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Antifertility activity of *Acacia leucophploea*

Dheeraj Ahirwar

School of Pharmacy, Chouksey Engineering College, Bilaspur (CG) India

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ABSTRACT

Alcoholic extract of Acacia leucophploea root was investigated to find out their antifertility activity. Antifertility activity was evaluated by estrus cycle study, genital organ weight and biochemical parameter. Alcoholic extract at 200 mg/kg dose increased proestrus phase significantly while estrus and metaestrus phases were decreased. At this dose weight of ovary also decreased and cholesterol content was increased significantly.

Keywords: *Acacia leucophploea*; antifertility; estrus cycle.

INTRODUCTION

Present eras emphasized on the development of new potent oral antifertility agents from plants despite the fact number of medicinal plants has been reported in the literature to possess antifertility activity; their efficacy has not been confirmed experimentally. For scientific impetus, many of these plants have been screened in laboratory animals, and no single plant is yet available which can be developed further as a potent antifertility agent. A number of plants have been tested in our laboratory [1-3] and the present paper deals with the antifertility activity of alcoholoic extract of *Acacia leucophploea*.

MATERIALS AND METHODS

Preparation of plant extract

Plant specimen (voucher no. RRCBI/mus.5-27) was collected from Baster region of Chhattisgarh, India and authenticated by Dr. N. Shiddhamallaya, RRI of CCRA, Bangalore, India. Root of *A. leocopholoea* was dried, powdered using electrical grinder and extracted in 50% alcohol at 37 °C for 72 h. It was filtered and lyophilized. The yield of the lyophilized powder was 6 g/100 g dry root. The yellowish brown powder was kept in dark clean jar in room

temperature for further experiments. For oral administration, the lyophilized powder of root extract was suspended in 1% carboxy methyl cellulose (CMC).

Animals

Adult (10-12 weeks) female laboratory rats of Swiss strain weighing110-120 g were used in the investigations. Animals were housed in a well ventilated room at 25 ± 2 °C with 12 h photoperiod and relative humidity of 50 ± 20% and were maintained on normal laboratory pellet diet and drinking water *ad libitum*. Animals in each group were kept separately in polypropylene cages with dry rice husk as the bedding material. Animals were maintained according to the guideline of CPCSEA (Reg. No CPCSEA/16/2010). Vaginal smear of each rats were examined daily, only those rat showing 3-4 normal consecutive estrus cycles were selected for the experiment.

Antifertility study

To Study the effect of alcoholic extract on estrus cycle, selected animals were divided into two groups containing ten animals in each group and treatment was started when the animals were in the estrus phase [4]. The group I received vehicle only (CMC, 2 ml) and served as control. Group II received alcoholic extract at the doses of 200 mg /kg. The treatment was given for 20 days to cover five regular estrus cycles. Vaginal Smear from all the experimental animals was observed every morning. On day 21, after 24 h the last dose, half of the animals from each group were sacrificed, ovaries were dissected out freed from adhering tissues and weighed. One ovary from each animal was processed for biochemical analysis of cholesterol [5]. The student's "t" test was used to determine significant difference between treated and control groups.

RESULTS

Effect on estrus cycle

Results are presented in Table 1. Alcoholic extract at 200 mg/kg dose decreased in the duration of estrus and the metaestrus phasese significantly ($p < 0.05$) when compared to control. It was also characterized by a prolongation of proestrus phase while diestrus phase remain unchanged.

Table 1. Effect of alcoholic extract of *Acacia leucopholoea* on estrus cycle

Group	No. of days in proestrus	No. of days in estrus	No. of days in metaestrus	No. of days in diestrus
Control	2.17±0.41	3.33±0.52	4.50±0.55	5.67±0.54
AL 200mg/kg p.o.	6.50±0.51*	1.32±0.49*	1.17±0.40*	5.00±1.10

** = p<0.05, p.o. = Per Oral, AL = Alcoholic extract of Acacia leucopholoea*

Table 2. Effect of alcoholic extract of *Acacia leucopholoea* on weight of ovary and cholesterol content

Group	Ovarian weight in mg/100 g body weight	Cholesterol content in ovary (mg/50 mg)
Control	41.56±2.11	0.40±0.02
AL 200mg/kg p.o.	29.04±1.19*	1.69±0.09*

** = p<0.05, p.o. = Per Oral, AL = Alcoholic extract of Acacia leucopholoea*

Effect on ovary
Data of Table 2 reflect the effect of alcoholic extract on weight of ovary and cholesterol level. At 200 mg/kg dose extract significantly decrease the weight of ovary while cholesterol content increased significantly.

DISCUSSION

Vaginal epithelium in the rodents is involved in the continuous replacement of their epithelial cells from the large rounded epithelial cells to the smaller translucident cells via thick cornified layer of the cells. These changes are mainly regulated by estrogen and progesterone and are in turn controlled by the pituitary gonadotrophins through the pituitary-ovarian axis [6]. Estrogen is known to transform vaginal epithelial cells into typical cornified stage when administered to ovariectomized rats [7]. In the present investigation administration of alcoholic extract did not induce cornification in adult cyclic female rats and hence it can not be considered as an estrogenic agent. Prolongation of proestrus phase indicats that maturation of the graffian follicle in the preovulatory phase was delayed, leading to non-maturation of the graffian follicle. Non-availability of matured graffian follicle was indicated by reduction in the estrus and metaestrus phases and ovulation inhibited.

Ovary can be considered an aggregate of three endocrine tissues, stroma, follicle and corpus luteum. The weight of these tissues constitutes the net weight of the ovary. During the estrus cycle the weight of the ovarian tissue increases under the influence of estrogen. Decreased weight of ovaries of treated rats indicates a decrease in the activity of stroma, follicle and corpus luteum in the ovary along with non-availability of gonadotrophic or steroidal hormones or both. Decreased weight of ovary associated with elevation of cholesterol, which is the precursor for the synthesis of steroid hormones in ovaries suggesting thereby that cholesterol was not utilized [8]. On the basis of these findings it may be concluded that plant has potential anti-ovulatory activity.

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