

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغييرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار





بعض الوثائق الأصلية تالفة





بالرسالة صفحات لم ترد بالأصل





Ain Shams University

Faculty of Specific Education

Home Economics Department

Effect Of Some Rich Sources Of Phytoestrogens Feeding On Developmental Indications And Sex Hormones Status In Experimental Animals

By

Hanan AbdElhamied Ahmed Mohammed EL-Beshlawy

(B.Sc. Specific Edu. Home Economic Dept., Zagazige University., 2000.and MsD.

Specific Edu. Home Economic Dept., (Nutrition and food science).

Ain shams University., 2014)

A Thesis Submitted for Partial Fulfilment of the Requirements

Of Ph.D. Degree in Home Economic Dept., Cairo, Egypt

(Nutrition & Food Science)

Under the supervision of:

Prof. Dr. Usama El-said Mostafa

Professor of Nutrition and Food Sci.;

and Dean Faculty of Specific

Education

Ain shams University

Prof. Dr. El Sayed AbduKhalik Hassanin

Professor of Biochemistry and Nutritional

Chemistry- Metabolism Dept., and Head of

Central Laboratory- National Nutrition Institute-

Prof. Dr. Lobna Mohamed Salah El-Hadedy

Professor of Clinical Nutritional Medical of

Pediatrics- National Nutrition Institute.

Prof. Dr. Walaa Ibrahim Mohamed

Professor of Nutrition and Food Sci.,

Faculty of Specific Education.

Ain shams University

Cairo
2020



اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ * خَلَقَ
الْإِنْسَانَ مِنْ عَلَقٍ * اقْرَأْ وَرَبُّكَ
الْأَكْرَمُ * الَّذِي عَلَّمَ بِالْقَلَمِ * عَلَّمَ
الْإِنْسَانَ مَا لَمْ يَعْلَمْ ﴿ العلق: 1 - 5

صدق الله العظيم

APPROVAL SHEET

Name: Hanan AbdEl-hamied Ahmed Mohammed EL-Beshlawy

Title : "Effect Of Some Rich Sources Of Phytoestrogens Feeding On Developmental Indications And Sex Hormones Status In Experimental Animals"

MsD.; in Specific Edu. Home Economics Dept.; Nutrition and Food Science, Ain Shams University, 2014.

Degree: PhD in Specific Education- Home Economics- Nutrition and Food Science
This Thesis for PhD., Degree has been approved by:

Prof. Dr: **Dr. Eveleen Said Abdalla**, Professor of Nutrition and Food science, Home Economics Dept., and Vice-Dean for Specific Education for Environmental Affairs and Graduate Studies., Ain Shams University

Prof. Dr: **Dr. El Sayed Abd El-Khalik Hassanin**, Professor of Biochemistry and Nutritional Chemistry- Metabolism Dept., and Head of the Central Laboratory- National Nutrition Institute- Cairo.

Prof. Dr: **Dr. Usama El-said Mostafa**, Professor of Nutrition and Food science, Home Economics Dept., and Dean of Fac of Specific Education., Ain Shams University.

Prof. Dr: **Dr. Emad Mohamed El-Kholie**, Professor of Nutritional and Food science, Faculty of Home Economics, Menoufia University.

Prof. Dr: **Dr. Lobna Mohamed Salah El-Hadedy**, Professor of Clinical Nutritional, and Medical of Pediatrics, National Nutrition Institute- Cairo-Egypt.

Prof. Dr: **Dr. Walaa Ibrahim Aniess**, Professor of Nutrition and Food science, Home Economics Dept., Fac. of Specific Education, Ain Shams University

Committee in charge

Date: / / 2020

Acknowledgment

First and above all, I'm gratefully acknowledges my deepest gratitude and thanks to "**Allah**" for achieving any work in my life

To my Father who always inspired me, my sole mentor who always believed on me and my passion. From the better to the best was his morning blessings. Depression never exist in my dictionary because of his endless support.

I would like to express my supervisor with deepest gratitude and sincere appreciation, **prof. Dr. El Sayed Abd El-Khalik Hassanein** Head of Biochemistry and Nutritional Metabolism Department, National Nutrition Institute, Ministry of Health, for his continuous encouragement, sincere advice, close supervision, co-operation in all steps of this work and support throughout this investigation and revising the manuscript.

I wish also to express my deepest thanks to **Prof. Usama El-said Mostafa**, Professor, of Nutrition and Food science, Home Economics Dept., and Dean of Faculty of Specific Education, Ain Shams University, Not only his supervision, but also the most helpful at all stage , encouragement, useful discussion during the study, and effective help in this work.

Also my deepest thanks to **Prof. Lobna Mohamed Slah Elhadidy**, who gave hand during conduction of this work, Not only her supervision, but also the most helpful at all stage , encouragement, useful discussion during the study, and effective help in this work.

I would like also to express my deepest grateful sincere appreciation and respect to **Prof. Walaa Ibrahim Mohamed Aniess Prof.** of Nutrition and Food science, Faculty of Specific Education, Ain Shams University, for his supervision, encouragement, great help throughout the work, and revising the manuscript

Committee in charge

Date: / / 2020

"Effect of Some Rich Sources of Phytoestrogens Feeding on Developmental indications and Sex Hormones Status in Experimental Animals"

Hanan AbdElhamied Ahmed Mohammed EL-Beshlawy

(B.Sc. Specific Edu. (Home Economics Dept), Zagazige University., 2000., MsD., Specific Edu. Home Economics Dept., 2014 "Nutrition & Food Sciences")

A Thesis Submitted for Partial Fulfilment of the Requirements of
Ph.D. Degree in Home Economic Dept., (Nutrition & Food Science)

ABSTRACT:

Background: Phytoestrogens are double-edged sword, broadly dietary chemical substances of plant origin that are structurally and functionally similar to 17- β -oestradiol (E2). This structural similarity to E2 enables phytoestrogens to cause (anti) oestrogenic effects by binding to the oestrogen receptors, and the question of whether phytoestrogens are beneficial or harmful to human health remains conflicted. **Aims and Objective:** Doubts concerning phytoestrogens have increased recently, when exposure early of phytoestrogens, including infants, adolescents, and puberty. Moreover, the question of whether potential of adverse effects on sex hormones, developmental and reproductive on male and female in this work. **Material and Methods:** Ninety Six (96) pre-weanling male and female albino rats of Sprague-Dawley strain (30 - 40g), postnatal day (PND) 21 *ds*. The rats were divided into two main groups for four weeks (short term) first main group (negative control) divided into two groups male (8 rats/ group), female (8 rats/ group) were fed on basal diet AIN-93G /4wks, Then according to AIN-93M (Mature) for 8 weeks (long term), and the second main group (Treated groups) divided into two groups male (40 rat/group), female (40 rat/group) were fed soy infant formula (Isomil) for four weeks, Iso Nu "1" was fed since onset trail until two weeks, and Iso Nu "2" feeding two last weeks(short term). After that AIN-93M supplemented with soybean 15%, 30%, flax seeds 7.5%, and sesame seeds 30% were modified and corrected for protein, fat, carbohydrate and fiber contributed by all seeds instead of corn starch. And divide equally into treatment 8 subgroups of equal mean weights (10 rats/ group) (long term), daily feed intake, and weight gain for rat was calculated, then section of liver, testis in male and liver, ovary and uterine in female.

Results: There were a significantly different ($p < 0.05$) in "BWG, FI, and FER" in treated groups and their negative controls male or female groups during 12 weeks, and revealed that some morphological changes in testis male groups as hypertrophy and atrophy, meanwhile, there were no significantly changes ($p < 0.05$) in section of liver in male or female groups. On the other hand, there were a significant different ($p < 0.05$) in F-testosterone, FSH, LH, SBHG, PROG, and thyroid gland (T4, TSH) not differ in T3 in male or female groups. Histological were appeared significantly change in section testis, ovary and uterine in treatment groups. **Conclusion:** In spite of, phytoestrogens are common in infant and adult foods especially foods made from soybeans and products, flaxseed, sesame rich on isoflavones and lignan which have adverse effects on reproductive health, sex hormones and development, so i should be increased research's on effects of phytoestrogens toxicity on pituitary dysfunction or endocrine disruptors "ECD", and the right age for exposure to phytoestrogens fractions "isoflavonis, liganan, coumestans"

Key words: phytoestrogens-adverse effects- soybean- flaxseeds- sesame seeds- sex hormones- developmental-reductive- short-term- long-term.

Editor By/ Researcher:-

Hanan AbdElhamied Ahmed El-Beshlawy

2020

CONTENTS

Abstract:	1
LISTCONTENTS	I
LIST OF TABLES	III
LIST OF FIGURES	IV
LIST OF ABBREVIATION	VII
1. Introduction:	1
Aims Of The Study:	7
2. Review Of Literature	8
2.1. DIET AND NUTRITION	8
2.2. DEFINITION, ORIGIN AND CLASSIFICATION OF PHYTOESTROGENS	9
2.3. CHEMISTRY, ESTROGEICITY AND ANTIESTROGENICITY	10
2.4 DIETARY SOURCES OF PHYTOESTOGENS	14
2.5. EFFECTS OF PHYTOESTROGENS ON SEX HORMONE METABOLISM	22
2.6. ABSORPTION, DISTRIBUTION, METABOLISM AND EXCRETION OF PHYTOESTROGENS	23
2.7. MECHANISM OF PHYTOESTROGENS, ESTROGENS ACTION	25
2.8. ANALYSIS OF PHYTOESTROGENS	26
2.9. DAILY INTAKE OF PHYTOESTROGENS	27
2.10. CORRELATION BETWEEN PHYTOESTROGENS AND SEX HORMONES	27
2.11. HEALTH BENEFITS OF PHYTOESTROGENS IN SOYBEAN, FLAXSEEDS AND SESAME SEEDS:	29
2.12. ADVERSE EFFECTS OF PHYTOESTROGENS:	37
2.15.EPIDEMIOLOGICAL STUDY OF TOXICITY OF PHYTOESTROGENS	40
3. MATERIALS AND METHODS	41
3.1. MATERIALS	41
3.2. ANALYTICAL METHODS:	42
3.3. DETERMINATION OF ISOFLAVONES ON SOYBEANS	42
3.4 DETERMINATION OF LIGNAN IN FLAXSEEDS:	42
3.5 BIOLOGICAL EXPERIMENT	43
3.6 BIOLOGICAL DETERMINATION:	49
3.7. BIOCHEMICAL ANALYSIS OF SERUM:	50

3.8. <i>HISTOPATHOLOGICAL EXAMINATION:</i>	52
3.9. <i>STATISTICAL ANALYSIS:</i>	52
4. RESULTS AND DISCUSSION	
4.1 <i>CHEMICAL COMPOSITION OF SEEDS</i>	53
4.2. <i>ISOFLAVONES IN SOYBEANS</i>	53
4.3. <i>BIOLOGICAL STUDIES</i>	54
4.4. <i>BIOCHEMICAL PARAMMETAR OF SERUM</i>	82
5. HISTOPATHOLOGICAL RESULTS.....	111
5.1. <i>HISTOLOGICAL EXAMINATION OF LIVER</i>	111
5.2. <i>EFFECT OF RICHEST SOURCES OF PHYTOESTROGENS ON HISTOLOGICAL EXAMINATION OF SEXUALORGAN MALE</i>	116
5.2.2. <i>Testis (testicles).....</i>	116
5.2.2. <i>Ovarian and Uterine</i>	123
6. RECOMMENDATIONS	129
7. SUMMARY.....	130
8. REFERENCES	135
9. الملخص العربي.....	1
توصيات البحث.....	7
المستخلص.....	1

LIST OF TABLES

NO.	Title	Page
A	Chemical Composition of seeds (soybean-flaxseeds-sesame seeds)	58
B	Isoflavones in soybeans	58
1	The composition of basal diets AIN-93G*; AIN-93M*	48
2	the composition of salt mixture AIN-93G*; AIN-93M*	48
3	The composition of salt mixture g/kg diet	48-49
4	The composition of Vitamins to <i>AIN-93G</i> and <i>AIN-93 M</i> diets Mixture.	49
5	Composition of experimental diet Short-terms	50
6	Composition diet of treatment groups during Long-terms	50-51
7	Effect of feeding Some Rich Sources of phytoestrogens on (WG, FI, and FE) in weaning rats their male or female for 12/wks	63
8	Effect of feeding Some Rich Source of Phytoestrogens on male growth curve during initial 4/wks	69
9	Effect of Some Rich Source of Phytoestrogens on Female growth curve during first 4/wks	69
10	Effect of feeding some rich sources of phytoestrogens on relative organs (Liver, Kidney, Spleen, Heart, and Testis) in weaning rats their male for 12/wks.	71
11	Effect of feeding some rich sources of phytoestrogens on relative organs (Liver, Kidney, Spleen, Heart, and Ovary+Uterine) in weaning rats their female group's for 12/wks	73
12	Effect of feeding Some rich sources of Phytoestrogens, on "F-Testo" "pg/ml" levels in serum of male or female albino rats for 12/wks.	88
13	Effect of feeding some rich sources of phytoestrogens on 17β -estradiol "E2" levels in serum of male or female albino rats for 12/wks.	91
14	Effect of feeding some rich sources of phytoestrogens on "SHBG" hormone "ng/ml" levels in serum of male or female albino rats for 12/wks.	94
15	Effect of feeding some rich sources of phytoestrogens on progesterone "ng/ml" levels in serum of male or female for 12/wks.	97
16	Effect of feeding some rich sources of phytoestrogens on "FSH" ng/ml levels in serum of male or female for 12/wks.	99
17	Effect of feeding some rich sources of phytoestrogens on "Luteinizing hormone "LH" ng/m levels in serum of male or female for 12/wks	101
18	Effect of feeding some rich sources of phytoestrogens on "aromatase enzyme "ARO' ng/ml levels in serum of male or female for 12/wks.	104
19	Effect of feeding some rich sources of phytoestrogenests on Triiodothyronine " T3" ng/ml levels in serum of male or female.	106
20	Effect of feeding some rich sources of phytoestrogens on " "T4" ng/ml levels in serum of male or female for 12/wks.	108
21	Effect of feeding some rich sources of phytoestrogens "TSH" ng/ml levels in serum of male or female for 12/wks.	111
22	Effect of feeding some richest sources of phytoestrogens on histopathology of liver tissue in male or female albino rats for 12/wks.	125
23	Effect of feedingsome richest sources of phytoestrogens on Histopathology of testis tissue male albino rats for 12/wks.	130
24	Effect of feeding some richest sources of phytoestrogens on Histopathology of Ovary and Uterine tissue female albino rats for 12/wks.	135

LIST OF FIGURES

NO.	Title	Page
1	Classification of phytoestrogens	11
2	Other classification of phytoestrogens	11
3	Chemical structures and names of the isoflavones, as Genistein, Daidzein, & 17 β -estradiol	12
4	Biological Study- 96/Rats Sprague-Dawely	52
5	Effect of feeding some rich sources of phytoestrogens on feed intake (g/day) of male or female albino rats for 12wks	64
6	Effect of feeding some rich sources of phytoestrogens on body weight gain (g/day) of male or female albino rats for 12wks	66
7	Effect of feeding some rich sources of phytoestrogens on feed efficiency ratio (g/day) of male or female albino rats for 12wks	68
8	Effect of feeding (AIN-93G) and (SIF) rich Source of Phytoestrogens on male growth curve during initial for 4/wks.	69
9	Effect of Rich Source of Phytoestrogens on Female growth curve during initial for 4/wks.	70
10	Effect of feeding some rich sources of phytoestrogens on relative weight liver in male albino rats for 12/wks	71
10A	Effect of feeding some rich sources of phytoestrogens on relative weight oranges in male groups in all group female.	71
11	Effect of feeding some rich sources of phytoestrogens on relative Liver in female rat group's for12/wks.	74
11A	Effect of feeding some rich sources on relative weight oranges in Female groups in all group female.	74
12	Effect of feeding some rich sources of phytoestrogens on relative Kideny in male rat group's for12/wks	76
13	Effect of feeding some rich sources of phytoestrogens on relative Kideny in female rat group's for12/wks.	76
14	Effect of feeding some rich sources of phytoestrogens on relative Spleen in pre and post- weaning rats their male group's for12/wks.	78
15	Effect of feeding some rich sources of phytoestrogens on relative Spleen in female rat group's for12/wks.	78
16	Effect of feeding some rich sources of phytoestrogens on relative Heart in male rat groups for 12/wks.	79
17	Effect of feeding some rich sources of phytoestrogens on relative Heart in female rat group's for12/wks.	80
18	Effect of feeding some rich sources of phytoestrogens on relative Testis in male rat group's for12/wks.	82
19	Effect of feeding some rich sources of phytoestrogens on relative Overy+Uterine in male rat group's for12/wks.	85
20	Effect of feeding some rich sources of phytoestrogens on "F-Testo" male rat group's for12/wks	88
21	Effect of feeding some rich sources of phytoestrogens on "F-Testo" female rat group's for12/wks.	88
22	Effect of feeding some rich sources of phytoestrogens on 17 β -estradiol "E2" male rats group for 12/wks.	92
23	Effect of feeding some rich sources of phytoestrogens on 17 β -estradiol "E2" female rats group for 12/wks.	92
24	Effect of feeding some rich sources of phytoestrogens on "SHBG" hormone ng/ml male rats group for 12/wks	95