

## The Effect of Cinnamon Extract on Gonadotropin Changes (FSH& LH) in Rats Treated with Gelofen

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<http://dx.doi.org/10.13005/bpj/499>

(Received: May 25, 2014; Accepted: June 26, 2014)

### ABSTRACT

Gelofen is an Anti-inflammatory drug which by Inhibition of Prostaglandin and cyclooxygenase prevents the conversion of Arachidonic acid to intermediate Endo-peroxides and has numerous effects on various tissues of the body. Cinnamon bark has many therapeutic properties; its use strengthens the heart, stomach and intestines, improving Kidney activity. Considering the possible side effects of Gelofen and cinnamon's beneficial effects on the body, the most important objective of the present study is to investigate the effect of Cinnamon on possible side effects of Gelofen in secretion of Estrogen and Progesterone hormones. 42 female Wistar rats were randomly divided into 7 groups. The first group (the control group) was not treated with any drugs. The experimental group 1 and 2 only received 50, 200 mg/kg dosage of cinnamon respectively, the experimental group 3 received only Gelofen with 400 mg/kg dosage and the experimental group 4 and 5 received Gelofen and cinnamon extract with 50 and 200 mg/kg dosages intraperitoneally. At the end of the day 21<sup>th</sup>, the blood sample was taken from the rats and serum concentrations of estrogen and progesterone were measured. Then statistical data were processed with SPSS version 18 using ANOVA test (One-way analysis of variance), they were determined as significant ( $P < 0.05$ ). The concentration of Estrogen in the experimental group 1 increased significantly compared to control group. Progesterone concentrations were significantly decreased in the experimental group 3 compared to the control group and the experimental group 1 and 2 ( $P < 0.05$ ). According to the above it can be stated that Gelofen causes a relative decrease in the secretion of estrogen and progesterone hormones by production of hydroxyl radicals and damaging the ovarian tissues, but Cinnamon extract reduces the side effects with its antioxidant properties and effective substances.

**Key words:** Cinnamon, Gelofen, Estrogen, Progesterone, Rat.

### INTRODUCTION

In Medicine and Veterinary, Non-steroidal anti-inflammatory drugs are used as sedative, antipyretic and anti-inflammatory for many diseases<sup>1</sup>. These drugs particularly Ibuprofen, are vastly used to relieve pain caused by extensive surgery<sup>2</sup> and dentistry<sup>3</sup> and as non-opiate analgesics in children<sup>4</sup>. Various non-steroidal anti-inflammatory drugs have different effects in different animal species<sup>5</sup>. The mechanisms of action of these drugs

are also different. They may inhibit the synthesis of a specific group of prostaglandins and endo-peroxides, or may inhibit certain biochemical reactions. Therefore, before using these drugs in a particular species, the species should be examined and evaluated<sup>5,6</sup>. Considering the side effects of chemical drugs, Researchers have recently turned to these other herbal medicines<sup>7</sup>. And now science has progressed towards herbal medicines. So enjoying some herbs along with chemical drugs can help to treat some diseases<sup>8</sup>.

The generic name for Gelofen is Ibuprofen. It is a non-steroidal anti-inflammatory, Non-narcotic analgesic and antipyretic drug. Its various brand names are as follows<sup>9</sup>. It is used in the treatment of inflammatory diseases (Such as rheumatoid arthritis and osteoarthritis), relieving mild to moderate pains, Control of pain and inflammation in dental surgery, bone surgery and midwifery, as an adjunctive therapy in the treatment of painful menstrual periods. Dizziness, mild nausea, heartburn and headache are among the possible side effects of this drug. Red spots on skin, hives, itchy skin, black tarry stools, bloody urine, blood-streaked vomit, abnormal bleeding gums, unusual bruising, wheezing, shortness of breath, swelling of the legs or ankles, a rapid increase in body weight, Confusion, seizures and coma are also among the dangerous side effects of this drug<sup>10</sup>.

Cinnamon is the general name for 'Cinnamomum Zeylanicum Nees' (its scientific name) which is an aromatic and pleasant herb (110). It is from Laurel family (Lauraceae) which all the parts have the fragrant odor of cinnamon<sup>12</sup>. Cinnamon is the secret for youth and its daily use keeps the body healthy and young. Cinnamon is used for heightening and recovering the sex drive, warms up the kidneys and eliminates the waist and leg weakness, and treats Anemia. Cinnamon is the best medicine for muscle pain. Cinnamon has a sedative and cheerful effect and is better than many tranquilizers. Lowering the fever is another use of Cinnamon<sup>12</sup>. Cinnamon bark contains more than 50 different compounds of which 60-80 percent is Cinnamaldehyde. Some of its combinations are: Cinnamic acid, Phenolic compounds like Eugenol and Furanol and Saffron, Terpene compounds such as limonene and linalool, trans-cinnamaldehyde, Tannins, coumarin, resin and the phenylpropane compounds like hydroxycinnamaldehyde; The sweet taste of cinnamon is due to mannitol. One teaspoon of cinnamon contains 28mg of calcium, iron, more than one gram of fiber and plenty of vitamins, and manganese. It also contains the amount of 1.2 grams of carbohydrate (13). Considering the above mentioned issues and the prevalence of infertility followed by the use of generic drugs inappropriately, this study was conducted in order to investigate the antioxidant effects of a cinnamon extract on the levels of estrogen and progesterone secretion in Gelofen

treatment.

### Methodology

The current research is conducted completely experimental in a randomized manner. All the ethics of working with laboratory animals in this study were met. 49 adult female Wistar rats weighing  $50 \pm 200$  g and aged 100-120 days were obtained from the research center in Jahrom. The rats were placed in Islamic Azad University of Jahrom for 32 days in experimental conditions including a temperature of  $2 \pm 21^\circ \text{C}$  and 12 hours light and 12 hours dark cycle. The rats were fed standard rat chow (pellets). Also, the water was provided for them in special water bottles. Their cages disinfected with 70% alcohol three times a week. The method of preparation and administration of Gelofen was as follows: Gelofen was bought from a drugstore in Jahrom, produced by Danapharmaceutical companies in capsules of 400mg, then the drug was taken out of the capsules and after dilution with distilled water, was injected intraperitoneally in mentioned dosages (400mg/kg) to corresponding experimental groups on a daily basis using Insulin syringe and needles.

To prepare the cinnamon extract, 1 kg cinnamon stick was purchased from market, then it was well ground and completely powdered. Soxhlet extraction method was used, in this way, for every 10 grams of cinnamon powder, 200ml of the solvent containing ethanol and water was added to it and poured in Soxhlet machine, at the end, the solvent was separated from the extract using the Rotavapor machine. The rats were and only divided into 7 groups as following:

### Control

Were kept in normal state without any treatment.

Experimental 1	They received 50 mg / kg cinnamon extract intraperitoneally on a daily basis.
Experimental 2	They received 200 mg / kg cinnamon extract intraperitoneally on a daily basis.
Experimental 3	They received 400 mg / kg Gelofen intraperitoneally on a daily basis.
Experimental 4	They received 400 mg / kg Gelofen and 50 mg / kg

Hydroalcoholiccinnamon extract intraperitoneally on a daily basis.

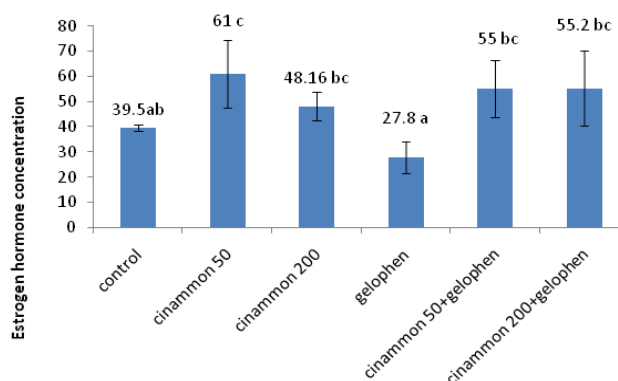
Experimental 5 They received 400 mg / kg Gelofen and 200 mg / kg Hydroalcoholiccinnamon extract in traperitoneally on a daily basis.

At the end of the 21-dayperiod, after weighing, all the groupsof rats were anesthetized by Ether and blood samples were taken from their heart. After separation of serum, estrogen and progester one concentrations were measuredin the laboratoryof Medical SciencesUniversity of Jahrom. One way ANOVA was applied to compare the treatments and then t-test and Duncan testwas usedfor multiple comparisons between the groups. (P<0.05) was considered as significant .Data analysis and statistical testing was performed using SPSS, version 18.

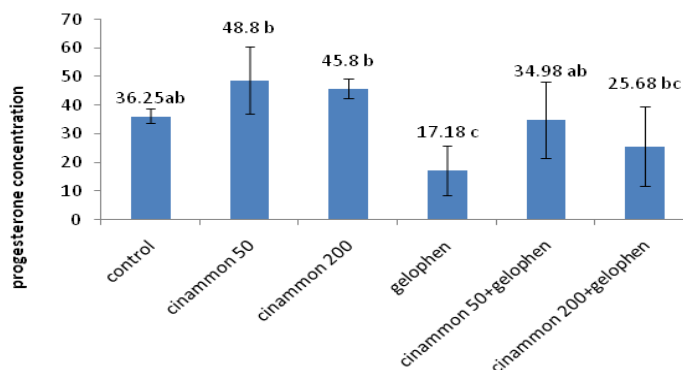
**RESULTS**

The results indicate that the Estrogen concentration in experimental group 1 has a significant increase compared to the control group. The experimental group 3 also has a significant decrease compared to the experimental group 1 and 2.The experimental groups 4 and 5 also had a significant increase compared to the experimental group 3. ( P<0.05) (Figure1.)

The results indicate that progesterone concentrationswere significantlydecreasedin the experimental group3 compared to the control group and the experimental groups 1 and 2.Also, The experimental group 4 has a significant increase compared to the experimental group 3 .P<0.05) (Figure2)



**Fig. 1: Changes of Estrogen Hormone**



**Fig. 2: Changes in progesterone level**

## DISCUSSION

The present results indicate a significant decrease of progesterone concentrations in the experimental group 3 compared to the control group and the experimental groups 1 and 2. Also, the concentration of estrogen in the experimental group 3 compared to experimental groups 1 and 2 has significantly reduced.

It is stated that NSAIDs can prevent the proliferation of mesenchymal cells<sup>14</sup> which is done through inhibition of AP-1 through four mechanisms<sup>15</sup>. It also stated that the drug injected bilaterally into the various tissues of the body stimulates the production of hydroxyl radicals and damages the tissues and using this substance can be effective in assessing and measuring impairment<sup>16</sup>. Further research regarding the effect of this drug on various organs suggest that NSAIDs such as raloxifene are selective estrogen receptor modulators and the result of this study suggests that raloxifene significantly decreases MZ cell proliferation and fibronectin accumulation in tissues of diabetic<sup>18, 17</sup>. Also, as stated Granulosa cells of follicles are responsible for production of estrogen and progesterone in Ovary<sup>19</sup>. It is likely that this drug by the mechanism of hydroxyl radical production causes damage to ovarian tissue and reduces the estrogen and progesterone hormones in Gelofen receiver compared to the groups which received the cinnamon extract.

On the other hand, in the present study, in the groups received cinnamon, the experimental group 3 had a significant increase in the concentration of estrogen compared to the control group. Also, the experimental groups 4 and 5 showed a

significant increase in estrogen levels compared to the experimental group received 3 which only received Gelofen.

Cinnamon contains phenolic compounds such as eugenol, Flandren and Safrvl, Terpene compounds such as limonene and linalool, trans-synaldehyde, Tannins, coumarin, resins, the phenylpropane compounds like hydroxylsynaldehyde; The sweet taste of cinnamon is due to cinnamaldehyde<sup>20,21</sup>. Cinnamon is a very powerful anti-free radical. Antioxidant properties of cinnamon are comparable with other spices such as ginger, licorice, mint and vanilla, as well as chemical preservatives<sup>22</sup>. The investigation determined that Cinnamon increases levels of the estradiol hormones and thereby increasing ovulation due to its antioxidant properties and its effective substances<sup>23,24</sup>.

It is also stated that the Dltakadyn existed in cinnamon, increases LH secretion and LH in turn increases the direct effect of estrogen and progesterone hormones synthesis<sup>25</sup> which is consistent with the present research; and certainly, the groups that received the extract and drugs simultaneously showed the improvement in estrogen and progesterone hormones compared to the group that received only the drug, indicating the positive effect of this extract.

## CONCLUSIONS

According to the above it can be stated that Gelofen causes a relative decrease in estrogen and progesterone hormones by production of hydroxyl radicals and damaging ovarian tissue, but Cinnamon extract with its antioxidant properties and effective substances reduces the side effects.

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