

EFFECTS OF AQUEOUS EXTRACTS OF GLYCINE MAX (SOYBEAN) ON SOME SEX HORMONES IN FEMALES RATS

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ABSTRACT

Summary: The effect of aqueous extract of Soy bean (Glycine max) on the function of ovary was studied for the females of rat physiologically. Thirty adult female albino rats were involved in the present study, divided into three equal groups (n=10). The first group received water orally and served as control. The second group was given aqueous Soy bean (Glycine max) extract at dose: 3 mg/ml orally for 14 days and the third group received aqueous Soy bean Glycine max extract at dose: 3 mg/ml orally for 30 days. Blood samples have been taken on the fifteenth day and in 31 days for the control group and treated groups. Serum follicle stimulation hormone (FSH), luteinizing hormone (LH), estrogen (E₂) were estimated. The hormonal study showed a significant increase at (p<0.05) in the level of LH and FSH and a significant decrease at (p<0.05) in the level of E₂ in treated groups comparing with control group. Also, there was no death or significant decrease (p>0.05) in body weight was observed during the experimental period in female rats. **Conclusions:** The results of this study indicate the ability of the *Glycine max* extract to inhibit the activity of ovary.

Keywords: *Glycine max*, Ovary, LH, FSH.

INTRODUCTION

Soybean (Glycine max) is the most common leguminous species which have widely grown and numerous uses, derived from Fabaceae family, it is rich in phytochemical contents, especially isoflavones, Soybean classified as an oilseed instead of a pulse by UN Food and Agricultural Organization [1]. The chemical structure of *Glycine max* is nearly related to estrogen hormone, which commonly known as phytoestrogens [2].

Epidemiological studies show the Soybean uses to prevent and treatment of several diseases like cancer, heart disease, manage the pre and post menopausal, symptoms and osteoporosis [3].

Many previous studies recorded toxic effects of isoflavones related to fertility, other researchers reported that Soybean decreased significant estradiol hormone (E₂), Progesterone, Follicle stimulating hormone (FSH) and luteinizing hormone (LH), so as sex hormone binding protein (SHBP) [4,5,6].

The ovary determined as an internal secretion gland (Endocrine function) which produce sex steroid hormone like estrogen and progesterone [7] by secretion of those hormones from the ovary responsible to hormones of anterior pituitary, which is (FSH) and (LH) both of them secretion due to the under hypothalamus hormone and (GnRH) all these hormones share in processing female hormone system [7, 8].

MATERIALS AND METHODS

Plant extract

Soybean was obtained from Baghdad Agricultural Research Center and blended with a high-speed blender. The extract was prepared by homogenizing 100 g of blended soybean with 400 ml of deionized water and left for 8 hrs to increase the extract efficiency followed by filtration through overlapped muslin and centrifuged at 800 g for 10 min. This solution will be referred to from here on as "the soybean extract" (E,6). The solution was offered to rats, in aluminum-foil-wrapped bottles to avoid light decomposition.

Animals and experimental treatments

The study was done in the animal house of medicine college in Baghdad University, following the guide for the care and use of

laboratory animals. It included thirty adult female albino rats. Their ages were about two months and their weights ranged from (100-150gm) grams. Rats were divided into three equal groups (n=10) as showed in Table 1:

Table 1: Experimental treatments.

Group	Experimental design
(I)	Was given water orally and served as control.
(II)	Was given aqueous <i>Glycine max</i> extract at dose: 3 mg/ml concentration orally for 14 days.
(III)	Was given aqueous <i>Glycine max</i> extract at dose: 3 mg/ml concentration orally for 30 days.

Body weight Recorded

The body weight of each rat was assessed using a sensitive balance during the acclimatization period, once before the commencement of dosing and once on the day of sacrifice.

Analysis of serum hormone concentrations

Blood samples have been taken on the fifteenth day and in 31 days for treated group and control group respectively. Serum FSH, LH, and E₂ levels were estimated by the ELISA method (Diagnostics Systems Laboratories, Webster, Tex, USA).

Statistical analysis

Results are expressed as mean ± SEM. The effect of treatment was analyzed by a One-Way ANOVA using SPSS (IBM, Armonk, NY, USA) version 13 statistical software. The significance of differences between individual means was determined by Duncan's Multiple Range Test and were considered significant at (P<0.05).

RESULTS AND DISCUSSION

The results of this study shows that the aqueous extract of *Glycine max* (soybean) led to decrease the activity of ovarian function and structure as the high (P <0.05) levels of hormones FSH, LH with low (P <0.05) levels of E₂ in groups II and III which are treated with aqueous extract of *Glycine max* compared with group I (control) as seen in Table 2.

Table 2: The influence of dietary Glycin max extract (3 mg/ml) on the serum levels LH, FSH and E2 in female rats during the experimental period.

Hormone levels	Group I	Group II	Group III
FSH(mIU/mL)	4.43 ± 0.09*	6.18 ± 0.07	7.31 ± 0.09
LH(mIU/mL)	3.32 ± 0.08*	5.91 ± 0.07*	6.90 ± 0.08
E2 (pg / ml)	12.6 ± 3.01*	7.91 ± 0.08	6.06 ± 0.07

Value (Mean ± Standard Error), *significantly (P<0.05) different from groups II and III

Glycine max consist of significant amount of isoflavones which is act similar to endogenous estrogens for display each of estrogenic and weak anti-estrogenic activities whom play an important role in reproductive failure [9, 10] the current results shows decreased level of E2, compatible with some previous studies [11] who recorded significant decrease of E2, whereas, other studies have shown no significant reduction [12, 13, 14, 15]. Interestingly, the study of [15] shows a significant decrease in estradiol only in Asian but not in non-Asian subjects.

Soybean is very helpful for postmenopausal as estrogen levels decline, but it is also was intriguingly getting worse the prognostic of estrogen receptor patients (ER).

Because of Soybean is uniquely rich in isoflavones [16], it may be being as phytoestrogens and classified as selective estrogen receptor modulators (SERMs), which were tissue selective depends upon the tissue SERMs. So, it can exert estrogenic effects, anti-estrogenic or no effects at all, in affected tissues by estrogen hormone [17].

In this study, LH, FSH increasing levels, because of the Soybean isoflavones are weakly estrogens and can be binding to estrogen receptors in hypothalamus and pituitary and must be regulated ovarian hormone. Synthesis by the effective production of gonadotropins [18].

Two previous studies have been reported the suppressive effect on serum LH and FSH concentration [19, 20] whereas, it suggestion by another study, there is no effective on LH, FSH serum, that was enhances the reports of [21,22], the fertility impaired by isoflavones also reproductive tract disorders happen in female rats which exposed to high dose of Soybean.

It can be a suggestion from these different studies the variation of Soybean effect on ovarian hormone and the ovary activity.

The present study showed a non-significant decrease in body weight of female rats during the period of the experiment, this was agreed with [23] which reported there were no significantly differences in body weight.

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