

## International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 12, December 2014

# Postcoital Antifertility Activity of *Catharanthus roseus* (Vinca Rosea) in Female Swiss Albino Mice

Dr. Preeti Gupta

Department of Zoology, Associate Professor, L.B.S. Govt. College, Kotputli, District Jaipur, Rajasthan, India

**ABSTRACT:** Catharanthus is a [genus](#) of [flowering plants](#) in the family [Apocynaceae](#). Like the genus [Vinca](#), they are known commonly as periwinkles. There are eight known species. Seven are [endemic](#) to [Madagascar](#), though one, *C. roseus*, is widely naturalized around the world. The eighth species, *C. pusillus*, is native to [India](#) and [Sri Lanka](#). The name Catharanthus comes from the [Greek](#) for "pure flower". These are perennial herbs with oppositely or almost oppositely arranged leaves. Flowers are usually solitary in the leaf axils. Each has a [calyx](#) with five long, narrow lobes and a corolla with a tubular throat and five lobes. *Catharanthus roseus*, known formerly as *Vinca rosea*, is a main source of [vinca alkaloids](#), now sometimes called catharanthus alkaloids. The plant produces about 130 of these compounds, including [vinblastine](#) and [vincristine](#), two drugs used to treat cancer. *Catharanthus roseus* is also cultivated as an [ornamental plant](#) in gardens. Several [cultivars](#) have been bred to produce flowers in many shades of pink, red, lilac, and white, or in light shades with dark throats. The present review explains Postcoital Antifertility Activity of *Catharanthus roseus* (Vinca Rosea) in Female Swiss Albino Mice

**KEYWORDS:** postcoital, antifertility, *Catharanthus roseus*, Vinca Rosea, Swiss Albino Mice, apocynaceae

### I. INTRODUCTION

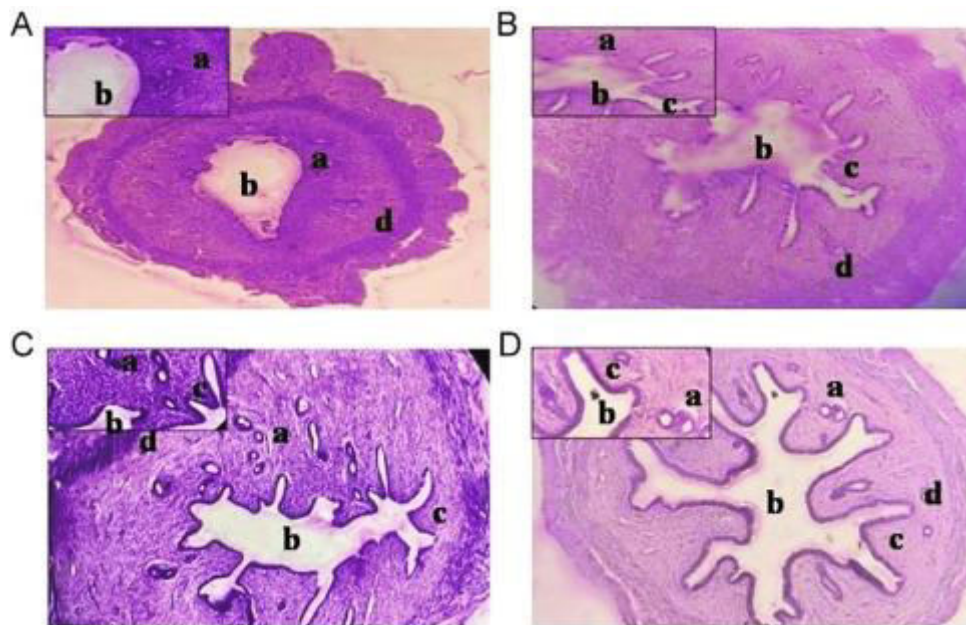
Four successive solvent extracts of the whole plant *Catharanthus roseus* (Apocyanaceae) were tested for post-coital antifertility activity in female swiss albino mice. Of these, the petroleum ether and ethanol extracts were found to be most effective in causing significant anti-implantation activity. The antifertility activity was reversible on withdrawal of the treatment of the extracts. Both the extracts at 600 mg/kg body weight showed estrogenic activity. Histological studies of the uterus were carried out to confirm this estrogenic activity. The mice, which continued their pregnancy, did not deliver any litters after their full term. Hence the combined antifertility (anti-implantation and abortifacient) activity of ethanol extract was 100%. The results suggest that the ethanol extract possess both anti-implantation and abortifacient activity. The ethanol extract also exhibited estrogenic activity tested in immature ovariectomised female swiss albino mice. The antifertility activity was reversible on withdrawal of the plant extract treatment.[1,2]

### II. MATERIALS AND METHODS

The roots of *Catharanthus roseus* were collected from Hisar during August 2002. The plant was authenticated at New Delhi. Herbaria are made and their voucher specimen retained in the department for future references. The shade-dried roots of the plant were coarsely powdered (500 g) and were extracted with ethanol (95%, 3l) in a soxhlet extractor for 72 h. The extract was concentrated to dryness under reduced pressure and controlled temperature (50–60°C) to yield a reddish brown solid (52 g). The extract was stored in refrigerator. A suspension of this was prepared in distilled water [5,6]. Immature colony-bred female albino rats (Wistar strain), 21–23 days old, were used for the study of estrogenic activity. Adult albino mice of either sex were used for acute toxicity studies. Adult albino mice of either sex were divided into three groups containing five animals in each group. The mice were fasted for 18 h with water ad libitum. The suspensions prepared as above were administered orally at two different doses 2000 and 4000 mg/kg body weight, respectively, to different groups of mice separately. The animals were observed for 72 h for behavioral changes and mortality.[3,4]

**III.DISCUSSION**

Ethanol extract was found to be active amongst the two treatments in post-coital antifertility testing. Hence, it was subjected to a detailed investigation for potential estrogenic and antiestrogenic activity. The uterine weight and vaginal cornification method was employed for this assay .



There is an increased proliferation of endometrial glands, folds of lumen and hyperplasia of endometrium and myometrium (400 × ). (a. endometrial glands; b. lumen of the uterus; c. folds of lumen; d. myometrium thickness.)

Colony-bred immature ovariectomized female albino mice, 21–23 days old, weighing were used .They were divided into four groups, consisting of six mice each. The second group received ethinyl estradiol in olive oil, 1 mg/mice per day, subcutaneously. The third group received the ethanol extract at a dose of 400 mg/kg body weight. The fourth group received, in addition to ethinyl estradiol, a test dose of the ethanol extract at 400 mg/kg body weight. All the above treatments were given for 7 days. On the 8th day, the mice were sacrificed by decapitation, the uteri dissected out and surrounding tissues removed. The uteri were blotted on filter papers and weighed quickly on a sensitive balance and fixed in Bouin’s fluid for 24 h. The tissues were dehydrated and embedded in paraffin[7,8]. The paraffin sections were cut at 6 mm and stained with hematoxylin–eosin for histological observation . The diameter of the uteri and thickness of the endometrium were measured in 16 randomly selected sections using an ocular micrometer. All results were expressed as mean standard error. The data was analyzed using Student’s t-test. The results were judged significant if  $P < 0.05$ . [9,10]

The anti-implantation activity is expressed as percentage of animals showing absence of implantation in uteri when laparotomized on day 10 of pregnancy. The ethanol extract given orally to the mice at a dose of 400 mg/kg exhibited a very potent anti-implantation activity since no implants, in all the treated animals, were observed, indicating 100% anti-implantation activity . No toxic effects were observed either by gross visual examination or in the weight of animals. After discontinuation of treatment, all the animals were mated. This resulted in pregnancy and delivery of normal litters, indicating that the action of the extract was reversible. The uteri of these mice were inflated and full of fluid resembling the proestrous/estrous uterus. The epithelium of the endometrium consisted of spindle shaped cells with

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 12, December 2014

basal nuclei. The stroma consisted of loose and edematous fibroblast-type cells. The treated mice showed open vaginas. Examination of the vaginal smears of treated rats revealed predominantly cornified and nucleated epithelial cells. [10]

## IV.RESULTS AND CONCLUSIONS

Pre-implantation losses can also arise due to disruption of events that are prerequisite for fertilization or an impairment in the production of cytokines, growth factors and various types of adhesion molecules, either by the developing blastocyst or by uterine epithelium around the site of implantation. Oral administration of *Catharanthus roseus* Linn, leaf extract caused widespread testicular necrosis, hyalinization of tubules and Sertoli cell-only-Syndrome. Biochemical studies revealing notable reduction in glycogen and fructose levels in reproductive tissues support the histological observations and confirm the antifertility properties of *C. roseus* extract.[11]

Vinca alkaloids are obtained from periwinkle plant *Catharanthus roseus* and have shown significant post-coital antifertility activity in swiss albino mice. There are five major vinca alkaloids which are having clinical uses: vincristine, vinblastine, vinorelbine, vindesine and vinflunine, but only vincristine, vinblastine, and vinorelbine have been approved for clinical use .Vinca alkaloids act by interacting with tubulin and results in disruption of microtubule function causing metaphase arrest, which in turn block mitosis by inhibiting the process of cell division in foetus and terminates pregnancy. It leads to impairment of epididymal functions because it possesses potential to produce pathological changes in the principle and apical cells of caput and nuclear cells of cauda. It affected spermatogenic cell lines other than spermatogonia in male mice.[12]

## REFERENCES

1. lectotype designated by Pfeiffer, Nom. 1: 627 (1873)
2. ^ "World Checklist of Selected Plant Families". Retrieved May 21, 2013.
3. ^ *Catharanthus*. Integrated Taxonomic Information System (ITIS).
4. ^ *Catharanthus*. Madagascar Catalogue. eFloras.
5. ^ "*Catharanthus roseus*". Germplasm Resources Information Network (GRIN). Agricultural Research Service (ARS), United States Department of Agriculture (USDA). Retrieved December 12, 2012.
6. ^ "*Catharanthus pusillus*". Germplasm Resources Information Network (GRIN). Agricultural Research Service (ARS), United States Department of Agriculture (USDA). Retrieved December 12, 2012.
7. ^ *Catharanthus*. The Jepson eFlora 2013.
8. ^ van Der Heijden, R.; et al. (2004). "The catharanthus alkaloids: pharmacognosy and biotechnology". *Current Medicinal Chemistry*. 11 (5): 607–28. doi:10.2174/0929867043455846. PMID 15032608.
9. ^ Cooper, Raymond; Deakin, Jeffrey John (2013). "Africa's gift to the world". *Botanical Miracles: Chemistry of Plants That Changed the World*. CRC Press. pp. 46–51. ISBN 9781498704304.
10. ^ Keglevich, Péter; Hazai, Laszlo; Kalas, György; Szántay, Csaba (2012). "Modifications on the basic skeletons of vinblastine and vincristine". *Molecules*. 17 (5): 5893–5914. doi:10.3390/molecules17055893. PMC 6268133. PMID 22609781.
11. ^ Raviña, Enrique (2011). "Vinca alkaloids". *The evolution of drug discovery: From traditional medicines to modern drugs*. John Wiley & Sons. pp. 157–159. ISBN 9783527326693.
12. ^ *Catharanthus roseus*. Missouri Botanical Garden.