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EVALUATION OF ABORTIFACIENT EFFICACY OF *DOLICHANDRONE FALCATA* LEAVES IN FEMALE ALBINO RATS.

ABSTRACT

The practice of traditional medicine for the control of fertility in most part of India is based on the uses of plant medicine for many years. According to folklore medicine, the plant *Dolichandrone falcata* (Biognoniaceae) possesses abortifacient activity in human females. The present study was carried out in female albino rat to explore the abortifacient activity of the *Dolichandrone falcata* leaves. Pregnant rats weighing 140 -210 gm were randomized into 10 group (1-10). Rats were laprotomised on 10th day of pregnancy and the two horns of uteri were examined to determine the implantation sites. Aqueous, chloroform and alcoholic extract of *Dolichandrone falcata* exhibited significant abortifacient activity. The aqueous extract and the alcoholic extract at a dose of 400 mg/kg and 200 mg/kg body weight was found to be most effective in causing strong abortifacient activity. The phytochemical screening of the leaves of *Dolichandrone falcata* revealed the presence of flavonoids, simple phenolics, alkaloids, steroids, tannins and saponins.

KEY WORDS- Abortifacient, *Dolichandrone falcata*, Female albino rat, Post implantational, Resorption,

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1. INTRODUCTION

The search of an oral agent that can control human fertility is at least as old as recorded history and was vague in pre-historic times. Although a wide variety of synthetic contraceptive agents are available, these cannot be used continuously due to their severe side effects¹. Several plants have been confirmed as antifertility, abortive, uterine stimulant, estrogenic or cytotoxic agents in animals and humans². Hence people are now looking back to age old tradition of using herbal medicines which have minimum side effects.

Herbal contraceptives offer alternatives for women who have problem with or lack access to modern contraceptive options, particularly women living in rural areas, in developing nations with very high population like India, China, Africa (Nigeria) and Bangladesh³. Studying this potency and toxicity of local plants that are reputed for birth control in the folkloric medicine of these countries may generate greater confidence in and wider acceptance of herbal contraceptive⁴.

Dolichandrone falcata Bignoniaceae, is a deciduous tree commonly known as Medshingi in local areas of Melghat region of Maharashtra, India. It occurs as a tree small to medium sized 6 to 15 m in height. Different parts of this plant are reported to possess medicinal properties. Its bark paste is applied on fractured or dislocated bones⁵. The bark is also used as a fish poison. A decoction of the fruits is being used to procure abortion³. Bark juice is used in cases of menorrhagia, leucorrhoea⁶. The leaves are used as an anti-oxidant, anti – allergic, anti-inflammatory, anti cancer, antiestrogenic and for anxiolytic activities⁷ despite those traditional claims and successful isolation of the bioactive compounds no in depth scientific study has been performed regarding its abortifacient properties. Thus, the aim of the present study was to validate scientifically the claimed abortifacient activity of *Dolichandrone falcata* leaves extract at different doses.

2. MATERIALS AND METHODS

2.1. Collection of plant material

The plant *Dolichandrone falcata* was collected from Melghat region and identified and authenticated by experts from Botanical Survey of India, Pune (Accession No. MAWD OF1). A voucher specimen of the sample was deposited in the herbarium collection at department.

2.2. Preparation of extract

The leaves of *Dolichandrone falcata* were collected, shade dried, powdered and subjected to soxhlet extraction successively with distilled water and alcohol. The extract was evaporated to near dryness on a water bath and kept at 40c in refrigerator until the experimental testing.

2.3. Phytochemical screening

The presence of various plant constituents in the plant extract was determined by preliminary phytochemical screening as described by Thimmaiah⁸.

2.4. Procurement and rearing of experimental animal

Albino rats (Wistar strain) used in the present investigation were procured from Sudhakar Rao Naik Institute of Pharmacy, Pusad (M.S). The rats were acclimatized for 15 days to the best laboratory conditions (prior to experiment), and maintained on balanced diet (Trimurti lab feeds, Nagpur) and water was provided ad libitum.

2.5. Acute toxicity study

The animals were divided in four groups of six rats each. The extract was administered orally at the dose of 1000, 2000 and 4000 mg/kg body weight to the first three groups respectively. The fourth group was treated as control and received the vehicle only. The rats of both experimental and control groups were observed for 72 hr. for behavioral changes and mortality⁹.

2.6. Abortifacient activity

The plant extract were tested in female albino rats for abortifacient activity by the method described by Khanna and Chaudhary¹⁰. The vaginal smears of caged female rats of known fertility were monitored daily. Unstained material was observed under a light microscope. The proportion among the cells observed was used for determination of the estrous cycle phases¹¹. The female rats were caged with males of proven fertility in the ratio of 2:1 in the evening and examined the following day for the evidence of copulation. Rats exhibiting thick clump of spermatozoa in their vaginal smear were separated and that day was designated as 1st day of pregnancy. These rats were randomly distributed into 2 groups, a control group and experimental groups of 6 animals each. On the 10th day of pregnancy animals were laprotomised under light anaesthetic ether using sterile conditions. The two horns of uteri were examined to determine the implantation sites. There after the abdominal wound was sutured in layers. Post operational care was taken to avoid any infection.

The extracts to be tested were then fed to operate pregnant rats. i. e. aqueous extract, alcoholic extract, chloroform extract. *Dolichandrone falcata* (leaves) at dose of 100 mg/kg, 200 mg/kg and 400 mg/kg body weight daily by an intragastric (i.g.) soft rubber catheter from day 11 up to the 15 day of pregnancy. The animals were allowed to go full term. After delivery the pups were counted and the abortifacient activity of extract was evaluated. Litters were examined for any malformations.

All experimental protocols were subjected to the scrutinization and approval of institutional Animal Ethics Committee registration number 1060/ac/07/CPCSEA (IAEC/4/2009).

3. Statistical analysis

All the data are expressed as mean \pm SEM. Statistical analysis was done by paired and unpaired student's t-test¹².

4. RESULT AND DISCUSSIONS

Preliminary photochemical screening of the leaves extract of *Dolichandrone falcata* revealed the presence of alkaloids, flavonoids, steroids, tannins and sponins (Table-1).

Dolichandrone falcata leaves extracts did not produce any mortality even at the does of 4000mg/ kg body weight, thus it was found to be non-toxic. The results showed no clinical signs such as weights loss respiratory distress, salvation and change in appearance of hair as well as maternal mortality. On the basis of above result three doses (100,200,400 mg/kg body weight) of *Dolichandrone falcata* was selected for further abortifacient studies.

All the experimental extracts when evaluated for their abortifacient activity, were found to exhibit significant pregnancy interceptive activity. The alcoholic extract at a dose of 200 mg/kg body weight and the aqueous extract at a dose of 400 mg/kg body weight showed 100% abortifacient activity. No vaginal bleeding was observed in any of the animals. This observation reveals that all the implants have been resorbed by the uterus. The abortifacient activity is expressed as percentage resorptions of fetus in uteri (Table- 2, 3, 4).

Abortion refers to the premature expulsion of the products of conception from the uterus. Abortion may be due to maternal exposure to chemicals, which can disrupt pregnancy and cause detachment of the embryo¹³. In the present study the alcoholic and aqueous extract of *Dolichandrone falcata* at 200mg/kg and 400 mg/kg respectively showed 100% abortifacient activity while the chloroform extract of *Dolichandrone falcata* did not show very significant abortifacient activity. However, it reduced the number of viable fetuses

The number of litters born due to the treatment of alcoholic and aqueous extract was significantly less than that of control. This indicates the abortifacient nature of the leaves of *Dolichandrone falcata*. Similiar effect was observed with 200 mg/kg dose of the ethanolic extract of the roots of *Derris brevipes*¹⁴.

Preliminary phytochemical studies indicated the presence of alkaloids, steroids, flavonoids, phenols in the *Dolichandrone falcata* leaf extract. Since several of these compounds are known to exhibit antifertility activity^{15, 16, 17}, the abortifacient effect of the extract might be due to the presence of such compounds.

5. Conclusion

The present study suggests that the leaf extract of *Dolichandrone falcata* possesses abortifacient activity and these findings could explain its traditional use as an abortifacient. However an identification of its active constituent merits further detailed investigation.

6. ACKNOWLEDGEMENT

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Institute of Science and Humanities, Amravati for giving the permission for doing the experimental work on rats.

Name of the plant	Alkaloids	Simple Phenolics	Steroids	Anthraquinone	Flavonoids	Tannins	Saponins
Dolichandrone falcate	+	+	+	-	+	+	+

+ Present, - Absent

Table 1- Phytochemical profile of *Dolichandrone falcata* leaves extract

Treatment groups	Drug dose (mg/kg body wt.)	Body weight (gm)	Sample size	No. of foetus in individual rats on day 10	No. of litter delivered	No. of resorption in individual rats	No. of resorption in Mean \pm S. E.	% abortifacient activity
Group - 1 Control (Vehicle)	-	150 - 200	6	7,7,9,8,7,4	6(7,7,9,8,7,4)	0,0,0,0,0,0	0	Nil
Group - 2 Aqueous extract <i>D. falcata</i>	100	150 - 200	6	11,8,8,8,7,9	6(8,5,6,6,4,5)	3,3,2,2,3,4	2.83 \pm 0.30***	33.33%
	200	150 - 200	6	6,9,9,9,10,8	6(3,4,5,4,5,4)	3,5,5,4,5,4	4.33 \pm 0.33***	50.98%
	400	150 - 200	6	8,2,6,6,8,4	6(0,0,0,0,0,0)	8,2,6,6,8,4	5.66 \pm 0.95***	100%

Values in Means \pm S. E. (Standard error), *P<0.05, **P<0.01, ***P<0.001, When compared between group.

Table 2- Effect of aqueous extract of *Dolichandrone falcata* (leaves) on fertility of female rats when fed orally from day 11 to 15 of pregnancy

Treatment groups	Drug dose (mg/kg body wt.)	Body weight (gm)	Sample size	No. of foetus in individual rats on day 10	No. of litter delivered	No. of resorption in individual rats	No. of resorption in Mean \pm S. E.	% abortifacient activity
Group - 1 Control (Vehicle)	-	150 - 200	6	7,7,9,8,7,4	6(7,7,9,8,7,4)	0,0,0,0,0,0	0	Nil
Group - 2 Alcoholic extract <i>D. falcata</i>	100	160 - 200	6	5,7,8,6,6,5	6(0,1,0,2,1,1)	5,6,8,4,5,4	5.33 \pm 0.61***	86.48%
	200	150 - 190	6	8,6,6,4,2,3	6(0,0,0,0,0,0)	8,6,6,4,2,3	4.83 \pm 0.91***	100%
	400	140 - 190	6	9,8,11,8,9,14	6(0,0,0,0,0,0)	9,8,11,8,9,14	9.83 \pm 0.95***	100%

Values in Means \pm S. E. (Standard error), *P<0.05, **P<0.01, ***P<0.001, When compared between group.

Table 3- Effect of alcoholic extract of *Dolichandrone falcata* (leaves) on fertility on female rats when fed orally from day 11 to 15 of pregnancy

Treatment groups	Drug dose (mg/kg body wt.)	Body weight (gm)	Sample size	No. of foetus in individual rats on day 10	No. of Litter delivered)	No. of resorption in individual rats	No. of resorption in Mean \pm S. E.	% abortifacient activity
Group - 1 Control (Vehicle)	-	150 - 200	6	7,7,9,8,7,4	6(7,7,9,8,7,4)	0,0,0,0,0,0	0	Nil
Group - 2 Chloroform extract <i>D. falcata</i>	100	160 - 210	6	8,6,5,9,8,7	6(7,5,4,8,8,6)	1,1,1,1,0,1	0.83 \pm 0.16***	11.62%
	200	160 - 210	6	8,9,10,9,7,8	6(7,7,9,7,5,7)	2,2,1,2,2,1	1.66 \pm 0.21***	17.64%
	400	160 - 210	6	10,9,9,8,6,9	6(7,6,7,6,3,7)	3,3,2,2,3,2	2.5 \pm 0.08***	29.41%

Values in Means \pm S. E. (Standard error), *P<0.05, **P<0.01, ***P<0.001, When compared between group.

Table 4- Effect of Chloroform extract of *Dolichandrone falcata* (leaves) on fertility of female rats when fed orally from day 11 to 15 of pregnancy

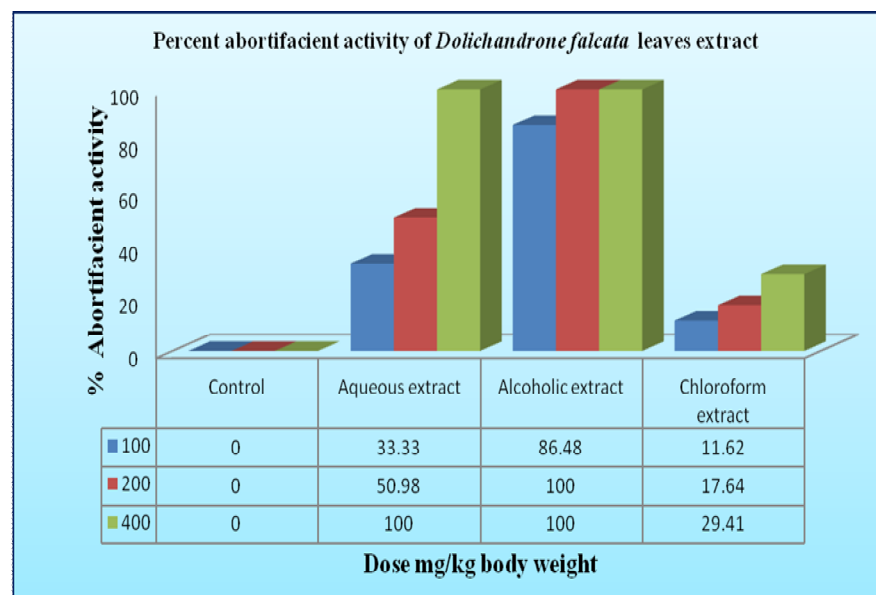


Figure 1- Graphical representation of abortifacient effect of *Dolichandrone falcata* leaves extract on female albino rats

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