Al-Kufa University Journal for Biology / VOL.7/ NO.3/ Year: 2015
Print ISSN: 2073-8854 & Online ISSN: 2311-6544

Study the effect of Aqueous Extract of *Allium porrum* (leek) on Reproductive Hormone values in Female Rats

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Abstract:

Methodology: This study was conducted in laboratories of physiology and chemistry at the faculty of Veterinary Medicine /University of Kufa, for period from 4/2/2014 to 5/1/2015. It was used 15 female white rats, giving deferent dosages with deferent concentration (400,800) mg/kg for 20 days.

Results: It shows significantly decrease($p<0.05$)in FSH hormone of white female rats for both concentration 400,800 mg/kg and the concentration 800 mg/kg is more significant in reducing the level of FSH hormone comparing with control group, It also show significant decrease($p<0.05$)in LH hormone of with female rats for both concentration 400,800 mg/kg and the concentration 800 mg/kg is more significant in reducing the level of LH hormone when compared with control group. While the prolactin hormone shows significant increase ($p<0.05$) in white female rats for both concentration 400,800 mg/kg and the concentration 800 mg/kg is more significant in increasing the level of prolactin hormone. And the estradiol hormone shows significant increase ($p<0.05$) in white female rats for both concentration 400,800 mg/kg and the concentration 800 mg/kg is more significant in increasing the level of estradiol hormone. In short comparing with control group. The aqueous of leek extract acts as anti-fertility in white female rats through its negative effects on the FSH, LH, prolactin and estradiol hormone.

Key words: *Allium porrum*, Reproductive system, Rats, FSH, LH Estradol, prolactin.

Introduction:

The leek is a vegetable that belongs to family Amaryllidaceae, subfamily Allioideae and the genus *Allium*, currently.[1]. They are a rich in nutrients, some important of these iron, nickel, calcium, manganese, and several vitamins such as pyridoxal phosphate (B6), folate (B9),zeaxanthin, lutein Pantothenic acid (B5),and Vitamin C, A, K E.[2] They are also contains fiber, that they are mostly found in outer parts (darker green).

These vegetables contain flavonol (anti-cancer compounds) such as quercetin and kaempferol .Quercetin restrict the spread of cancer in the body most likely colorectal cancer and prostate cancer. .[3] kaempferol has pharmacological activities, including estrogenic/antiestrogenic, anti-inflammatory, antioxidant, antimicrobial, anticancer, antidiabetic, cardioprotective, neuroprotective, antiosteoporotic, anxiolytic, analgesic, and antiallergic activities.[4,5] The kaempferol substance that leek contains reduces ovarian cancer in females.[6]

Several flavonoids found in leek such as apigenin, and flavones have antiestrogenic activity in the estrogen receptor (ER), which have the capacity to displace [3H] estradiol from ER.They did not binding with ER, and but their suppression of estrogen-mediated gene transactivation and proliferation may occur independent of direct antagonism of the receptor.

A particular combination of nutrients in leek is very helpful in steadying decrease in high blood pressure levels, elevated blood sugar level. Leeks help to raise in the HDL (High Density Lipoprotein also called good cholesterol) levels and the certainly decrease in the LDL (Low Cholesterol Lipoprotein levels). Leeks are very low in calories.[7]

Leek helps to detox the body by assisting with cleansing of the colon. The leek have a good source of potassium element, which assist to lowering blood pressure. The leeks contains much amount of omega-3, fatty acids, folate excellent source of iron .[8] Leeks are good source of vitamins A and C (Vitamin A is essential for vision, helping you see colors and at night. Both vitamins A and C also help keep your immune system strong and helpful for decrease infections). Iron and calcium are both essential minerals for ouer bodies.[9]

Aim: The aim of this study is to evaluate the effect of aqueous extracts of *Allium porrum* (leek) on Hormonal parameters in female albino Rats.

Meterials and Methods

Perperation of Laboratory Animals: The study included 15 female white rats type *Rattus ratus* age average between 8-12 week, with average body weights (150_ 200) gram were used for the study and randomly assigned into three study group of each five. the animals were obtained from Faculty of Veterinary Medicine /University of Kufa. Normal rats feed and tap water were provided *ad libitum*s with 12 hours light/dark cycle.

Preparation of plant extract: Preparing the aqueous extract warm for leek plants, according to methods do it the scientists Nasem in 1998 [10], one hundred grams of the powder was extracted with 1000 ml of distilled water using Sox let extraction. The extract was slowly evaporated to obtain a total yield. Weighed sample of the extract was then used to prepare test solution of the desired concentration to enable administration of appropriate doses of material.

Experimental design

The rats were randomly selected and assigned to three groups of 5 rats per cage. One group (control) was givin ordinary distilled water orally at 1ml /100 g body weight (b.wt.). the remaining two group were given aqueous extract of *Allium porrum* orally at 400 and 800 mg/kg b. wt. respectively.

Hematological analysis:

The effects of extract on FSH,LH, prolactin and estradiol

Statistical Analysis:

The result of experiments for the aqueous warm extract analyzed for each concentration 400 and 800 mg/kg for duration 20 days after the replications five for each concentration , using design completely randomization factorial experiments with completely randomized design, this design has been used least significant deference (L.S.D.).

Results:

The table shows the results of the FSH hormone and other hormonal parameters in the experimental animals. There were significant decrease ($p \leq 0.05$) in the FSH hormone after treatment with the aqueous extract of the leeks plant for both concentration 400, 800 mg/kg, amounting to (8.33 ± 0.46) and (8.13 ± 1.22). respectively compared with the control group reaching (8.82 ± 0.01) has expressed his focus 800 mg/kg significant decreased higher in hormone levels.

In same table showed the results and having significant decrease ($p \leq 0.05$) in the LH hormone after treatment with the aqueous extract of the leeks plant for both concentration 400,

800 mg/kg, amounting to (5.16 ± 1.97) and (4 ± 1.03). respectively compared with the control group reaching (7.25 ± 0.00) has expressed his concentration 800 mg/kg significant decreased higher in hormone levels.

The table refers to the presence of significant increase ($p \leq 0.05$) in the prolactin hormone after treatment with the aqueous extract of the leeks plant for both concentration 400, 800 mg/kg, amounting to (42.33 ± 3.21) ,(45.33 ± 5.31) compared with the control group reaching (25.66 ± 6.02) has shown concentration 800 mg/kg significant decreased higher in hormone levels.

while showed the same table and having significant increase ($p \leq 0.05$) in the Estradiol hormone after treatment with the aqueous extract of the leeks plant for both concentration 400, 800 mg/kg, amounting to (48.33 ± 7.50), (70.33 ± 2.08) compared with the control group reaching (16.66 ± 1.52) has shown concentration 800 mg/kg significant decreased higher in hormone levels.

Table Effect of the leek extracts on follicle stimulating hormone (FSH) uIU/ml and Luteinizing hormone (LH) uIU/ml in rats.

Hormone concentration	Concentration Mg/Kg	Mean ± SD
follicle stimulating hormone (FSH) uIU/ml	400	8.33 ± 0.46*
	800	8.13 ± 1.22*
	Cont.	8.82 ± 0.01
Luteinizing hormone (LH) uIU/ml	400	5.16 ±1.97*
	800	4.00±1.03*
	Cont.	7.25 ± 0.00
Prolactin ng/ml	400	42.33 ± 3.21*
	800	45.33 ± 5.31*
	Cont.	25.66 ± 6.02
Estradiol ng/ml	400	48.33 ± 7.50*
	800	70.33 ± 2.08*
	Cont.	16.66 ± 1.52

L.S.D. for FSH=9.84

L.S.D. for LH=8.09

L.S.D. for prolactin =21.26

L.S.D. for Estradiol=23.92

Results are presented as Mean ± SE ; *$p \leq 0.05$, significant as compared with control.

Discussion:

From the results of the current study observed the presence of a significant decrease in follicle stimulating hormone (FSH) and luteinizing hormone (LH) after treatment with the aqueous extract of the leeks plant for both concentration 400, 800 mg/kg, may be the leeks work to impaired in hypothalamus which release GHnH hormone to induce pituitary gland to produce FSH,LH hormone lead to change the hormonal balance in the body. The results of this study agreed with the other study but with different in the plant, they used the seeds leaves and other effective parts of different plants and noted the roles in reducing the FSH, LH hormone.[11,12]

When the high concentration of the Estrogen hormone acts a negative feedback by inhibiting the production of GnRH in the hypothalamus. Inhibit acts to pituitary gland for production FSH, LH hormone.[13] The Prolactin is an important hormone that plays role in fertility by inhibiting gonadotropin-releasing hormone (GnRH) and follicle stimulating hormone (FSH) when elevated.[14]

From the results of the current study observed the presence of a significant increase in estradiol hormone because the aqueous extract of the leeks may be attributable to contain this plant on compound like quercetin , it have estrogenic activity because its flavonoids compounds, its acts as phytoestrogenic plant, which work increase the level of estrogens hormone in blood of female rats. [15]

The results of this study agreed with the other study, they used this plants that shows increase the endometrium layer of uterus and this may be due to the suppressed effect on the axis of the hypothalamus –pitutaryand this due to decreasing in secretion follicle stimulating hormone (FSH).[16]

The aqueous extract of the leeks contains many kinds of flavonoids that have antiestrogenic activity, their suppression of estrogen-mediated gene transactivation and proliferation. That act as blocks the utilization of estrogens,[17] or inhibits their effects.[18] That lead to high concentration of these hormone in blood not utilize so act negative feedback on FSH, LH hormones. The leek plant contains of flavonied compounds that have estrogenic activity that lead to elevated the estrogen level in blood and their relationship direct correlation on the hand act as negative feedback on hypothalamus and pituitary gland to reduce or block the production FSH, LH hormone.[19]

From the results of the current study observed the presence of a significant increase in prolactin hormone because the aqueous extract of the leeks elevated level of estrogen hormone, that stimulates prolactin hormone secretion at the hypothalamus through effects on dopamine secretion and at the pituitary through effects on gene expression. The rise in number of the lactotrophs in the pituitary correlates with increased serum estrogen levels.[20]

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