**International Journal of Zoology and Applied Biosciences** **ISSN: 2455-9571**
**Volume 6, Issue 3, pp: 114-106, 2021**
**https://doi.org/10.5281/zenodo**
**http://www.ijzab.com**

**Research Article**

# PHARMACOLOGICAL EVALUATION AND ANTIFERTILITY ACTIVITY OF *ARISTOLOCHIA INDICA* IN RATS

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**Article History:** Received 10th March 2021; Accepted 22nd April 2021; Published 15th June 2021

## ABSTRACT

Pharmacological and antifertility activity evaluation of *Aristolochia indica* in rats. The antifertility activity of the extracts of *A. indica* in rats was evaluated using two experimental animal models. Anti-implantation and early abortifacient activity was performed in female Wistar rats by determining the number of implantations and implantation resorptions. In estrogenic activity evaluations, the ethanolic and aqueous extracts offered significant estrogen-like activity at 200 mg kg−1 p.o. by increasing the uterine weight compared to vehicle control group. Ethanolic extract (200 mg kg−1, p.o.) treatment significantly decreased the number of implants and increased the number of resorptions compared to vehicle control group. The results of the present study provide the evidence of the anti-fertility activity of *A. indica* as claimed in the traditional use. The results are consistent with the literature reports related to the antifertility effect of flower extracts of *A. indica*.

**Keywords:** Antifertility, *Aristolochia indica,* Anti implantation, Rats.

## INTRODUCTION

Studies of many years have highlighted the unmet demand for safe, inexpensive, and acceptable contraceptives to avoid unwanted pregnancies and resultant abortions. The quest for the oral contraceptive agent that can control human fertility is as old as recorded history. Although a wide variety of synthetic contraceptive agents (Ajayl, 2012) are available, these cannot be used continuously due to their severe side effects. Hence, people are looking back to age-old tradition of using herbal medicines, which have minimum side effects. India in general and Western Ghats region in particular have enormous wealth of medicinal plants. Roots are used in leprosy, decoction of leaves is used as purgative and stomachic, leaves are used as febrifuge for intermittent fevers, and latex is used on ulcers (Agrawal *et al*., 2012). It contains compounds other than diterpenoids. The chief compounds reported are triterpenoid, sterol, alcohol, and hydrocarbon. The phenolic compounds include flavonoid lignans, coumarin tannin, phenanthrenes, quinones, phenolic acid, alkaloids, cyanogenic glycosides, and glucosinolates.

## MATERIALS AND METHODS

### Anti-Implantation Activity

Female rats of proestrus phase were kept with male rats of proven fertility in the ratio of 2: 1. The female rats were examined in the following morning for evidence of copulation. The animal was which showed thick clumps of spermatozoa in vaginal smear were separated from the male partner. Only the rats with normal estrous cycles were selected for the experiment. The animals divided into six groups of six animals each. The various groups were treated as follows:

Group I: control (saline solution) p.o.

Group II: ethanolic roots extract of AI (100 mg kg),

Group III: ethanolicroots extract of AI (200 mg kg),

Group IV: aqueous roots extract of AI (100 mg kg),

Group V: aqueous roots extract of AI (200 mg kg).

The extracts were administered orally from day 1 t day 7 of gestation. On the 10th day, laparotomy was carried out under light ether anesthesia in sterile conditions. The uteri

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were examined to determine the number of implantation sites; the numbers of corpora lutea in ovaries were recorded. The abdomen was sutured, and the animals were left in cages. The drugs were administered orally again for 3 days (days 14-16). On the 18th day, laparotomy was carried out again for evaluating the early abortifacient activity.

## RESULTS AND DISCUSSION

The anti-implantation activity is expressed as the percentage decrease in the number of implantations in the uteri on day 10 of pregnancy, and the number of resorbed implants from the existing number of implants will be recorded on day 18 for evaluating the early abortifacient activity. Devi *et al*. (2015) the ethanolic and aqueous extracts have offered significant and dependent anti-implantation and early abortifacient activity by decreasing the number of implantation sites and showed significant resorption of the existing implants compared to vehicle control. The ethanolic extract at 200 mg kg−1 p.o. showed 74.27% antifertility activity and it was found to be more potent than aqueous extract; at 200 mg kg−1 p.o., aqueous extract (200 mg kg−1 p.o.) offered 46.78% antifertility activity. The results are shown in Table-1.

**Table 1**. Effect of *Aristolochia indica* root extracts on anti-implantation and early abortifacient activity in rats (x ± s, n=6).

| Treatment/dose | % anti-implantation activity | % early abortifacient activity | % antifertility activity |
|---|---|---|---|
| Vehicle control | 0 | 0 | 0 |
| Ethanolic extract 200 mg kg | 12.35±0.24 | 1.45±0.24** | 13.23±0.32 |
| Ethanolic extract 400 mg kg | 22.42±0.20 | 3.41±1.32*** | 38.14±0.14 |
| Aqueous extract 200 mg kg | 15.23±0.28 | 1.29±0.21** | 17.15±0.08 |
| Aqueous extract 400 mg kg | 32.35±0.17 | 05.04±2.07*** | 23.34±0.14 |

P < 0.01, P < 0.001 versus vehicle control.

The antifertility activity of the ethanolic and aqueous extracts may be mainly due to their estrogenic activity. The phytochemical constituents such as isoflavones along with coumestans (also flavonoids) and lignans belong to a class of substances known as nonsteroidal phytoestrogens, and they produce infertility in animals. In addition, it has also been proved that several commonly occurring flavonoids mimic the biological effects of 17β-estradiol by virtue of their ability to bind and activate the nuclear estrogen receptors. Anitha *et al*., (2013) *Aristolochia indica* is a traditional plant used for family planning. It was found that this plant has a variety of phytochemical constituents, which have a multiplicity of pharmacological actions. Vasudeva & Sharma, (2006) the present preliminary phytochemical investigation on leaves extracts reveals the presence of carbohydrates, steroids, glycosides, flavonoids, alkaloids, and tannins in ethanolic extract. The ethanolic extract of *Aristolochia indica* revealed more significant estrogenic activity with the increase in uterine weight, as compared to control group of rats. Thakur *et al*., (2010) The results of the present study provide the evidence for the antifertility activity of *A. indica* as claimed in the traditional use. The terpenoids, phytosterols, and flavonoids present in the extracts may be responsible for their activity. Further studies are going on in this laboratory to find out the active principals and the exact mechanism of action.

## CONCLUSION

In estrogenic activity evaluations, the ethanolic and aqueous extracts offered significant estrogen-like activity at 200 mg kg−1 p.o. by increasing the uterine weight compared to vehicle control group. Ethanolic extract (200 mg kg−1, p.o.) treatment significantly decreased the number of implants and increased the number of resorptions compared to vehicle control group. The results of the present study provide the evidence of the anti-fertility activity of *A. indica* as claimed in the traditional use. The results are consistent with the literature reports related to the antifertility effect of flower extracts of *A. indica*.

## ACKNOWLEDGMENT

The authors express sincere thanks to the head of the Sri Satya Sai University of Technology & Medical Sciences for the facilities provided to carry out this research work.

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