



The effects of hydro alcoholic extract of pea on male reproductive hormones of mice

Mahnaz Vatankhah¹, Mehrdad Modaresi^{2*}, Akbar Karimi¹ and Aliasghar Pilevarian¹

¹Department of Biology, Payam e Noor University, Isfahan, IRAN

²Department of Animal Science, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, IRAN

ABSTRACT

Pea is belonging to leguminosae family and has many medicinal properties including strengthening the reproduction system and immune system. Current study was carried out to investigate the effects of hydro alcoholic extract of pea on male reproductive hormones of mice. Samples were divided in five groups: control, placebo, and three experimental groups with 15 mice in each group. Samples were kept under similar conditions. Hydroalcoholic extract of pea was injected in 50, 100, and 200 many doses intraperitoneal every other day for 20 days. All hormone tests were done using immunoenzymatic method (ELA). At the end of injections, changes in levels of testosterone, LH and FSH hormones were measured. According to results, FSH amount was increased by extract increment. Testosterone and LH were decreased by 200_{mg/kg} dose ($p < 0.05$). Therefore, pea's extract can affect male reproductive potential dose dependently.

Keywords: pea, male reproductive system, FSH, LH, testosterone

INTRODUCTION

Medicinal plants are very important and valuable for communities' health because of preventing and also curing diseases [1]. People tend to use these plants lately because of negative side effects of chemical drugs and also threatening world by environmental pollutions [2].

Pea (*Cicer arietinum*) is belonging to leguminosae family. Mature dried seeds of pea have high nutritional value and are full of protein (18-23%) [2]. This plant also improves soils especially in arid regions. Medicinal properties of this plant are cleansing liver, spleen and kidney, and emitting pus from purulent wounds and Cancer Surgery, Reinforcing the lungs [3, 4].

Considering the mentioned properties of pea, current study was carried out to investigate the effects of hydro alcoholic extract of pea on male reproductive hormones of mice. Injection method was used to ensure from entering accruing dose of drug to animal's body.

EXPERIMENTAL SECTION

Forty male mice from Balb/C race from the weight range of 30 ± 5 were selected and kept for one month to adapt to environment.

After that, mice were divided into five groups with eight mice in each group: control group did not receive any injection. Placebo group received 0.3cc injections of physiological serum. Three experimental groups received 50, 100, and 200_{mg/kg} doses of extract intraperitoneally every other day for 20 days.

At the end of injections period, blood samples were taken and serum was separated using centrifuge machine. LH, FSH and testosterone amounts were measured using Elisa test. Obtained data were analyzed using SPSS program, one way analysis of variance method and Duncan test.

RESULTS AND DISCUSSION

- FSH amount

FSH amount (mIU/ml) was increased in second (150_{mg/kg}) and third (200_{mg/kg}) experimental groups significantly but first experimental group was not significantly different from control group (Figure 1).

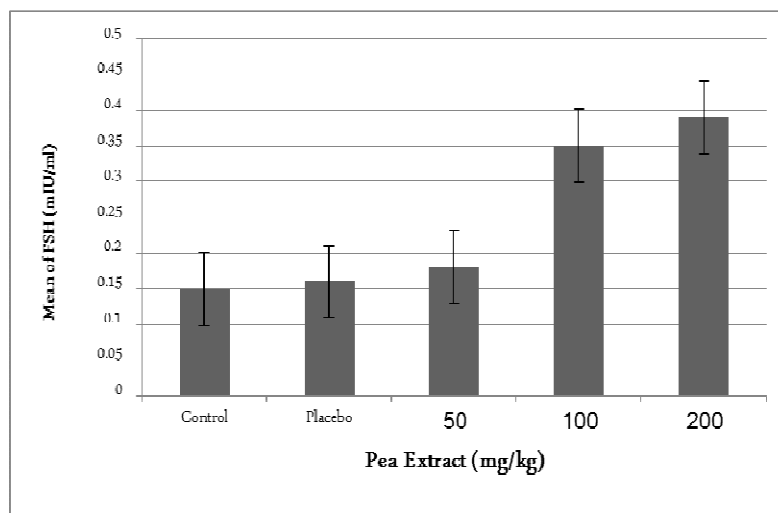


Figure1. FSH amount in control and experimental groups

- LH amount

The amount of LH hormone (mIU/ml) was significantly more than control in third experimental group (200_{mg/kg}) whereas first and second groups were not different from control group statistically (Figure 2).

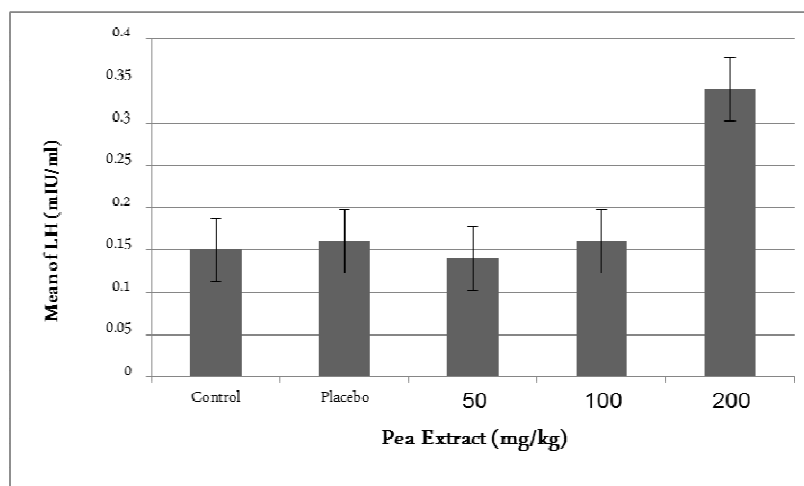


Figure2. LH amount in control and experimental groups

- Testosterone amount

Testosterone amounts of all experimental groups were different from control group ($p < 0.05$). Third experimental group (200_{mg/kg}) had more testosterone amount than control group whereas first and second groups had less testosterone amounts (Figure 3).

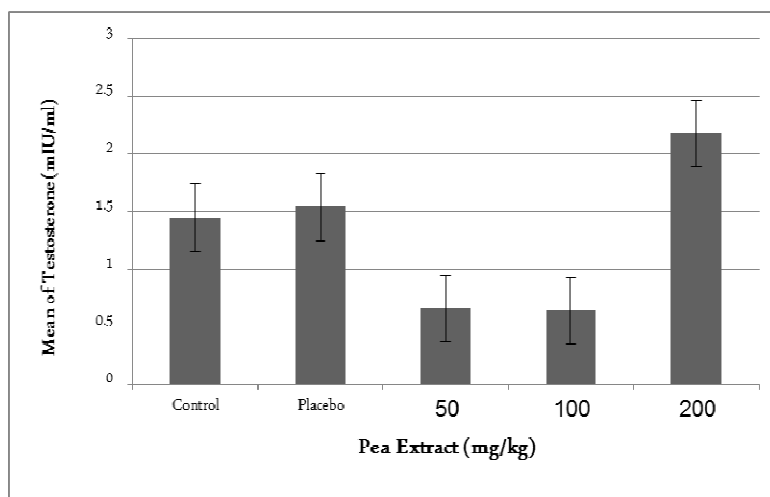


Figure3. Testosterone amount in control and experimental groups

LH amount of third experimental group (200mg/kg) was significantly different from control group whereas first and second groups were not different from control group ($p < 0.05$).

FSH amount was increased in second (150_{mg/kg}) and third (200_{mg/kg}) experimental groups significantly [5].

The main path of controlling reproductive actions is hypothalamic- pituitary- gonadal axis (HPG). This axis regulates reproductive actions in human and other mammals under feedback control [6]. In male sex, this axis acts to accurate control of testosterone hormone secretion and spermatogenesis, as follows:

- 1- Hypothalamus stimulates front pituitary via GnRH releasing hormones and causes secretion of gonadotropins (LH and FSH).
- 2- LH increases secretion of androgens (testosterone) by affecting Leydig cells of testis. FSH also stimulates gametogenesis and spermatogenesis.
- 3- By increasing androgen hormones, this axis regulates and controls testosterone hormone via feed back effect. Increase in testosterone amount affects hypothalamus and controls lutein releasing hormone and somewhat follicle-stimulating hormone via negative feedback mechanism. Reduction in bloods testosterone removes inhibitory effects of hypothalamus and restores testosterone secretion to normal situation.
- 4- Inhibin is a hormone which is secreted from Sertoli cells of testis. This hormone is secreted in response to FSH increment. It has negative feedback effect on front pituitary and controls FSH and regulates spermatogenesis. So, mentioned axis acts as main path in regulating reproductive actions [7].

Hypothalamic- pituitary- gonadal axis is affected by various neural-hormone factors [8]. One of the factors which control and regulates secretions of this axis is norepinephrine (NE).

Terminals of norepinephrine axons extant in brain are next to gonadotropin releasing GnRH cells in front hypothalamus [9]. Secreted NE from these neurons increases GnRH in Syrian mice by affecting hypothalamus. By reducing the effect of epinephrine on receptors, hypothalamus will be affected less by it and less GnRH will be secreted from hypothalamus. Therefore, the amount of FSH and LH will be reduced [10].

CONCLUSION

It seems that extant compounds in pea extract affect HPG axis and causes changes in the production of the male sex cells. 100_{mg/kg} 200_{mg/kg} doses have positive effect on male sex physiology by increasing FSH of blood but 50_{mg/kg} didn't affect it because it did not change the FSH amount. 200_{mg/kg} group increased testosterone amount and increased reproductive activity. Therefore it is considered as effective dose.

Acknowledgements

This study was supported by Payam-e-Noor university-Isfahan center, Isfahan, Iran, and resulted from M.Sc thesis of Mahnaz Vatankhah.

REFERENCES

- [1] Shailesh AS, Ishwarsinh SR, Bhanubhai NS, Dharmesh AP, Vijay KP, Bharat KS and Vikas MV. *J. of Chromatography*. **2007**, 848: 232 – 8.
- [2] Rall B, Ammon HP and Safayhi H. *Phytomedicine*. **1996**, 3: 75 - 6.
- [3] Behnamrasuli M, Hoseinzadeh H and Ghafarimoghadam G. *Tarbiat Moalem University J. of Sci*. **2001**, 1:14.
- [4] Shailesh AS, Ishwarsinh SR, Bhanubhai NS, Dharmesh AP, Vijay KP, Bharat KS and Vikas MV. *J. of Chromatography*. **2007**, 848: 232 – 8.
- [5] Regato R, Cruz-landim C. *Cell Biology International*. **2002**, 26:243-2
- [6] Kulkarni RR, Patki PS, Gandage SG and Patwardhan B. *J. Ethnopharmacol*. **1991**, 33: 91 – 9.
- [7] Gayton A. Tehran University. **2011**, 2: 245.
- [8] Ghasemidehkordi N. *Iranian Herbal Pharmacopoeia*. First edition. Ministry of health and medical education. Tehran. **2002**, 647 - 54 .
- [9] Rall B, Ammon HP and Safayhi H. *Phytomedicine*. **1996**, 3: 75 - 6.
- [10] Poeckel D and Werz O. *Curr Med. Chem*, **2006**, 13: 3359 – 69.