

REVIEW ARTICLE

Review on some ethnomedicinal plants having antifertility activity in female albino rats

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Manuscript Details	ABSTRACT
<p>Received : 26.11.2014 Revised : 28.01.2015 Revised Received : 28.02.2015 Accepted : 15.03.2015 Published: 25.04.2015</p> <p>ISSN: 2322-0015</p> <p>Editor: Dr. Arvind Chavhan</p> <p>Cite this article as:</p> <p>Dabhadkar DK, Thakare VG, Zade VS, Charjan AP, Dhore MM, Deosthale SM. Review on some ethnomedicinal plants having antifertility activity in female albino rats, <i>Int. Res. J. of Sci. & Engg.</i>, 2015; 3(2):41-46.</p> <p>Copyright: © Author(s), This is an open access article under the terms of the Creative Commons Attribution Non-Commercial No Derivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>This review discussed the current research done on the most popular natural antifertility agent of plants origin and examines the weight of evidence to support the use of any of these substances to enhance antifertility activity and function. A variety of natural contraceptive of plants origin are known to have a potential effect on the sexual functions, supporting older claims and offering new hopes. The available synthetic drugs and treatments have limited efficacy, unpleasant side effects and contraindications in certain disease conditions. The present review, describes the detail information about the major constituents and their medicinal importance found in naturally occurring plants, which are helpful to further development of pharmaceutical formulations. In the present investigation total 6 plants were examine for their antifertility activity in female albino rats as claimed by tribal of Yavatmal and Amravati districts.</p> <p>Keywords: Amravati district, Herbal drugs, <i>Plumeria rubra</i>, Tribals, Yavatmal district.</p> <p>INTRODUCTION</p> <p>The extraordinary growth of the world population stands as one of the significant event of the modern era to think over. The current world population is around 6-7 billion. One of the critical problems of the</p>

developing countries like India and other countries are its geometrical increase in human population. This population explosion will have negative impact on our economic, social policies and would simultaneously misbalance our socio-economic infrastructure. Thus the control of human fertility in sense of its limitation is the most important and urgent of all biosocial and medical problems. So to control fertility, drugs in the forms of hormones and other compound have been developed. To avoid the inevitable advanced effects of drugs prepared from chemical sources, indigenous plants are given preferences, which are also cheap, easily available and harmless. (Leswar and Widjata, 1992).

Development of safe orally effective, fertility regulating agents from higher plants, for use in human, is not a new idea. From centuries, virtually every indigenous culture has utilized plants in one form or another in an attempt to limit the population of culture. Many plants have fertility regulating properties. Recently continuous efforts are ongoing to develop antifertility products from plants. Plants based contraceptive measures such as crude plant extract or composite preparation with scientifically proven efficacy could be beneficial and appreciable to the poor population of country, as the cost of such contraceptive choices would be within their affordability. Indeed extensive researches are being carried out to evaluate the putative abortifacient and other antifertility activities of different plant as well as traditionally used folk contraceptive all over the world (Murugan et al., 2000). Antifertility agents prevent the fertility by interfering in various normal reproductive mechanisms, in both males and females. The ideal contraceptive agents are one which possesses 100% efficacy, reversibility of action, free from side effects and easy to use (John, 1981). These traditional knowledge systems have started to degraded with the passage of time due to scarcity of written documents, lack of scientific basis and relatively low income in these traditions.

Such traditional knowledge form is present in two tribal's dominating areas of Maharashtra; one is Amravati district and second is Yavatmal district. The Amravati district of Maharashtra lies in close vicinity of Satpuda Mountains. The Melghat region and Satpuda Mountains of Amravati district are known for their rich flora. Some tribals of this region like *Gawali*, *Halbi*, *Gond*, *Korku*, *Nihal* and *Wanjari* have been using various plants for fertility regulation. In Yavatmal district there are three forest divisions Yavatmal, Pusad and Pandharkawda which are rich in medicinal plants. Some tribals like *Gond*, *Kolam*, *Pradhan*, *Lohar* and *Banjara* of the area have been using various plants and their parts as medicine to check the fertility.

Fortunately, the ethanobotanical enumerations of Yavatmal and Amravati district for antifertility regulation were recorded or documented by several researchers for this region. Also, the scientific evaluation of antifertility activity of medicinal plants was carried out. Therefore, the present study is small effort to gain insight in the knowledge of traditional medicine of this region and also focus on the screening of some meaningful medicinal plants from this region and establishing their contraceptive potentials.

STUDY AREA

The Melghat region of Amravati district of Maharashtra state of India is located in 20° 11' to 21° 46' North latitudes and to 76° 38' to 77° 34' East longitudes and Yavatmal district is located in eastern (Vidarbha) region of the Maharashtra. It is located between 19° 26' to 20° 42' North latitudes and 77° 18' to 79° 98' East longitudes.

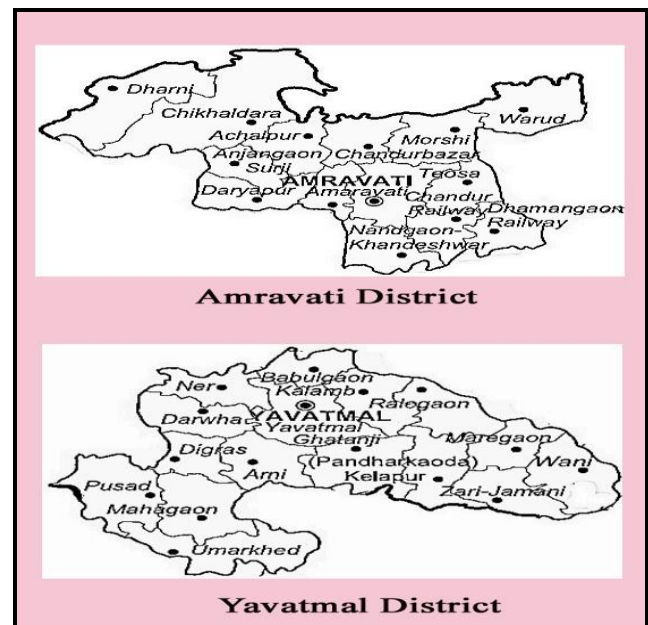
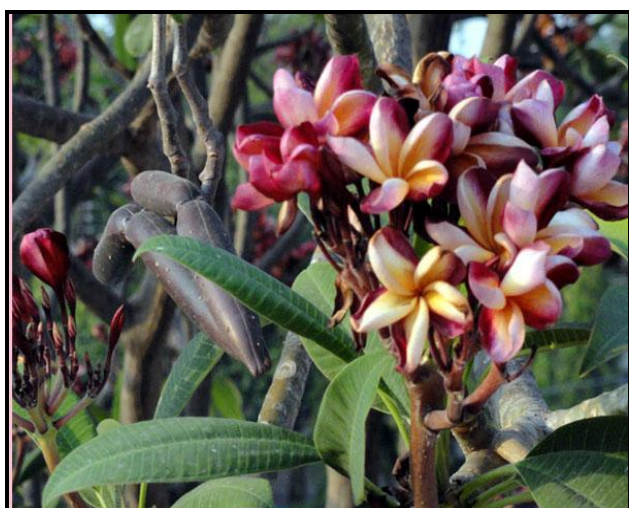


Fig 1: Map showing the Amravati and Yavatmal district region under study

1) *Plumeria rubra* (Linn); Family: Apocynaceae

Plumeria rubra L. (Hindi: Lal champa; English: True Frangipani) are laticiferous trees and shrubs, belong to the Apocynaceae family. The evaluation of effective abortifacient activity of the aqueous, alcohol, ethyl acetate and chloroform extract of *P. rubra* pod in female albino rats was observed. Each extract at the doses of 50, 100 and 200 mg/kg body weight were administered from day 11 to 15 of pregnancy and animals were

allowed to go full term. Clinical toxicity symptoms such as salivation, respiratory distress, dull eyes, diarrhea weight loss, and change in the appearance of fur as well as mortality were not observed in the animals at any period of the experiment. All the four extracts of *P. rubra* pods exhibited significant abortifacient activity (8 - 100%). The extracts significantly reduced the number of live fetuses, whereas the resorption index and post implantation losses increased significantly. The % of abortion was found to be highest (100%) with 200 mg/kg dose of alcoholic extract of *P. rubra* pods (Dabhadkar and Zade, 2012). In ovariectomized immature young rats, the extract showed significant estrogenic effect (vaginal opening, vaginal cornification and increased uterine weight) at the dose 200 mg/kg body weight (Dabhadkar *et al.*, 2012). In the present study it was observed that the alcoholic extract of *Plumeria rubra* pod extract at 200 mg/kg body weight prolonged the estrous cycle and particularly diestrus phase in the experimental animals (Zade and Dabhadkar, 2012). In biochemical studies, the extract had no adverse effect on the activity of the liver, as shown by ALP, SGPT and SGOT liver enzyme assay. The pod extract of *Plumeria rubra* showed no change in the serum total cholesterol content of rats. The hormonal assay suggest that, there was reduction in the level of FSH and LH hormone, while level of estrogen increased but there was slight decrease in the level of progesterone hormone. The extract shows non-significant change in the body weight but there was significant decrease in weight of ovary and increase in the uterine weight in treated rats. The phytochemical screening of *Plumeria rubra* revealed the presence of alkaloids, flavonoids, steroids, tannins and saponines whereas anthraquinone were not detected. All findings suggest that the *Plumeria rubra* does not cause any toxic effect in rats, and the extract possesses estrogenic and contraceptive activity (Dabhadkar *et al.*, 2013).



***Plumeria rubra* (Linn)**

2) *Indigofera trifoliata* (Linn); Family; Fabaceae

Indigofera trifoliata L (Hindi: Diwali) belongs to family Fabaceae, which is a shrub widely distributed in various parts of India. Study the potential abortifacient activity of the *Indigofera trifoliata* leaves extract (aqueous, alcohol, Ethyl acetate and chloroform) in female albino rats was observed. Pregnant rats weighing 120 to 200 gm were randomized into 13 groups. Rats were laprotomised on 10th day of pregnancy and live fetuses were observed in both the horns of the uterus. Rats in group 1 (control) were orally administered, with 0.5 ml of distilled water once daily while those in group 2 to 13 (experimental groups) were administered 100, 200 and 400 mg/kg body weight doses of aqueous, alcoholic, chloroform and ethyl acetate extract of *Indigofera trifoliata* leaves respectively. The doses were administered from day 11th to 15th of pregnancy of rats and then the animals were allowed to go full term. The phytochemical screening revealed the presence of alkaloids, flavonoids, simple phenolics, steroids, tannins and saponins. Clinical toxicity symptoms such as respiratory distress, salivation, weight loss, dull eyes, diarrhea, and change in the appearance of fur, and mortality were not observed in the animals at any period of the experiment. All the four extracts of *I. trifoliata* leaves exhibited abortifacient activity (7- 92.30%). The extracts significantly reduced the number of live fetuses, whereas the resorption index and post implantation losses increased significantly. The % of abortion was found to be highest (92.30%) with 400 mg/kg dose of alcoholic extract of *I. trifoliata* leaves. The hormonal assay shows that, there was reduction in the level of FSH and LH hormone, while level of estrogen increased however there was slight decrease in the level of progesterone hormone. The administration of extract shows significant changes in the body weight of animals, however there was slight decrease in weight of ovary and increase in the uterine weight in treated rats (Dabhadkar and Zade, 2013).



***Indigofera trifoliata* (Linn)**

In ovariectomized immature young rats, the extract showed significant estrogenic effect (vaginal opening, vaginal cornification and increased uterine weight) and also prolonged the estrous cycle (Dabhadkar et al., 2013).

3) *Luffa acutangula* (Roxb.); Family: Cucurbitaceae

Luffa acutangula, (Family: Cucurbitaceae), commonly known as Ridge gourd and dodaki, is a large monoecious, annual climber, found wild and also cultivated throughout the greater parts of India. The aqueous, alcohol, chloroform and ethyl acetate extract of *Luffa acutangula* fruit possesses significant anti-implantation activity (12.61 % to 72 %). All the extract treated groups reduce significantly the number of litter born confirming the antifertility activity of the plant used. It was also found to possess significant estrogenic activity causing increase in the uterine weight, height of the endometrial epithelium and thickness of the endometrium. Estrous cycle was significantly increased and this increase was marked particularly in the proestrus and the estrus phases. The ethanolic extract did not show any toxic effect on RBCs, WBCs and its indices. Similarly it did not exert any effect on liver and kidney enzyme. The significant reduction in the level of LH and slight decrease in the level of FSH level with reduction in serum progesterone level and slightly increase in the level of estrogen hormone. Thus the imbalance between these hormones may have resulted in the early abortive (anti-implantation) activity of fruit of *Luffa acutangula*.



Luffa acutangula (Roxb.)

4) *Dolichandrone falcata* (Linn); Family: Biognoniaceae

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 (Wikhe et al., 2013). Therefore the present study was undertaken to explore the abortifacient activity of *Dolichandrone falcata* and its effect on the estrous cycle. The *Dolichandrone falcata* leaf extract was also found to prolong the estrous cycle significantly; particularly the diestrus phase (Wikhe et al., 2012).



Dolichandrone falcata (Linn)

5) *Cannabis sativa* (Linn); Family: Cannabinaceae

According to traditional ethnomedicine, the plant *Cannabis sativa* (Cannabinaceae) possesses antifertility activity. The present study was carried out in female albino rat to explore the abortifacient activity of the *Cannabis sativa* leaves. Pregnant rats weighing 140 -210 gm were randomized into four groups of six animal each. Rats were laprotomised on 10th day of pregnancy and the two horns of uteri were examined to determine the implantation sites. Aqueous, alcoholic and chloroform extract of *Cannabis sativa* exhibited significant abortifacient activity (9% to

42%). The alcoholic extract at a dose of 400 mg/kg body weight was found to be most effective in causing strong abortifacient activity. The extract also showed estrogenic activity and prolonged the estrous cycle in experimental animal. The extract of *Cannabis sativa* caused a significant decrease in the ovarian and uterine weight, while a non-significant increase in the body weight. There was a slight decrease in the serum estrogen level and an increase in serum progesterone level, while the level of LH and FSH were found to be significantly reduced. The phytochemical screening of the leaves of *Cannabis sativa* revealed the presence of flavonoids, simple phenolics, alkaloids, steroids and saponins (Wikhe *et al.*, 2013).



Cannabis sativa (Linn.)



Cicer arietinum (Linn)

CONCLUSION

In conclusion, the present study reveals antifertility (abortifacient) activity of *Plumeria rubra*, *Indigofera trifoliata*, *Luffa acutangula*, *Cannabis sativa*, *Dolichandrone falcata* and *Cicer aronanticum*. These results are in agreement with the traditional use of this plant as abortifacient by the tribal's of Amravati and Yavatmal district.

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6) *Cicer arietinum* (Linn); Family: Fabaceae

The plant *Cicer arietinum* Linn. belonging to family Fabaceae is largely cultivated in most parts of India. There is a growing demand for the discovery of new phytoestrogens to be used as safe and effective hormonal replacement therapy. *Cicer arietinum* is an indigenous herb found abundant in India. It is traditionally being used as an abortifacient. Aqueous, alcoholic and chloroform extract of this herb were tested for abortifacient activity in female albino rat from day 11 to 15 of pregnancy at the dose level of 100, 200 and 400 mg/kg body weight. The aqueous extract at a dose of 400mg/kg was found to be most effective in causing significant abortifacient activity. Similarly it was also found to increase the reproductive organ weight and possess estrogenic activity when tested in immature ovariectomised female albino rats suggesting the antifertility activity of the extract (Wikhe *et al.*, 2012).

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