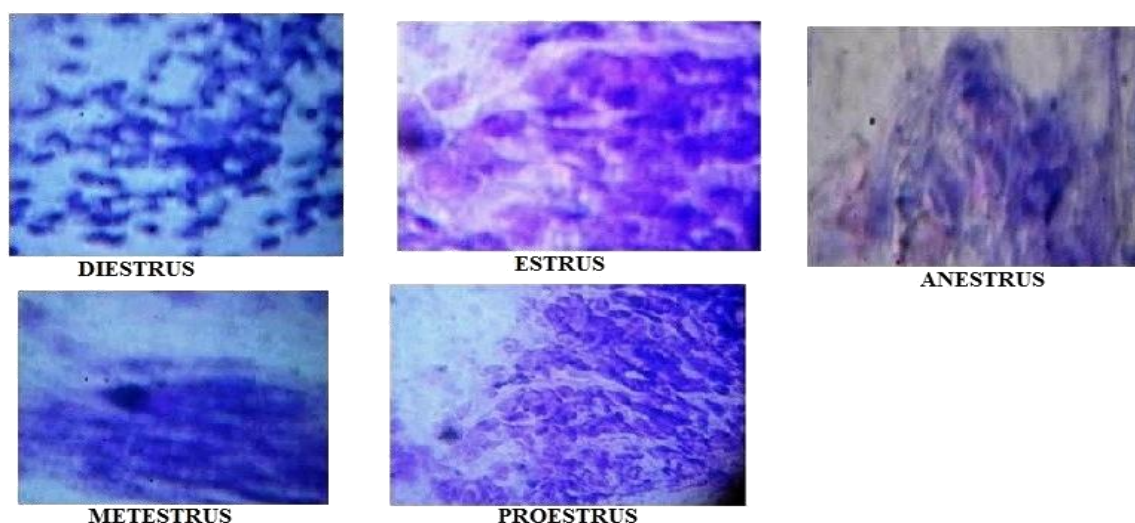


Fig. 1: Stages of rat Estrus Cycle

2.9. Anti-implantation activity

The anti-implantation activity was determined according to the method of Stella O. Olagbende-Dada [20].

Wistar Albino rats mature females colony bred were divided into eight groups (6 female rats per group). The extract was administered orally after making a suspension

in the vehicle of 1% Tween-80 in distilled water from 1 to 10 days of pregnancy.

Group I: Served as Control and received vehicle orally for 10 days.

Group II: Served as Standard 0.1 mg estradiol benzoate in olive oil (s/c) once daily for 10 days.

Group III: Received 200 mg /kg ethanolic extract of leaves of *Mimosa hamata* for one to ten days of pregnancy.

Group IV: Received 400 mg /kg ethanolic extract of leaves of *Mimosa hamata* for one to ten days of pregnancy.

Group V: Received 200 mg /kg ethanolic extract of stems of *Mimosa hamata* for one to ten days of pregnancy.

Group VI: Received 400 mg /kg ethanolic extract of stems of *Mimosa hamata* for one to ten days of pregnancy.

Group VII: Received 200 mg /kg ethanolic extract of roots of *Mimosa hamata* for one to ten days of pregnancy.

Group VIII: Received 400 mg /kg ethanolic extract of roots of *Mimosa hamata* for one to ten days of pregnancy.

Female rat of proestrous phase were kept with males with proven fertility in ratio of 2:1. The female rats were examined in the following morning for evidence of copulation the vaginal smear was examined for thick clumps of spermatozoa. The day on which the spermatozoa were found in the smear was considered the first day of pregnancy (Day 1). A 200 mg/kg of body weight and 400 mg per kg of body weight of the extract was administrated intra-gastrically for 10 days from day 1 to day 10 of pregnancy for the test group and same volume of vehicle for the control group. On day 11, all groups of rats were laparotomized under light ether anesthesia to determine the number of implantation sites in the horns of the uteri. The presence of significant difference in the mean number of implantation sites between the extract and the control was taken as a positive response. Both uterine horns were examined for number of implants which were recorded.

% anti-implantation activity = $100 - (\text{No. of implantation sites} / \text{No. of corpora lutea}) \times 100$

2.10. Abortifacient activity

Female albino rats (150 -200 gm) of the normal estrous cycles were maintained and provided with food and water *ad libitum*. The females of proven fertility were left

overnight with proven fertility male albino rats with 2:1 ratio at early estrous stage of estrous cycle. Then vaginal smear of females was observed for the presence of the sperms and formation of vaginal plug. Subsequent day was selected as day one of pregnancy. Such pregnant females were grouped into eight groups of six animals in each group [21].

Group I: Served as positive control, received vehicle distilled water orally for one to fourteen days of pregnancy.

Group II: Served as Standard 0.1 mg estradiol benzoate in olive oil (s/c)

Group III: Received 200 mg /kg ethanolic extract of leaves of *Mimosa hamata* for one to fourteen days of pregnancy.

Group IV: Received 400 mg /kg ethanolic extract of leaves of *Mimosa hamata* for one to fourteen days of pregnancy.

Group V: Received 200 mg /kg ethanolic extract of stems of *Mimosa hamata* for one to fourteen days of pregnancy.

Group VI: Received 400 mg /kg ethanolic extract of stems of *Mimosa hamata* for one to fourteen days of pregnancy.

Group VII: Received 200 mg /kg ethanolic extract of roots of *Mimosa hamata* for one to fourteen days of pregnancy.

Group VIII: Received 400 mg /kg ethanolic extract of roots of *Mimosa hamata* for one to fourteen days of pregnancy.

On tenth day of pregnancy, laparotomy was performed under light ether anesthesia and semi sterile conditions to know the presence of implantation sites in the uterine horns. The abdominal cavities are sutured and rats were allowed to continue the pregnancy to the full term. Second, laparotomy was performed three days after completion of treatment i.e. on the 18th day of pregnancy the number implantation sites counted and compared with initial number of implantation on 10th day of pregnancy. Both the uterine horns were examined for number of abortifacient sites which were recorded.

% Abortifacient activity = $(\text{No. of resorption sites} / \text{No. of corpora lutea}) \times 100$

The percentage of pregnancy failure among treated groups was calculated [22].

3. RESULTS

3.1. Phytochemical Analysis

Preliminary phytochemical analysis of extracts revealed the presence of flavonoids, carbohydrate, glycosides and

tannins in ethanolic extract of leaves, stem and roots of *M. hamata*.

3.2. Acute Toxicity Study

No morbidity and mortality was detected till 2000 mg kg⁻¹, p.o. for ethanol extracts of leaves, stems and roots; hence, ethanol extracts of leaves, stem and roots were considered to be safe till 2000 mg kg⁻¹, p.o.

3.3. Monitoring of estrous cycle

Estrous cycle imparts chief role in changes of histological,

physiological, morphological and biochemical within the ovary. These hormonal changes occur under the influence of ovarian and extra ovarian hormones. Consequently any imbalance occurs in these hormones caused irregularity in the function of the ovary. Further it disturbs or changes the period of estrous cycle. The oestrus phase indicates the ovulation in rat. It demonstrated the presence of about 100% cornified cells in the vaginal smear in every four to five days.

Table 1: Effect of ethanolic extracts of *M. hamata* on the estrous cycle of rats for different groups of rats

Groups	Number of cycles (Mean± SEM)	Duration of phases of estrous cycle (days)			
		Proestrous	Estrous	Metestrous	Diestrous
Normal control	6.12±0.31	5.76±0.13	7.23±0.06	5.64±0.29	10.52±0.65
0.1 mg estradiol benzoate in olive oil	4.08±0.25	4.38±0.2	7.10±0.33	5.93±0.32	11.20±0.72
ELMH (200 mg/kg)	3.10±0.28	3.61±0.36	6.76±0.25	5.68±0.30	12.35±0.81*
ELMH (400 mg/kg)	3.14±0.36	3.43±0.29	6.51±0.21	5.43±0.29	13.62±0.92***
ESMH (200 mg/kg)	3.18±0.38	3.32±0.22	5.12±0.18	5.36±0.26	14.20±1.02**
ESMH (400 mg/kg)	3.21±0.21	3.26±0.18	5.03±0.15	4.89±0.21	13.5±1.13***
ERMH (200 mg/kg)	3.18±0.15	3.35±0.24	6.12±0.25	5.23±0.18	14.1±1.08**
ERMH (400 mg/kg)	3.23±0.24	3.34±0.21	6.08±0.21	5.12±0.20	13.98±0.96***

Statistical analysis was carried out by ANOVA followed by the Dunnet's test at the significance level of * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$, as compared with normal control.

3.4. Anti-Implantation Activity

The anti-implantation activity is expressed as the percentage decrease in the number of implantations in the uteri on day 10 of pregnancy, and the number of resorbed implants from the existing number of implants will be recorded on day 18 for evaluating the early abortifacient activity.

The ethanolic extracts have offered significant and dependent anti-implantation and early abortifacient activity by decreasing the number of implantation sites and showed significant resorption of the existing implants compared to vehicle control. % inhibition of implant in uterine horn when compared with vehicle treated group. The results are shown in Table 2.

Table 2: Anti-implantation activity of ethanolic extracts of *Mimosa hamata* (Willd)

Treatment	Days of administration of extract	No. of rats without implant on 10 day	No. of implantation sites	Percent reduction in implantation (%)
Control (Vehicle)	1 to 10	0	8.33±0.23*	0
0.1 mg estradiol benzoate in olive oil	1 to 10	0	0.5±0.50*	95.07
ELMH 200mg/kg	1 to 10	0	5.166±0.13*	38.078
ELMH 400mg/kg	1 to 10	1	6.33±0.33*	21.25
ESMH 200 mg/kg	1 to 10	0	4.05±0.42*	50.54
ESMH 400 mg/kg	1 to 10	1	2.33±0.05*	72.009
ERMH 200 mg/kg	1 to 10	0	7.66±0.21*	8.04
ERMH 400 mg/kg	1 to 10	1	6.50±0.34*	21.96

Statistical analysis was carried out by ANOVA followed by the Dunnet's test at the significance level of * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$, as compared with normal control.

Ethanol extract of leaves of *Mimosa hamata* (Willd.) were evaluated for anti-implantation activity. The ethanol extract of leaves of *M. hamata* at the dose of 200 mg/kg and 400 mg/kg body weight inhibited pregnancy as compared to 400 mg/kg.

Ethanol extract of stems of *Mimosa hamata* (Willd.) were evaluated for anti-implantation activity. The ethanol extract of stems of *M. hamata* at the dose of 200 mg/kg and 400 mg/kg body weight inhibited pregnancy in rats with mean number of implants 4.05 ± 0.42 and 2.33 ± 0.05 , the percentage pre-implantation loss were 50.54% and 72.009% respectively (Table No. 3). The ethanol extract of stems of *M. hamata* at a dose of 400 mg/kg body weight significantly inhibited pregnancy as compared to 200 mg/kg.

Ethanol extract of roots of *Mimosa hamata* (Willd.) were evaluated for anti-implantation activity. The ethanol extract of roots of *M. hamata* at the dose of 200 mg/kg and 400 mg/kg body weight inhibited pregnancy in rats with mean number of implants 7.66 ± 0.21 and 6.50 ± 0.34 , the percentage pre-implantation loss were 8.04% and 21.96% respectively (Table No. 3). The ethanol extract of roots of *M. hamata* at a dose of 400 mg/kg body weight significantly inhibited pregnancy as compared to 200 mg/kg.

pregnancy in rats with mean number of implants 5.166 ± 0.13 and 6.33 ± 0.33 , the percentage pre-implantation loss were 38.078% and 21.25% respectively (Table No. 3).

3.5. Abortifacient activity

Pregnant rats of control group receiving vehicle showed maximum implantation and exhibited 0 % abortion rate. Pregnant rats receiving 0.1 mg estradiol benzoate in olive oil exhibited 95.07 % abortion rate.

Pregnant rats receiving 200 and 400 mg/kg of ethanolic extracts of leaves of *M hamata* exhibited 30% and 40 % abortion rate respectively.

Pregnant rats receiving 200 and 400 mg/kg of ethanolic extracts of stems of *M hamata* exhibited 70% and 90 % abortion rate respectively.

Pregnant rats receiving 200 and 400 mg/kg of ethanolic extracts of roots of *M hamata* exhibited 50% and 60 % abortion rate respectively.

The ethanolic extract of stems of *M. hamata* at 400mg/kg p.o. showed 72.009% anti-implantation activity which was found to be more potent than ethanolic extract of stems of *Mimosa hamata* at 200mg /kg p.o., offered 50.54%.

Also the ethanolic extract of stems of *M. hamata* at 400mg /kg p.o. exhibited 90 % abortion rate which was found to be more potent than ethanolic extract of stems of *Mimosa hamata* at 200mg /kg p.o., offered 70% abortion rate.

Table 3: Abortifacient activity of ethanolic extracts of *Mimosa hamata* (Willd.)

Group	Treatment	No of implantation-mean on 10 th day	No of implantation mean on 18 th day	% of Abortion
I	Control	$10.0 \pm 0.29^*$	$10.0 \pm 0.29^*$	00
II	0.1 mg estradiol benzoate in olive oil	$0.5 \pm 0.50^*$	$0.54 \pm 0.51^*$	95.07
III	ELMH 200mg/kg	$8.0 \pm 0.13^*$	$7.0 \pm 0.06^*$	30
IV	ELMH 400mg/kg	$7.0 \pm 0.05^*$	$6.0 \pm 0.10^*$	40
V	ESMH 200mg/kg	$8.0 \pm 0.13^*$	$3.0 \pm 0.36^*$	70
VI	ESMH 400mg/kg	$6.0 \pm 0.05^*$	$1.0 \pm 0.25^*$	90
VII	ERMH 200mg/kg	$8.0 \pm 0.13^*$	$5.0 \pm 0.06^*$	50
VIII	ERMH 400mg/kg	$7.0 \pm 0.05^*$	$4.0 \pm 0.10^*$	60

Statistical analysis was carried out by ANOVA followed by the Dunnet's test at the significance level of $*p < 0.05$; $**p < 0.01$; $***p < 0.001$, as compared with normal control.

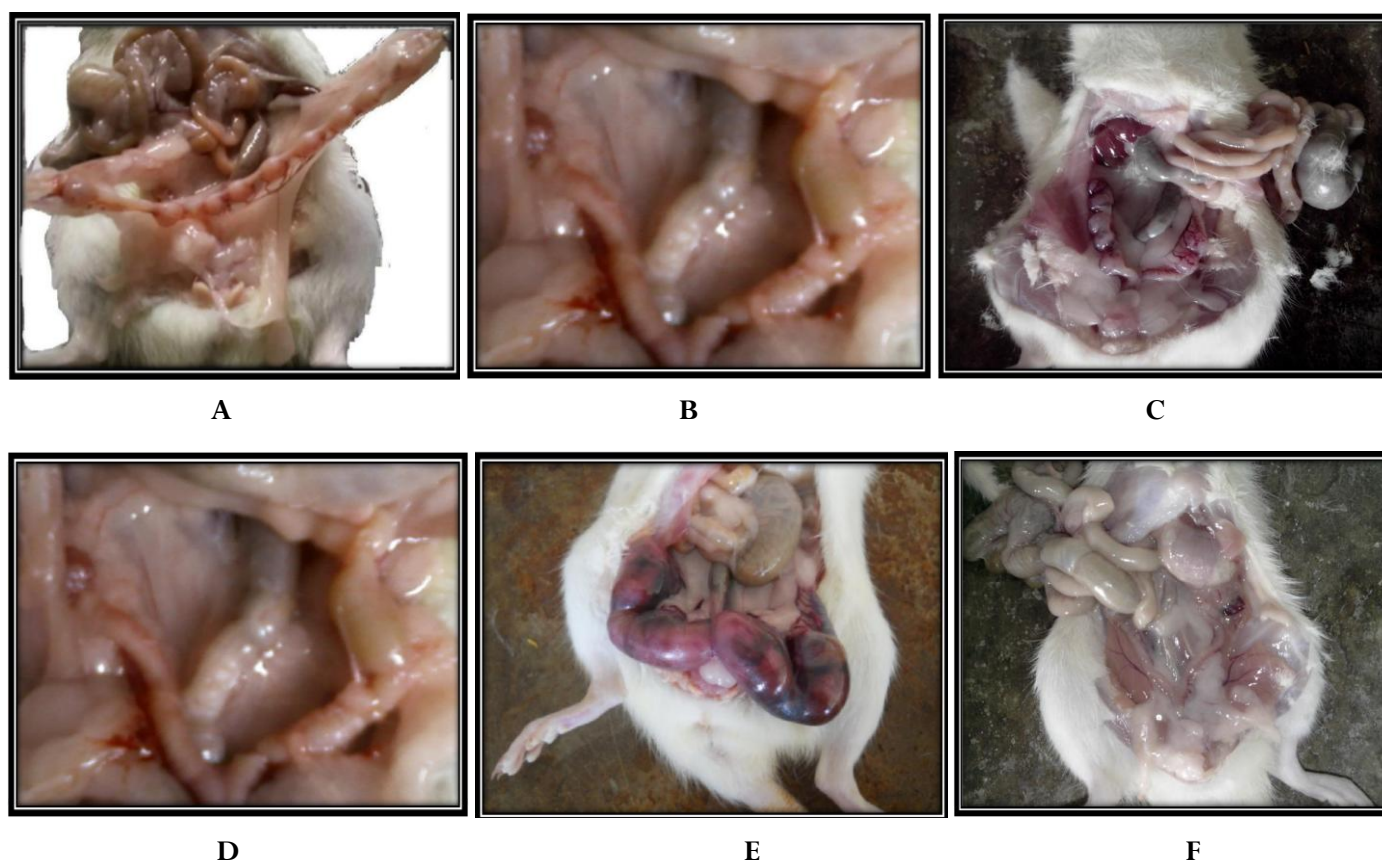


Fig 2: (a) ELMH Uterus horns of rat with implantation site, (b) Uterus horns of rat without implantation site, (c) ERMH Uterus horns of rat with implantation site, (d) Uterus horns of rat without implantation site, (e) ESMH Uterus horns of rat with implantation site, (f) Uterus horns of rat without implantation site

4. DISCUSSION

Research on fertility regulating plants has been given priority by Central Drug Research Institute (CDRI) Lucknow and Indian Council of Medical Research (ICMR) New Delhi, in recent years, but so far not a single plant product is marketed, which can be used as anti-fertility agent, in this direction the efforts have been made on the anti-fertility activity of *Mimosa hamata*. In the present study, stems of *Mimosa hamata* were tested for its anti-implantation activity and abortifacient activity. Among the six extracts tested at two different doses, the ethanol extract at 400 mg/kg body weight was more potent in their anti-implantation activity, which was further studied for abortifacient activity. The ethanol extract of *Mimosa hamata* stem exhibited significant ($P < 0.01$) antifertility activity. The rat has a characteristic short estrus cycle of 4 to 5 days in phases which make them ideal for reproductive studies. The presence and absence of four cell types and the relative proportion of each cell type, determine the stages of the estrous cycle. An estrous cycle is a rhythmic reproductive cycle in

sexually matured female mammals and is influenced by the release of gonadotropin releasing hormone (GRH) from the hypothalamus, gonadotropins from the pituitary gland and six hormones from the gonads. It is well known that for implantation exact equilibrium of estrogen and progesterone is essential, any disturbance in level of these hormones causes infertility [23]. A proestrous smear will have many epithelial cells with granular cytoplasm, indicating a rapidly growing vaginal epithelium and also the pre-ovulatory stage. Withdrawal of the treatment did not indicate any significant change either in the four phases of the estrous cycle, or in the duration of the cycle. An irregular pattern of estrous with a prolonged diestrus and consequently a reduced number of ova in the ovary was attributed to administration of *Mimosa hamata* stem extract. The prolongation in the diestrus phase explains the remote possibility of the rats getting pregnant. The reversible nature of the antifertility activity of the extract is explained through the observation that there was no significant change in the diestrus and the estrous cycle

after withdrawing the extract from those of the control. The extract with anti-implantation activity was further studied for its abortifacient activity. Ethanolic extract of stems of *Mimosa hamata* was found to possess significant abortifacient activity. In immature female rats, when compared to control, but not significantly greater than standard in dose dependent manner (Table 3). Preliminary phytochemical studies indicated the presence of carbohydrates, glycosides, tannins, glycosides, flavonoid, saponin. According to the literatures, flavonoids and saponins are known to exhibit antifertility activity. The non-steroidal compounds with estrogenic activity including flavonoids (flavones, flavonones and isoflavonoids) alkaloids, phenolics, occur in variety of plants are well documented as anti-fertility agents [24]. The ethanol extract displayed significant activity when compared with controls, indicating that flavonoids could be responsible for the activity.

5. CONCLUSION

A comprehensive research for antifertility agents is continued to tackle the problem of population explosion that may cause economic and health impact on the family in particular and the society in general especially in developing countries. The drug obtained from natural sources is practiced worldwide for control of fertility since ancient times. Nowadays people are showing more interest towards plants for its antifertility effect. Presently about 25% of prescriptions contain active principle derived from plants. Today various countries are trying to develop novel herbal antifertility drugs. Scholars are conducting extensive research for the development of solid dosage form of contraceptives prepared by synthetic substances & minimum approach towards natural origin.

The results of the present study provide the evidence for the antifertility activity of *Mimosa hamata* as claimed in the traditional use. The flavonoids, carbohydrate, glycosides and tannins present in the extracts may be responsible for their activity. With these preliminary results, we can conclude that the ethanolic extract *Mimosa hamata* showed significant antifertility activity by means of potent estrogenic, anti-implantation, and early abortifacient activities in a dose-dependent manner. The ethanol extract of stems of this plant could be used to induce abortion and can further be developed into a contraceptive. Further studies are going on laboratory scale to find out the active principles and the underlying cellular mechanism of action.

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