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Research Article

**THE EFFECTS OF FRANKINCENSE'S HYDROALCOHOLIC
EXTRACT ON OVARIAN HISTOLOGY IN MICE****Mansoureh Emadi¹, Mehrdad Modaresi^{2*}**¹ Department of Biology, Payam e Noor University, Isfahan Center, Isfahan, Iran² Department of Physiology, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran**Abstract:**

Frankincense destroys cancer cells in ovary as a cancer drug. This study was carried out to investigate the effects of frankincense's hydroalcoholic extract on ovarian histology of mice. Mice were divided into five groups including control, placebo, and three experimental groups with 10 members in each group. Control group did not receive any drug and experimental groups received intraperitoneal injections of 50, 100 and 200 mg/kg of the extract for 20 days every other day. Ovarian tissue slides were prepared and studied using light microscopy. Obtained results were analyzed using SPSS program and one-way analysis of variance. Means were compared using Duncan test at 5% probability level. According to results, frankincense reduced follicles in doses of 100 and 200 mg/kg significantly but 50 mg/kg group showed no significant difference from the control group. Significant reduction in the number of corpus luteum was observed in experimental groups. According to the results, frankincense extract can affect female mice reproduction system dose dependently and can reduce fertility of female sex.

Keywords: frankincense, ovarian histology, follicle, corpus luteum, mice.***Corresponding Author:****Mehrdad Modaresi,**Associated Prof., Department of Physiology, Isfahan (Khorasgan) Branch,
Islamic Azad University, Isfahan, Iran.**Tel:** +98(913)2074854**Fax:** +983135354060**Email:** mehrdad_modaresi@hotmail.com**Address:** Jey St., Arghavanieh, Department of Physiology,
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INTRODUCTION:

Medicinal plants play important roles in diseases treatment and have less, controllable side effects. Medicinal plants are available sources of very effective matters which are similar to materials used in the metabolism of the human body and therefore can be absorbed easily. Frankincense affects estrogen secretion and has been used as ovarian cancer drug for a long time [1]. Its rare side effects include mild headache or mild gastrointestinal complications [2].

Frankincense exudes from a tree called *Olibanum* as a white juice after scratching the trunk. These droplets turn into orange-brown gum with a bitter taste after about two weeks of losing moisture and drying. Oil extraction must be done before hardening. Extraction in the presence of carbon dioxide will preserve all its properties. The best time to collect frankincense is late winter and early spring. This resin is dissolved in ether, chloroform and turpentine but makes a white emulsion in water [3].

Chemical compounds of frankincense depend on species and collecting time but it generally includes 25-32% of alcohol-soluble substances and 60-70% resin [2]. Alcohol insoluble part includes arabin and basorin whereas alcohol soluble part has olibanugen and a group of mono, di, and triterpens [4].

Boswellic acid is a group of pentacyclic 4-triterpenoids and is main ingredient of frankincense resin which is found freely or in combination with other materials [5, 6].

Extant essences in frankincense have relaxant effect on vascular muscles (especially blood vessels of the brain) and spasm and stenosis of the arteries and therefore provide better blood supply for tissues [7].

This resin has been known from ancient ages and has been used as fragrant incense. It has been used as an effective drug for many diseases including cancer, nausea and memory improvement [4].

Due to the large amounts of phytoestrogens in the frankincense extract, current study was conducted to

investigate the effects of frankincense's hydroalcoholic extract on ovarian histology of mice.

MATERIALS AND METHODS:

In these experimental studies to environmental adaptation, samples were kept for two weeks under similar conditions of light and temperature as well as access to water and food. These conditions continued during the injection period.

Mice divided into five groups with ten mice in each group. The average weight of all groups was about 30 g and each group were kept in separate cages.

To regulate the sexual cycle, mice received 0.1 microgram of cloprostenol injection in peritoneum and three days later, 0.2 microgram of progesterone was injected subcutaneously [8].

Treatment groups were:

- Control group: without any injection
- Placebo group: normal saline 9%
- Three experimental groups: 50,100, and 200 mg/kg doses of extract

Injections were done for 20 days every other day.

The ovaries of each group were individually packed in 10% formalin vials for preparing tissue slides. Histological slides were prepared using *Hematoxylin-Eosin* staining method.

Statistical Analysis

Results were analyzed using SPSS program and one-way analysis of variance. Means were compared using Duncan test at 5% probability level.

RESULTS AND DISCUSSION:

Mean comparison results of follicles using prepared ovarian slides showed that first experimental group (50 mg/kg) was not significantly different from control group but second (100 mg/kg) and third (200 mg/kg) groups showed significant reductions ($p < 0.05$) in proportion to control group. Among the experimental groups, the third group (200 mg/kg) showed the most reduction. The results are presented in figure 1.

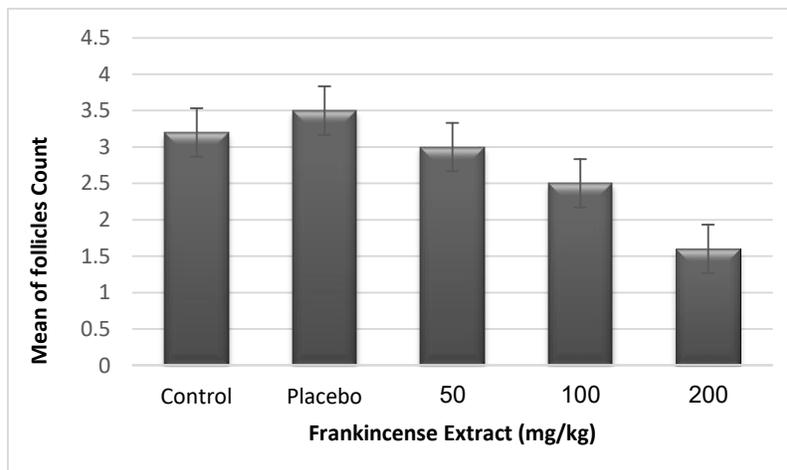


Figure 1. The mean of follicles of various treatment groups

The number of corpus luteum showed reduction in all experimental groups in proportion to control group. The results are presented in Figure 2.

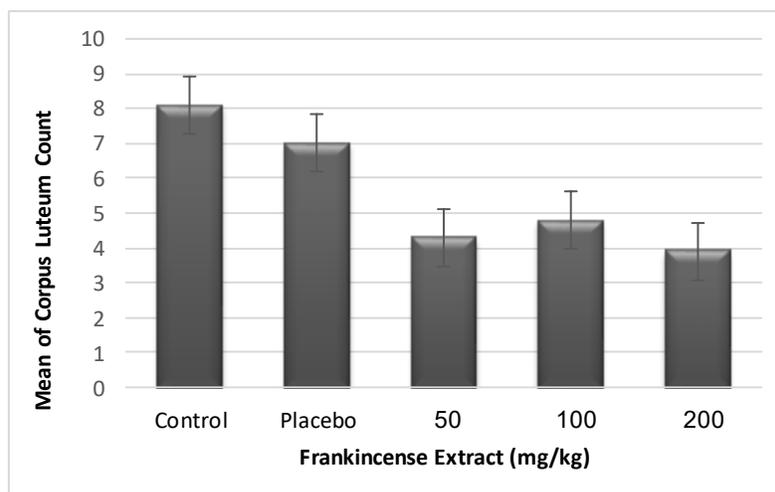


Figure 2. The mean of corpus luteum of various treatment groups

Table 1: Average numbers of follicles and corpus luteums of various treatment groups

Treatment groups	Control	Placebo	50mg/kg	100mg/kg	200mg/kg
Average follicle number	3.2	3.5	3	2.5	1.6
Average corpus luteum number	8.1	7	4.3	4.8	3.9

According to results, the number of follicles were reduced in second (100mg/kg) and third (200mg/kg) groups significantly. By reducing FSH level of follicle fluid, the amount of IGFBP 5/4 (from follicles growth influencing factors) will be increased and the activity of proteases will be controlled, therefore FSH antagonists will be increased, the follicle disappears. GnRh also stimulates IGFBP 5/4 production in granulosa cells of follicle and reduces also IGFBP protease; this

causes follicular atresia.

On the other hand, secretion of aromatase controlling protein from dominant follicle prevents the growth of other follicles and causes atresia [4]. Furthermore, low concentrations of Follicular fluid leptin have negative effects on growth and development of ovules [5].

The amount of corpus luteum was decreased significantly. By the reduction in the number of

follicles and corpus luteum, folliculogenesis will be stopped. In justifying these results, it can be said that the transformation of granulosa cells and the development of the corpus luteum depend on the presence of LH and the formation of corpus luteum does not occur in the absence of LH [9].

The results of this study indicate that the frankincense extract can have severe effects on mitosis and thereby reduce the number of ovarian follicles. At the same time, the destruction of ovarian tissue is also one of the other effects of frankincense's extract.

CONCLUSION:

According to results, frankincense reduced the number of follicles in all three experimental groups and prevented folliculogenesis via affecting ovaries. On the whole, frankincense showed dose dependent effects on reducing the reproductive potential of female sex and has antifertility properties.

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CONFLICT OF INTEREST:

The authors contributing to the present study and to this very manuscript have no conflict of interests to declare.

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