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## Antifertility Activity of Ethanol Extract of *Aristolochia tagala* Leaf

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**Ethanol extract of the plant *Aristolochia tagala* Cham. (Fam: Aristalochiasae) was investigated for antifertility activity in female Wistar rats. Rats treated with the plant extract showed reduction in the number of corpora lutea and implantation sites. The extract exhibited significant activity (72%) on oral administration of 100 mg/kg and 100% activity at a dose of 200 mg/kg.**

Rapid population growth has caused serious problem in economic growth and human development in the developing countries. The control of human fertility, in the sense of its limitation, is the most important and urgent of all bio-social and medicinal problems confronting mankind today<sup>1</sup>. One approach being pursued to identify new antifertility agents is the search for their presence in natural sources. Many plant preparations are reported for their fertility regulating properties in the ancient Indian literature. Chaudhary and Haq<sup>2</sup>, Kamboj and Dhawan<sup>3</sup> have exhaustively reviewed research on Indian plants with antifertility activity.

*Aristolochia*, a large genus of shrubs, rhizomatous perennial herbs often twining, is distributed in tropical and

temperate regions of the world. Of twenty species known extensive work has been carried out only on some of them like, *Aristolochia indica*, *Aristolochia bracteolata* and *Aristolochia tagala*, which are of much medicinal importance. These plants contain alkaloids and they have been used as a remedy for snakebite. *Aristolochia tagala* is a perennial herb highly prevalent in Himalayas, Bihar, Assam and southwards in forest cleanings. The root of the plant is reported to contain aristalochic acid, which possesses tumor-inhibiting activity and has been used in the treatment of cancer, snakebite, and helmenthiasis<sup>4</sup>.

It is reported that root extracts of *Aristolochia tagala* are used in female antifertility, as a tonic or emmenagogue and in the treatment of bowel complaints<sup>5</sup>. Literature survey revealed that no work was carried out on the leaves of

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*Aristolochia tagala* for antifertility activity. The present study is therefore an attempt to pharmacologically evaluate the antifertility activity of the alcoholic leaf extracts of this indigenous plant.

The leaves of *Aristolochia tagala*, were collected from Kolli hills, Namakkal district, Tamilnadu. It was identified and confirmed in Tampcol herbal farm, Kolli hills. The leaves were shade dried and subjected to pulverization to get coarse powder. Wistar rats of either sex weighing about 150-250 g were used for the study and they were maintained at room temperature with natural daylight, fed with pelleted feed and water ad libitum. Vaginal smears from each rat were monitored daily and only the rats with normal estrous cycle were selected for the pharmacological studies. About 500 g of shade dried, powdered leaves were eventually packed in Soxhlet apparatus and were extracted with ethanol by continuous hot extraction for about 72 h. The extract was then concentrated under reduced pressure to 1/10 of its volume<sup>6</sup>.

Healthy Wistar rats of either sex, starved overnight, were divided into 6 groups (n=6) and were fed with increasing doses (0.5, 1, 1.5, 2, 4 and 8 g/kg) of the ethanol extract. The total ethanol extract administered orally in doses of up to 8 g/kg, did not produce any sign of toxicity and mortality in rats when observed up to 14 d after administration.

Antifertility activity was evaluated by determining the anti-implantation and early abortifacient activity of the ethanol extracts as described by Khanna and Choudary<sup>7</sup>. The experimental protocols have been approved by the Institutional Animal Ethics Committee. Rats were divided into 3

groups of 6 animals each and they were paired with males in a ratio of 2:1. First groups received vehicle (1% Tween 80) and was considered as control, ethanol extract was administered orally (by an oral catheter) at two different doses of 100 and 200 mg/kg to second and third groups, respectively. The treatment of drug was such that the animals were allowed for mating, after continuous administration of the drug for seven days and during which period the animals were all in estrous stage. Mating was allowed by placing the treated female rats with untreated male rats in its cages. In the following day mating was confirmed by the presence of sperm in the vaginal smear or a sperm plug in the vaginal opening.

Female rats that gave a result of sperm positive were further treated with the same dose levels of the extract for another five days. Pregnancy starts from the day of mating and next day was taken as Day 1. Pregnancy is also confirmed by continuous diestrous stage of the female rats. The pregnant rats were segregated and housed in separate cages during gestation. A weekly examination was conducted for observing weight variations. On Day ten of pregnancy the rats were dissected under light anesthesia to observe the number of implantations, number of corpora lutea in the ovary and number of resorptions if any. Again the rats were examined on day 20 to record the number of implantation sites, a normal and degenerated fetus including gross abnormalities.

The early abortifacient and antiimplantation activities were calculated by using the following formulae<sup>7</sup>, % abortifacient activity=(mean number of resorptions/mean number of corpora lutea)×100, % antiimplantation

TABLE 1: DATA SHOWING ANTI-FERTILITY ACTIVITY OF ALCOHOLIC LEAVES EXTRACT OF *ARISTALOCHIA TAGALA* CHAM

Sample	Dose	Number of Corpora lutea	Number of Implantation sites	Number of Resorbed implantation	%Anti-implantation activity	%Early abortifacient activity	%Total antifertility activity
Vehicle Group I	2 ml/kg	11.33±1.82 <sup>a</sup>	10.5± 2.06 <sup>a</sup>	NA	NA	NA	NA
Extract Group II	100 mg/kg	8.83± 1.47 <sup>a</sup>	4.66±1.63 <sup>a</sup>	2.16±0.08 <sup>a</sup>	47.1	24.5	71.6
Extract Group III	200 mg/kg	3.33± 1.03 <sup>a</sup>	0.33±0.77 <sup>a</sup>	0.33±0.77 <sup>a</sup>	90	10	100

<sup>a</sup> denotes significant difference at P< 0.05 when compared with control, NA denotes no activity

activity=(mean number of implantations/mean number of corpora lutea $\times$ 100).

Preliminary phytochemical studies revealed that the ethanol extract showed the presence of alkaloids, saponins, flavonoid glycosides, steroids and phenolic compounds<sup>6</sup>. The ethanol extract of *A. tagala* showed significant reduction in the number of corpora lutea and increase in the no of resorptions in comparison to the control. The extract showed 72% antifertility activity on oral administration of 100 mg/kg whereas a remarkable 100% antifertility activity resulted on the administration of 200 mg/kg as compared to the untreated control group (Table 1). All the data were expressed as mean $\pm$ SD and subjected to students "t" test for statistical significance of satisfied probability level<sup>9</sup>.

There has been a continuous search for the indigenous drugs that can prevent the pregnancy since high rate of population is the cause for the dire situation that world now confronting. The present investigation revealed that the plant showed a significant antifertility activity on female Wistar rats. Estrogen secretion by corpus luteum at early stages of pregnancy provides the nutrition for early embryo and prevents the early abortion by decreasing the contractility of the uterus<sup>9</sup>. The plant *A. tagala* has been reported to

possess aristalochic acid that prevents pregnancy by antiestrogenic activity. The present study also provides a clue for antiestrogenic activity of *A. tagala*, which is predominantly due to the reduction in the number of corpora lutea.

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## Spectrophotometric Estimation of Tranexamic Acid in Bulk and Pharmaceutical Dosage Form.

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Two, simple, accurate, rapid and sensitive methods have been developed for the estimation of tranexamic acid in pharmaceutical dosage forms. Method A is based on the oxidation of tranexamic acid with potassium permanganate in an alkaline medium giving green coloured chromogen, which shows maximum absorption at 620 nm while method B is based on condensation of the drug with p-dimethylaminobenzaldehyde in sulphuric acid to form yellow coloured species which shows maxi-

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