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ANTIOVULATORY AND ABORTIFACIENT POTENTIAL OF THE ETHANOLIC EXTRACT OF *MIRABILIS JALAPA* LINN IN FEMALE WISTAR RATS

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ABSTRACT

Human fertility control is one of the major approaches which seem effective in controlling population. Traditional use of medicinal plants and their extracts have become widely known among society for various diseases including fertility related problems. Considering women healthcare, it has become important to use herbal anti-fertility agents which can interfere with the natural procedure of reproduction in women. These herbal contraceptives are found to be eco-friendly, can be easily available and affordable even in rural areas. Very few studies have been carried out to confirm the safety and efficacy of medicinal plants used as anti-fertility agents. The present study was aimed to evaluate the antiovarulatory and abortifacient potential of the ethanolic extract of *Mirabilis jalapa* linn in female albino wistar rats.

Keywords – *Mirabilis jalapa*, Antiovarulatory, Abortifacient. Albino wistar rats.

1. INTRODUCTION

There are many contraceptive methods which is used to control population growth and most widely used method is oral contraceptive which has serious side effects and the most common is Changes in the uterine bleeding pattern at menses or between menses, such as decreased bleeding at menses, breakthrough bleeding or spotting between periods, prolonged bleeding at menses, complete stopping of menstrual bleeding that occurs over several months in a row, or stopping of menstrual bleeding that only occurs sometimes. Traditional use of medicinal plants and their extracts have become widely known among society for various diseases including fertility related problems. These herbal contraceptives are found to be eco-friendly, can be easily available and affordable even in rural areas. They are more effective but less potential than synthetic drugs. Antifertility drugs are closed to control fertility and also used as oral contraceptives. These herbal plants act on females to prevent fertilization, prevent ovulation, implantation, destroys the zygotes, abortion. Very few studies have been carried out to confirm the safety and efficacy of medicinal plants used as anti-fertility agents. Recent studies have been focused on antiovarulatory and abortifacient activity of ethanolic extract of *Mirabilis jalapa* linn.

2. MATERIALS AND METHODS

2.1 Plant Materials

The leaves of the plant of *Mirabilis jalapa* were collected from in and around Kanyakumari district. The plant was identified and authenticated by Dr. Jeyaraman, Assistant Professor of Botany, Chennai

2.2 Preparation of Ethanolic Extract

The leaves were shade dried at room temperature. The dried leaves were subjected to size reduction to a coarse powder by using dry grinder and pass through sieve. The powder was packed in soxlet apparatus and extracted successively with Ethanol (60-80°C). The extract was dried at 45°C in hot air oven till solid to semi-solid mass is obtained and are stored in air tight container in a refrigerator below 10°C

2.3 Animals

Female albino rats (Wistar strain weighing 150-250 g) were used for the study. The animals were housed in standard condition of temperature at 22±1°C relative humidity 55 ±10% and a 12-h light dark cycle. The rats were acclimatized to laboratory hygienic conditions for 10 days before starting the experiment.

Animal experimentation protocols were approved by Institutional Animal Ethical Committee in K. K. college of pharmacy, Chennai. (KKCP/2015/038).

2.4 Antioviulatory Activity

Vaginal smear from each rat is examined daily for 15 days, and those rats exhibited three regular cycles were included in the study. The selected animals were divided into 4 groups. Group I received 0.2 ml of distilled water. Group II served as a standard received 0.02 mg/kg ethinyl estradiol. Group III and Group IV received 200mg and 400mg/kg of body weight of ethanolic extract of *Mirabilis jalapa*. One drop of vaginal secretion was collected every morning between 9 am and 10 am for 15 days. On 16th day, the animals were sacrificed under thiopentone anesthesia. Uteri and ovaries were dissected, removed of extra fat and weighed on sensitive balance. For tissue cholesterol estimation, one of the two ovaries from each rat was used for tissue cholesterol estimation.

2.5 Abortifacient Activity

The female rats in proestrous phase were caged with males of proven fertility in the ratio 2:1 and examined the following day for the evidence of copulation. The rats having thick clump of spermatozoa in their vaginal smear were separated and it was considered as first day of Pregnancy. Female rats at 1st day of pregnancy were divided into four groups, consisting of six animals in each group. Group I received 0.2 ml of distilled water, Group II received 0.02 mg/kg ethinyl estradiol and Group III received 200 mg/kg and Group IV received 400 mg/kg. Animals were observed for vaginal bleeding from day 10 to 18th of pregnancy. On 21st Day animals are laparotomised under thiopentone sodium anesthesia. Both horns of the uterus are observed for the number of implantation sites, resorptions, dead and alive fetuses.

2.6 Statistical Analysis

The data were Statistically Analyzed and expressed as mean ± SE. Statistical analysis of the variance between control and experimental values was performed by Student's t –test.

3. RESULTS AND DISCUSSION

Table 1: Effect of ethanolic extract of *Mirabilis jalapa* Linn on the estrus cycle in rats (values are expressed as mean \pm SEM, n=6)

Group	Treatment	Estrous cycle(days)	Proestrus (days)	Estrous (days)	Metastrous (days)	Diestrus (days)
I	Control	4.48 \pm 0.10	0.86 \pm 0.11	0.92 \pm 0.14	0.82 \pm 1.40	2.01 \pm 0.14
II	Standard 0.02 mg/kg ethinyl estradiol	6.44 \pm 0.60	0.50 \pm 1.28	1.92 \pm 0.01	0.48 \pm 1.22	3.92 \pm 1.21**
III	200mg/kg of M.J	5.48 \pm 1.20	0.68 \pm 0.12	1.30 \pm 1.46	0.62 \pm 1.48	3.38 \pm 0.11*
IV	400mgmg/kg of M.J	6.20 \pm 0.12	0.52 \pm 0.10	1.86 \pm 0.12	0.58 \pm 0.12	3.85 \pm 0.12**

The data were Statistically analyzed and expressed as mean \pm SEM, Statistical analysis of the variance between control and experimental values was performed by Student's t –test. *P<0.05, **P<0.01, ***P<0.001

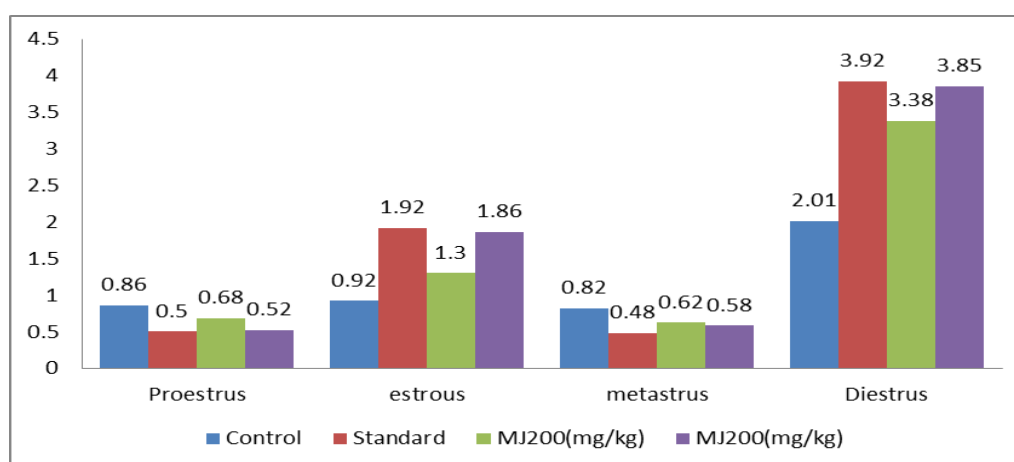


Fig.1: Effect of ethanolic extract of *Mirabilis jalapa* Linn on the estrus cycle in rats

Table 2: Effect of ethanolic extract of *Mirabilis jalapa* Linn on ovary and uterine weight

Group	Treatment	Ovarian weight in mg/100g body weight	Uterine weight(mg/100g)
I	Control	42.12 \pm 0.18	212.12 \pm 0.14
II	Standard 0.02 mg /kg ethinyl estradiol	128.20 \pm 0.16	810.10 \pm 0.14
III	Ethanolic extract of <i>Mirabilis jalapa</i> 200mg/kg	101.80 \pm 0.01	412.82 \pm 0.12
IV	Ethanolic extract of <i>Mirabilis jalapa</i> 400mg/kg	122.14 \pm 0.14	780.48 \pm 1.68

The data were Statistically analyzed and expressed as mean \pm SEM, Statistical analysis of the variance between control and experimental values was performed by Student's t –test. *P<0.05, **P<0.01, ***P<0.001

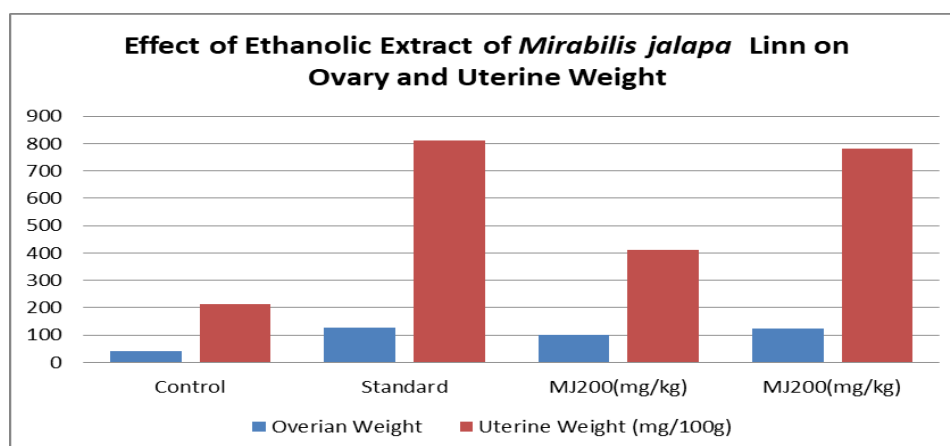


Fig.2: Effect of ethanolic extract of *Mirabilis jalapa* Linn on ovary and uterine weight

Table 3: Ethanolic extract of *Mirabilis jalapa* Linn on biochemical change in Ovary and Uterus.

Group	Treatment	Organ type	Protein(mg/kg)	Cholesterol(mg/kg)
I	Control	Uterus	242.12±0.61	544.01±1.02
		Ovary	88.24±1.40	220.12±1.26
II	Standard (0.02 mg /kg ethinyl estradiol)	uterus	116.2±1.28	301.02±0.12
		ovary	86.14±1.20	172.12±0.84
III	Ethanolic extract of <i>Mirabilis jalapa</i> 200mg/kg	uterus	128.12±1.01	296.14±0.11
		ovary	86.48±0.12	176.82±1.12
IV	Ethanolic extract of <i>Mirabilis jalapa</i> 400mg/kg	uterus	120.20±1.12	310.12±1.42
		ovary	84.12±4.10	180.28±0.14

The data were Statistically analyzed and expressed as mean ± SEM, Statistical analysis of the variance between control and experimental values was performed by Student's t –test. *P<0.05, **P<0.01, ***P<0.001

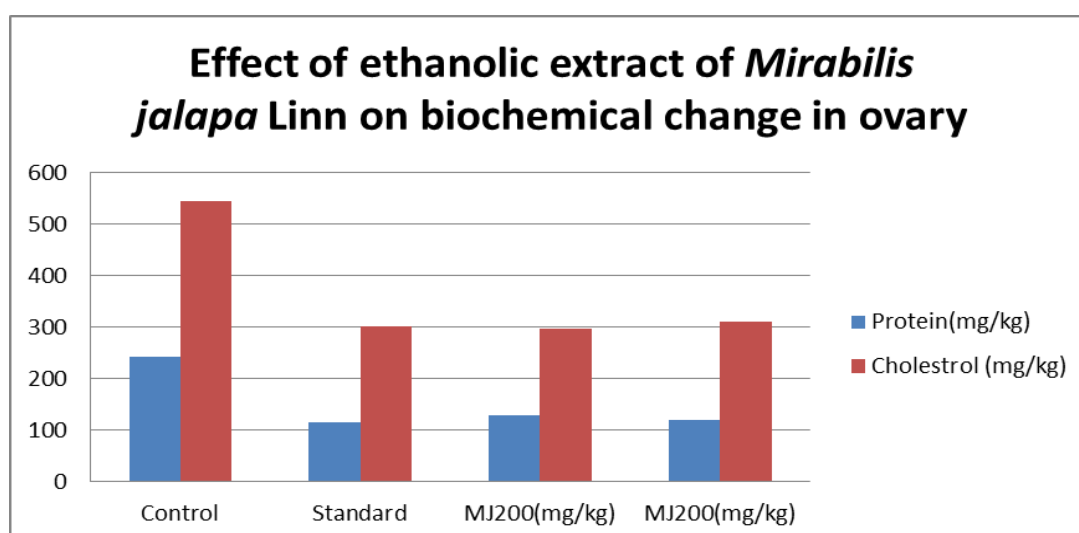


Fig. 3: Ethanolic extract of *Mirabilis jalapa* Linn on biochemical change in Ovary and Uterus.

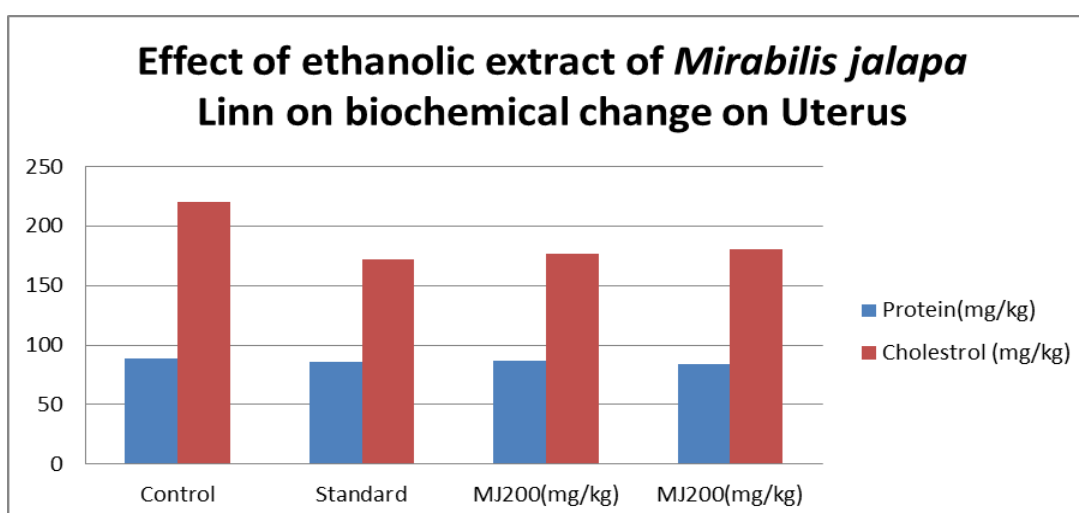


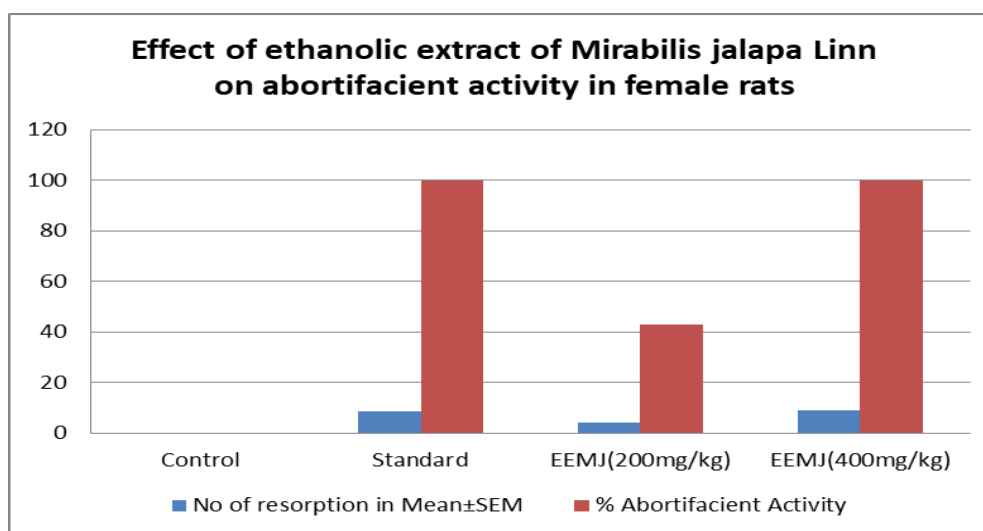
Fig. 4: Effect of Ethanolic extract of *Mirabilis jalapa* on biochemical change in uterus

Table 6: Effect of ethanolic extract of *Mirabilis jalapa* linn on abortifacient activity in female rats

Treatment	Body Weight	Drug Dose (mg/kg Body weight)	No. of fetus individual rates on day 10	No of rats delivered (little size)	No. of reabsorption in individual rats	No. of resorption in Mean \pm SEM	% Abortifacient Activity
Group I	140-210	Distilled Water	8,7,8,6,8,9	6(8,11,8,6,8,9)	0,0,0,0,0,0	0	Nil
Group II	140-220	Ethinyl Estradiol (0.02mg/kg)	8,9,8,10,11,6	6(0,0,0,0,0)	8,9,8,10,11,6	8.66 \pm 0.08	100
Group III	140-210	EEMJ 200mg/kg	8,10,11,9,8,9	6(4,8,7,5,4,7)	4,2,3,4,4,2	4.0 \pm 0.14	43.01
Group IV	140-220	EEMJ 400mg/kg	14,7,8,6,9,9	6(0,0,0,0,0,0)	14,7,8,6,9,9	8.83 \pm 0.28	100

EEMJ-Ethanolic extract of *Mirabilis jalapa*

The data were Statistically analyzed and expressed as mean \pm SEM, Statistical analysis of the variance between control and experimental values was performed by Student's t –test. *P<0.05, **P<0.01, ***P<0.001


Fig. 5: Effect of ethanolic extract of *Mirabilis jalapa* linn on abortifacient activity in female rats

In antioviulatory activity, the ethanolic extract showed most effective in interrupting the normal estrous cycle of rats. It showed prolonged diestrus stage of the estrous cycle with inhibition of ovulation. The ethanolic extract showed reduced duration of estrous and metaestrous phases with prolonged diestrus phases. In abortifacient activity, the ethanolic extract was found to exhibit significant pregnancy interceptive activity. The administration of 400 mg/kg body weight of the ethanolic extract resulted in 100% abortion and 200 mg/kg weight of the ethanolic extract resulted in 43.01% abortion. In 400 mg/kg body weight of Ethanolic Extract of *Mirabilis jalapa* Linn showed high number of reabsorption in individual rats when compared to control. This showed decrease in the percentage of lived fetuses. No live fetus was observed at the dose of 400 mg/kg body weight of ethanolic extract. The percent resorption index was zero in control groups, where as 100% in 400mg/kg of Ethanolic Extract and it showed 43% in 200 mg/kg of Ethanolic Extract of *Mirabilis jalapa* Linn.

4. CONCLUSION

In abortifacient activity, the oral administrative of Ethanolic Extract of 200 mg/kg and 400 mg/kg of *Mirabilis jalapa* Linn reported abortifacient activity. This abortifacient might be mediated through Estrogenic activity. Since estrogen are known to increase Uterine contractibility to expel fertilized egg. It also disrupts the functional equilibrium between Estrogen and Progesterone.

In antiovaratory activity, the ethanolic extract showed most effective in interrupting the normal estrous cycle of rats.it showed prolonged diestrous stage of the estrous cycle with inhibition of ovulation. The ethanolic extract showed reduced duration of estrous and metaestrous phases with prolonged diestrous phase.it showed inhibition of ovulation with interrupting in estrus cycle.it showed that this changes in the estrus cycle is by the synthesis of ovarian estrogen which is governed by pituitary gonadotropins and hypothalamic releasing factor.

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