

## THE EFFECT OF SOYBEAN (GLYCIN MAX) AQUEOUS EXTRACT ON OVARIAN STRUCTURE IN WHITE FEMALE RATS

NOOR AL-HUDA ALI A. H. SAEED, LIQAA JAMEEL IBRAHEEM, ISRAA M.S. AL-KADMY\*, HEBBA F. DELI AL-LAMI, SARA N. AZIZ

Department of Biology College of Science /Al-Mustansiriyah University. Email: israaalkadmy@gmail.com

Received - 01.05.2017; Reviewed and accepted -10.06.2017

### ABSTRACT

**Objective:** The effect of aqueous extract of *Glycine max* (soybean) in the structure of ovary was studied for the females of rats histologically. **Methods:** The total number of (60) white rats were involved in the present study, divided into three groups that treated as follows: the first group is the control group that have got the regular water and food, whereas, the second and third group were treated with the aqueous extract glycin max of concentration 3mg/ml for a period of two weeks and 4 weeks respectively. **Results:** The histological study for the aqueous glycin max extract treated groups showed no mortality or toxicologically clinical changes were observed through the experimental period. It also showed inhibition formation of primary and secondary with the primordial formation of follicles at 2 weeks and diffuse luteinization of the stroma of ovary with no follicles formation and presence of interstitial haemorrhage at 4 weeks. Comparing with the control group that showed the different stage of development of graafian luteum which reflects the effect of glycin max on the ovary activity. **conclusions:** The results of this study indicate the ability of the glycin max to inhibit the activity of ovary.

**Keywords:** female rat, ovary, glycin max

### INTRODUCTION

Soybean is a leguminous species of the fabaceae family, rich in phytochemical compounds, especially isoflavones products derived from soybean contain significant concentration of isoflavones, which are members of polyphenol group and their chemical structure is closely related to human estrogen, they are capable of inducing marked hormonal effects and are designated phytoestrogens[1].

The uses of soybean for prevention and treatment of several disease like management of pre and post menopausal symptoms, prevention and treatment of cancer, many contradictory studies report the toxic effect of isoflavones in fertility [2, 3].

Glycin max has been widely used as a traditional medicine and food, it has been used as an herbal medicine to treat jaundice and edema. It contains various biologically active compounds, include saponins, phytates, protease inhibitors, phenolic acid, phytosterols, isoflavones and omega-3 fatty acid, it also contain an impressive array of biologically active components, people have been eating soybean for almost 5000 years, because of it's a leguminous oilseed and one of the world's largest and most efficient sources of plant protein[4].

The ovary is an ovoid structure that can be divided into the outer cortex and the inner medulla[5]. Medulla consists of connective tissue and a large number of blood vessels, lymphangitis and nerves while the cortex consists of ovarian follicles and corpora lutea in various stages of development these structures are embedded in a loose connective tissue stroma[6]. A follicle is a structure containing an oocyte surrounded by specialized epithelial cells. The follicular growth and maturation-dependent on FSH from the adenohypophysis and LH are important for estrogen synthesis and ovulation[7].

### Materials and methods

The experimental study included 60 females white rat *Rattus* aged ten weeks and weights ranged between (150-200)gm were taken from the animal house at the college of medicine in Baghdad University and then the animals were divided into three equal groups as follows:-

- Control group: Animals of this group continued to eat regular drinking water freely throughout the experimental period.

- Treatment group: Animals of this group has been dosing daily for 14 days by the aqueous extract of glycin max with a concentration of (3 mg/ml).
- Treated group: Animals of this group has been continued dosing daily for 30 days by the aqueous glycin max extract with 3 mg/ml concentration.

**Anesthesia:** The animals were anesthetized by using ether and their ovaries removed after absolved from the surrounding tissue and tissues samples were fixed to preserve the structure of the tissue, the fixatives used was formaldehyde (10% formalin).

The samples passed to different concentrations of alcohols series (50-100%), cleared with xylene, infiltrated and embedded in paraffin wax. The paraffin blocks were sectioned at thickness 4  $\mu$  and then staining by hematoxylin and eosin (H & E) to color the nuclei dark blue (Hematoxylin) and the remaining cell components pink (Eosin) for the purpose of the histological study [8].

### Results and Discussion

Soybean contains a significant amount of isoflavones[9]. Which are structurally similar to endogenous estrogens and display both estrogenic and weak antiestrogenic activities [10]. the estrogenic effects of isoflavones are believed to have played a major role in the reproductive failure [11].

The current study shows that during the experimental period, there was no death rating or a significant decrease in body weight was observed in all female rats.

**Histological study:**

The tissue sections of this study were stained with hematoxylin-eosin (H&E) showed clear histological changes as follows:

- For the control group showing the development of graafin follicles with the presence of early formation of corpora lutea.
- For a treated group with aqueous extract of glycin max with a concentration of 3 mg/ml, showed inhibited the formation of follicles (less folliculogenesis), a decrease in the height of the follicular cell (flattening and epithelial). Increase of follicular lumen diameter and also increase the ratio of cold follicles and accumulation of colloid materials.

But presence inactive primordial follicle for 2 weeks, whereas, at the period of 4 weeks it has been showing no follicles formation with the presence of interstitial hemorrhage.

The current study shows alteration in the distribution of follicular size in the ovaries were also observed among treated animals and histopathological changes were statistically significant. Which inhibit the formation of follicles then no follicles formation with the presence of interstitial hemorrhage.

Soy isoflavones impaired fertility and reproductive tract disorders in female rats exposed to high doses of isoflavones their fertility decreased and had altered estrous cycling [12-14]. When phytoestrogens occupy estrogen receptors, follicles production is controlled and the number of primary follicles decreases [15,16]. Because of the secondary follicles and Graafian follicles are produced by primary follicles, then decrease of primary follicles results in a decrease the number of secondary and Graafian follicles [17, 18].

## REFERENCES

- Tempfer CB., Bentz EK., Leodolter S., Tscherne G., Reuss F., Cross HS., et al.: phytoestrogens in clinical practice. A review of the literature. *Fertile steril.* 2007; 87(8):1243-1249.
- Omoni AO., Aluko RE.: soybean foods and their benefits: potential mechanisms of action. *nutr* 2005 rev. 63, 272-283.
- Markovitz J., Linassier C., Fosse P., Couprie J., Pierre J., Jacquemn sablon A., et al.: Inhibitory effects of the tyrosine kinase inhibitor genistein on mammalian DNA topoisomerase II. *Cancer res.* 1989; 48:5111-5117.
- Ju YH., Allred CD., Allred KF., Karko KL., Doerge DR., Helferich WG.: physiological concentrations of dietary genistein dose dependently stimulate growth of estrogen-dependent human breast cancer (MCF-7) tumors implanted in athymic nude mice. *J nutr.* 2001; 131: 2957-2962.
- McGee EA., and Hsueh AJ.: Initial and cyclic recruitment of ovarian follicles. *Endocrine reviews* .2000.21, 200-14.
- Junpueira LC. and Carneiro J.: *Basic histology*, 10<sup>th</sup> ed. Lange medical books McGraw Hill, Newyork.2003, 423-456.
- Eroschenko VP.: *Difiorcs atlas of histological with functional correlations*, 10<sup>th</sup> ed. Lippincott Williams and Wilkins, Philadelphia.2005, 339-340.
- 
- Bancroft JD., and Stevens A.: *Theory and practice physiological techniques*. 2<sup>nd</sup> ed., 1982;32.
- Lu LJ., Anderson KE., Grady JJ., Kohen F., Nagamani M.: Decreased Ovarian Hormones during a soy diet: Implications for breast cancer prevention. 2000. *Cancer res* 1; 60 (15):4112-21.
- Mitchell J., Cawood E., Kinniburgh D., Provan A., Collins A., & Irvine S.: Effect of a phytoestrogen food supplement on reproductive health in normal males.2001.*clinical science*.100,613-618.
- Kurzer MS., and Xu X.: *Dietary phytoestrogens* . 1997.*Annu. rev. nutr.*17:353-381.
- Cassidy A., Bingham S., Setchell K.: Biological effects of isoflavones in young women: importance of the chemical composition of soybean products.1995. *Br J Nutr* 74:587-601.
- Lu LJW., Anderson KE., Grady JJ., Nagamani M.: Effects of soya consumption for one month on steroid hormones in premenopausal women: implications for breast cancer risk reduction.1996. *Cancer Epidemiol Biomark prev.*5: 63-70.
- Jefferson W., Padilla Banks., & Newbold R.: Adverse effects on female development and reproduction in CD-1 Mice following neonatal exposure to the phytoestrogen genistein at environmentally relevant doses.2005. *Biology of reproduction*, 73,798-806
- Jefferson W., Padilla Banks E., Goulding E., Las S., Newbold R., & Williams C.: Neonatal exposure to genistein discupts ability of female mouse reproductive tract to support preimplantation embryo development and implantation.2009. *Biology of reproduction*, 80.425-431.
- Saeed N. A.H., Ibraheem L. J., Ali L. Q., Shakir E. W., Jawad R. S.:seroprevalence study of human cytomegalovirus infection among bad obstetric history and primigravida pregnant women in Iraq. *WJPR*, (2016),5(8);1615-1621.
- Dinsdale E. & Ward W.: Early exposure to soy isoflavones and effects on reproductive health.2010. a review of human and animal studies. *Nutrients*, 2. 1156-1187.
- Khedhir hassan ali and Noor Al-Huda Ali A. H. Saeed. : cytotoxic effect of esculetin on myeloma and mayelogenous leukemic cells. *Iraqi Journal of Cancer and Medical Genetics*. 2012; 5(2), 147-152.

© 2017 by the authors; licensee MJPMs, India. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).