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ANTI-IMPLANTATION ACTIVITY OF THE ETHANOLIC EXTRACT OF *MIRABILIS JALAPA* LINN IN FEMALE ALBINO WISTAR RATS

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ABSTRACT

The present study was aimed to evaluate the effect of *Mirabilis jalapa* Linn on anti-implantation activity of female albino Wistar rats. The animals were treated with ethanolic extract of *Mirabilis jalapa*, with doses of 200 mg and 400 mg/kg body weight from day 1 to day 7 of pregnancy. The rats were sacrificed on day 10 of pregnancy. Presence of foetus, implantation sites and number of corporal lutea were recorded. There was a 100% reduction in pregnancy was observed in 400 mg/kg of *Mirabilis jalapa* and it showed maximum percent inhibition or reduction when compared with control. All the rats were delivered in control groups, where as 30% of rats delivered in 200 mg/kg of *Mirabilis jalapa* Linn when compared to control. Biochemical changes were observed in Blood Glucose, Cholesterol, triglycerides. In 400 mg/kg of Ethanolic Extract of *Mirabilis jalapa* Linn showed depletion in Blood Glucose, Cholesterol, Triglycerides when compared with control. In 200 mg/kg it showed less depletion of blood glucose, Cholesterol and Triglycerides when compared with control

Keywords – *Anti implantation, Mirabilis jalapa, Acute toxicity studies.*

1. INTRODUCTION

As per 2016 World Population Data Sheet published by Population Reference Bureau (PRB) USA, the world population in the year 2016 is 7.4 Billion and it projects the world population would reach 9.9 billion in the year 2050. The population would become 10 Billion in the Year 2053 as per the PRB's for the Year 2050 projections. It is up 33% increase from the Year 2016 of 7.4 Billion Population. Many nations with rapid population growth have low standards of living, whereas many nations with low rates of population growth have high standards of living. The most preferred method for fertility control is contraceptive method that is used for preventing the pregnancies temporarily or permanently. Ideally the method shall be safe, effective, acceptable, inexpensive, user controlled with minimal side effects and protective against infection. 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. In order to overcome these side effects, there is an urgency to meet the requirement of safe and active natural contraceptive agents with minimal side effects.

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 Experimental Animals

Albino rats (Wistar rats) of either sex, weighing (150-250 g) were placed in a polypropylene cage in a controlled room temperature 24°C±1°C and relative humidity of 60-70 % in animal house. The animals were maintained in standard pellet diet and water ad libitum. They were acclimatized to laboratory condition for seven days before commencement of the experiment. Animal experimentation protocols are approved by Institutional Animal Ethical Committee in K. K. College of Pharmacy, Chennai. (Ref: **KKCP/2015/038**).

2.4 Acute Toxicity (LD₅₀) Studies

Acute toxicity study of the extract was performed by OECD guidelines 423. Three animals were used for each step. The dose level used were 5, 50, 300 and 2000 mg/kg body weight. Mortality and toxic symptoms in the treated animals were observed continuously for the first 3 hours after dosing, periodically during the first 24 hours and then daily observation for a total period of 14 days.

2.5 Anti-implantation Activity

Proven fertile female rats of Wister strain weighing 200-250g were screened for 2-3 estrous cycles by examining the vaginal smears. The rats that showed normal cycles for two successive examinations were selected for study. The rats in proestrus and estrous stages were caged with fertile male in the ratio 2:1. The following day vaginal smear were examined and the appearance of sperm clusters in the smears was recorded as day 1 of pregnancy. These animals were divided into four groups containing six animals in each group. Group I served as control group received distilled water. Group II served as a standard received Ethinyl Estradiol 0.02mg/kg/rat per day. Group III and Group IV received 200mg and 400mg/kg of body weight of ethanolic extract of *Mirabilis jalapa*. On 10th day of pregnancy, the animals are laparotomized to find out number of implants present in both the uterine horns. Number of corpora lutea on the both ovaries are counted. Each pup is weighed and examined for gross defect. Weight gained by each rat of all the groups is recorded

2.6 Statistical Analysis

All the data were expressed as Mean ±SEM Statistical analysis was carried out by student's t-test.

3. RESULTS AND DISCUSSION

3.1 Acute Oral Toxicity Studies

There were no signs of toxicity up to 2000 mg/kg of the extract, it shows the absence of pilo erection, righting reflex, seizure, any stains of urine, loss of righting reflex, alopecia, edema, lacrimation etc.

Table 1: Body weight changes in the ethanolic extract of *Mirabilis jalapa* Linn

S.No	Treatment	Dose mg/kg	0 days	7 days	14days	21days
I	Control	Distilled water	184.01±1.02	186±0.21	188±0.12	192±0.16
II	Standard	Ethinyl estradiol	187.5±0.22	185±1.21	183±0.24	180±1.10
III	MJ	200	190.12±1.24	189±0.67	187±1.64	180±0.10
IV	MJ	400	188.18±0.21	184±1.21	180±2.89	178±0.21

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

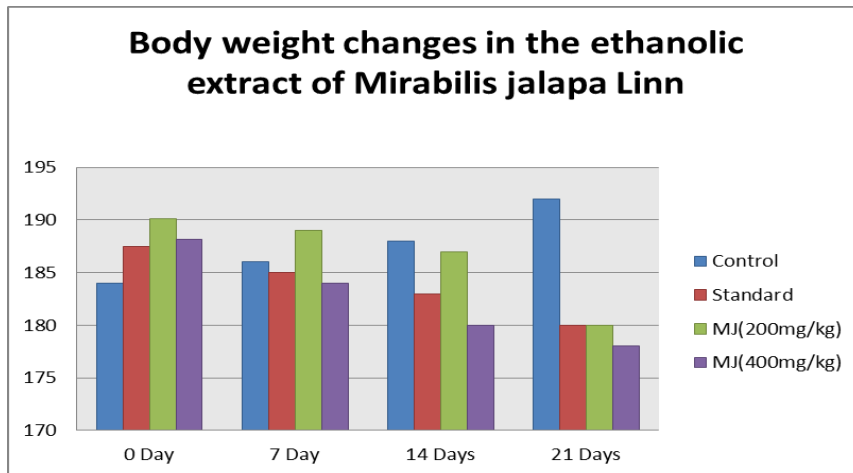


Figure 1: Changes in the body weight in the ethanolic extract of *Mirabilis jalapa* Linn

Table 2: Effect of ethanolic extract of *Mirabilis jalapa* Linn on reduction in pregnancy in rats

S. No	Treatment	Dose mg/kg	No of rats pregnant/treated	% Reduction in pregnancy	No. of implant in individual rats	No. of rats delivered (No. of pups)
I	Control		6/6	0	4,6,10,11,8,6	8(4,6,10,11,8,6)
II	Standard		0/6	100	0,0,0,0,0,0	0(0,0,0,0,0,0)
III	MJ	200	3/6	50	3,0,2,8,0,4	2(3,0,2,8,0,4)
IV	MJ	400	0/6	100	0,0,0,0,0,0	0(0,0,0,0,0,0)

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

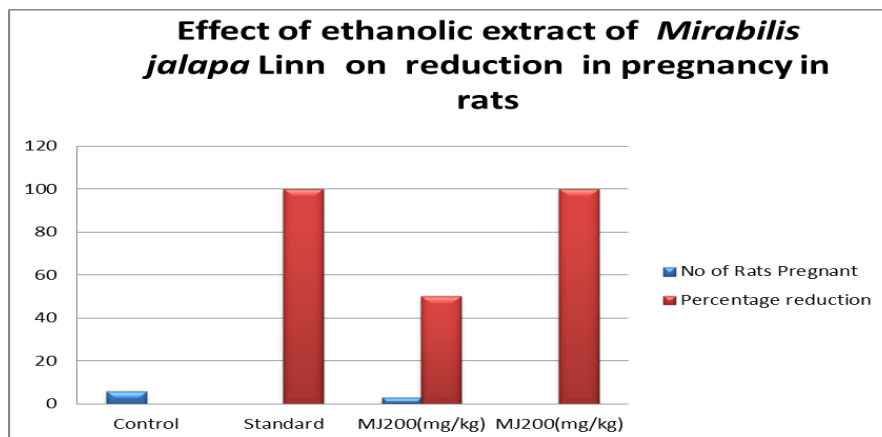


Fig 2: Effect of ethanolic extract of *Mirabilis jalapa* on reduction in pregnancy in rats

Table 3: Effect of ethanolic extract of *Mirabilis jalapa* on blood glucose, cholesterol and triglycerides.

S. No	Treatment	Dose mg/kg	Blood glucose	cholesterol	Triglycerides
I	Control	Distilled water	72.14±0.04	70.12±1.04	158.12±1.02
II	Standard	Ethinyl estradiol	70.94±1.86***	50.24±0.28***	130.22±0.11***
III	MJ	200	71.24±0.84**	56.16±0.01**	142.81±0.01**
IV	MJ	400	70.80±1.24***	54.32±1.01***	132.01±0.04***

The data was 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

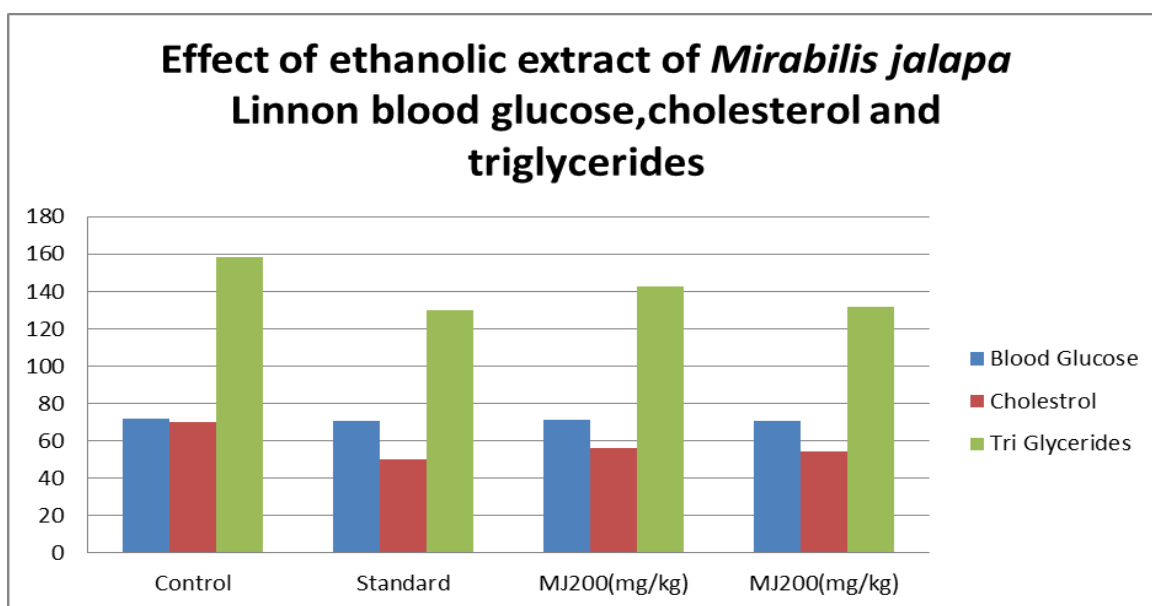


Figure 3: Effect of ethanolic extract of *Mirabilis jalapa* on blood glucose, cholesterol and triglycerides

In implantation activity, after treatment with 200 mg and 400 mg/kg body weight of *Mirabilis jalapa* Linn, the body weight was reduced up to 21 days. Maximum reduction in body weight as compared to control group. There are rise in body weight in control group Maximum percent inhibition or reduction was observed in 400 mg/kg of *Mirabilis jalapa* Linn when compared to control. There was a 100% reduction in pregnancy was observed in 400 mg/kg of *Mirabilis jalapa* Linn when compared to control. All the rats were delivered in control groups. There were no rats delivered in 400 mg/kg of *Mirabilis jalapa* Linn, where as 30% of rats delivered in 200 mg/kg of *Mirabilis jalapa* Linn when compared to control. Biochemical changes were observed in Blood Glucose, Cholesterol, triglycerides. In 400 mg/kg of Ethanolic Extract of *Mirabilis jalapa* Linn showed depletion in Blood Glucose, Cholesterol, Triglycerides when compared with control. In 200 mg/kg it showed less depletion of blood glucose, Cholesterol and Triglycerides when compared with control. This decreased in cholesterol level can cause the diminution of ovarian steroidogenesis. This causes Imbalance in the level of oestrogen and progesterone.

4. CONCLUSION

The ethanolic extract of *Mirabilis jalapa* linn 200mg and 400mg showed anti implantation activity in dose dependent manner. A strong anti-implantation (100% inhibition) activity was observed at the dose level of 400mg/kg body weight. Thus, the ethanolic extract of *Mirabilis jalapa* may be explored as a female contraceptive.

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6. REFERENCES

1. Human over population Wikipedia (https://en.wikipedia.org/wiki/Human_overpopulation)
2. Population Reference Bureau. (2016 world population data sheet)
3. https://en.Wikipedia.org/wiki/Total_fertility_rate.
4. https://en.Wikipedia.org/wiki/Birth_control
5. Walker CI, Trevisan G, Rossato MF, Silva CR, Pinheiro FV. Antinociceptive effect of *Mirabilis jalapa* on acute and chronic pain models in mice. *Journal of Ethnopharmacology*. 2013;149(3):685-93.
6. Zhou JY, Zhou SW, Zeng SY, Zhou Jy, Jiang MJ, He Y. Hypoglycemic and Hypolipidemic Effects of Ethanol Extract of *Mirabilis jalapa* Linn Root on Normal and Diabetic Mice. *Evidence Based Complementary Alternative Medicine*. 2012:257-374
7. Singh M, Kumar V, Singh I, Gauttam V, Kalia AN. Anti-inflammatory activity of aqueous extract of *Mirabilis jalapa* Linn. *Leave. Pharmacognosy Res*. 2010 Nov;2(6):364-7.
8. Nath LR, Manjunath KP Savadi RV, Akki KS. Anti-inflammatory activity of *Mirabilis jalapa* linn. *Leave. Journal of Clinical Pharm*. 2010;1(2):93-6.
9. Aoki et.al. Ethnopharmacological Review of Four O Clock Flower Plant *Mirabilis jalapa* Linn. 1960;19:297-317.
10. Gogoi J, Nakhuru KS *et al.*, Isolation and Characterization of Bioactive components from *Mirabilis jalapa* Linn radix. *J. Tradit Complement Med*. 2015 Jan 27;6(1):41-7.
11. Hanumantappa Bherigi Nayaka, Ramesh Londonkar. Evaluation of *Portulaca Oleracea* for Anti-Fertility Effect in Female Albino Rats 2014. 6(5). 0975-1491
12. Sunil Kumar Shah, Deenanath, Jhade. Anti-fertility activity of Ethanol and Aqueous Extracts of Aloe Vera Mill on Female Wistar Rats: Approaches of herbal contraception. *Journal of Pharmaceutical Sciences and Research*. 2016; 8(9):952 – 957
13. Parimal P. Katolkar, Bhumes. Anti-Implantation activity of the Methanolic Extract of *Corida Dichotoma* Lam. Bark in Rats. *International Journal of Bio-Medical and Advance Research*, 2012;3(3)
14. Ramesh Londonkar and Hanumantappa, Evaluation of Anti implantation and Abortifacient properties of *Portulaca oleracea* L in albino rats, 2011. 2(4):0975-6299