

Effect of *Linum usitatissimum* on Profile Lipid, total Protein, Albumin, Globulin, and Liver Enzyme Parameters in Female mice

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Abstract

The aim of this study is to explain the effect of *Linum usitatissimum* on lipid profile physiology parameter in female mice twelve adult female mice were used in this study divided into groups .First group is control (C) received (D.w.) for four weeks. The second (treated group) injected intraperitoneal with of *Linum usitatissimum* in dose 100mg/kg B.w. for weeks. animal starvation overnight then blood sample were collected without anti -goagulant and serum separated by centrifugation at 5000 rpm for 15 minute and stored at -20°C for biochemical analysis there was non-significant decrease ($p>0.05$) in cholesterol(CHO) ,Triglyceride (TG),Low density lipoprotein(LDL) , Very low density lipoprotein (VLDL) .and significant decrease in high density lipoprotein (HDL) , non –significant to Globulin but it was significant decrease ($p<0.05$) in total protein ,Albumin ,GOT, GPT and ALP

Keyword: *Linum usitatissimum*, Cholesterol, Triglyceride, Glutamic oxaloacetate transaminase (GOT), Glutimic pyruvic transaminase (GPT), alkaline phosphatase (ALP)

Introduction

Worldwide is used phytotherapy and it is more regarded as an alternative to modern medicine in developed countries ^(8,19). According to the World Health Organization, the worldwide consumption of herbal medicines is enormous and about 80% of populations in developing countries practice medical herbalism, based on the use of plants or their extracts ⁽⁵⁾. As for any product, there are particular health interests for consumers in relation to the quality and safety of herbal products and supplements ⁽³¹⁾. The use of medical plant to reduce these risks, it is primordial to improve control systems and evaluation procedures of natural products therapeutic effects, their toxicity and their interactions with prescription drugs ⁽³⁰⁾. Linseed (*Linum usitatissimum*) is a rich source of fibres, omega 3 fatty acids and phyto-estrogen mucilage. Year after year, this plant is gaining more importance because of the therapeutic effects of its components. It exhibits antioxidant, antineoplastic, antidiabetic, antiviral, antibacterial, antifungal, anti-inflammatory and antiatherosclerosis properties ⁽⁷⁾. Flaxseed is active

against angina pectoris and hypercholesterolemia. It is very useful in treating constipation and removing secretions within the respiratory tract flaxseed oil intake. Daily protects gastric and urinary tracts membranes, heals scars, protects from inflamed skin. It nourishes and regulates also hair follicles cycle ⁽⁶⁾. After linseed oil extraction, resultant flaxseed meal is used as a protein supplement in livestock feeds ⁽¹⁸⁾.

Material and Methods

1-Collection of animals

12 adult females of albino mice were collected from Pharmaceutical Supervision Department / The Ministry of Health, Which acclimated in conditions of the animals house in the Biology Department college of Science for Women /University of Baghdad .Adult female mice weighting 25-30gm were used in this study. The animals were housed for two weeks for adaptation. Animals were maintained on a natural 12h light and 12h dark cycle, received a balanced diet, water and libitum throughout the experimental period.

2- Control and treated groups

Animals were divided into two groups (n=6) and treated for four weeks as follows: control group (c) received. D.W. Intra peritoneal injection daily for four weeks and treated group (T) received flax seed at a dose of 100 mg/kg B.W.⁽²⁾ At the end of the experimental period, overnight fasting, blood samples were collected by heart puncture without anticoagulant for biochemical analysis.

3- Physiological study

Serum was separated from coagulant blood by centrifugation at 5000rpm for 10 minutes and stored at -20°C for studying the following: Triglyceride by using enzymatic assay Kit⁽¹³⁾, cholesterol by using enzymatic assay Kit⁽²⁰⁾, high density lipoprotein (HDL) by using enzymatic assay Kit⁽²⁴⁾, low density lipoprotein (LDL) by⁽¹⁴⁾, very low density lipoprotein (VLDL) by⁽¹²⁾. Total protein according to kit⁽¹³⁾, Albumin according to kit⁽²¹⁾, Globulin according to

kit⁽²⁴⁾, ALP concentration according to (14), total protein according to kit⁽³³⁾, Albumin according to kit⁽²⁶⁾, Globulin according to kit⁽¹⁵⁾, Alkaline Phosphatase (ALP) concentration according to kit⁽²⁹⁾.

Result

The results of the current study explained in physiological parameters that there was non – significant ($p > 0.05$) in cholesterol concentration in treated group as compared with control group. The triglyceride concentration was non-significant ($p > 0.05$) in treated group as compared with control group. The high density lipoprotein (HDL) concentration appeared that was significant decrease ($p < 0.05$) in treated group that was (18.82 ± 1.02) mg/dL as compared with control group (24.00 ± 1.41) mg /dL. In low density lipoprotein (LDL) there was non – significant ($p > 0.05$) in treated group as compared with control group. The very low density lipoprotein (VLDL) concentration appeared non _significant ($p > 0.05$) in treated group as compared with control group. The results was explain in (table 1).

Table -1- effect of *Linum usitatissimum* on the parameters of profile lipid in female mice in dose 100 mg/kg B.W. in cholesterol, triglyceride high density lipoprotein(HDL), low density lipoprotein (VLDL), parameters in control and treated group .

Group	Mean \pm SE (mg/dl)				
	Cholesterol	Triglyceride	HDL	LDL	VLDL
Control	94.98 \pm 7.38	100.04 \pm 15.08	24.00 \pm 1.41	67.00 \pm 3.16	24.00 \pm 3.30
Treatment	92.52 \pm 8.46	95.28 \pm 6.13	18.82 \pm 1.02	59.60 \pm 4.41	21.04 \pm 3.14
LSD value	25.913N NS	37.556 NS	4.031 *	12.516 NS	10.522 NS
* ($P < 0.05$).					

Values are expressed as means \pm SE n= 6

There was significant decrease ($p < 0.05$) in total protein concentration that was (61.54 ± 7.40) mg/dl in treated group as compare with control group (80.60 ± 2.11) mg/dl. The albumin concentration was significant decrease ($p < 0.05$) that was (35.12 ± 1.45) mg/dl in

treated group as compare with control group (44.60 ± 1.74) mg/dl. The Globulin concentration appeared that there was non- significant ($p > 0.05$) in treated group as compared with control group. The glutamic oxalo acetic transaminase (GOT) concentration was decrease

significant ($p<0.05$) that was (39.88 ± 0.57) mg/dl in treated group as compare with control group (53.00 ± 2.02) mg/dl and the glutamic pyruvic transaminase (GPT) decrease significant ($p<0.05$) that was (48.80 ± 3.51) mg/dl in treated group as compare with control

group (66.40 ± 2.24) mg/dl , the alkaline phosphatase (ALP)concentration appeared decrease significantly ($p<0.05$) that was (182.00 ± 3.11) mg/dl in treated group as compared with control group (237.80 ± 9.76) mg/dl. The results was explain in (table 2)

Group	Mean \pm SE (mg/dl)					ALP
	Total protein	Albumin	Globulin	GOT	GPT	
Control	80.66 \pm 2.11	.60 \pm 1.74 44	34.80 \pm 1.68	53.00 \pm 2.02	66.40 \pm 2.24	237.80+ _9.76
Treatment	61.54 \pm 7.40	35.12 \pm 1.45	32.80 \pm 0.61	39.88 \pm 0.57	84.80 \pm 3.51	182.00+-3.11
LSD value	17.786	5.247	4.139 NS	4.850	9.619	23.645
* ($P<0.05$).						

Values are expressed as means \pm SE n= 6

Table(2) The effect of *Linum Usitatissimum* in adose 100mg/kg B.W. in total protein ,Albumin ,Globulin , Glutamic oxaalo acetic transaminase (GOT), Glutamic pyruvic transaminase (GPT) ,Alkaline phosphatase (ALP) parameters in control and treated group.

Discussion

Flaxseed (*Linum usitatissimum*) is the richest dietary source of omega-3fatty acids among plant sources. Flaxseed is widely used for its edible oil in many parts of the world. A number of investigations have demonstrated that diet supplemented with flaxseed oil has profound beneficial health effects in various pathologies. Flaxseed is also the richest source of lignans, which have been reported to have antioxidant and hypolipidemic effects to have antioxidant and hypolipidemic effects⁽²⁵⁾ flaxseed in the diet in animal studies has shown inhibit atherogenesis⁽²⁷⁾ and protect during hyper-cholesterolemic conditions⁽¹⁰⁾. LDL is a lipoprotein that transports lipids from the liver to the peripheral (extrahepatic) and is often called “bad” cholesterol and constitutes a half to two-

thirds of cholesterol⁽²³⁾ and high levels of LDLs are highly atherogenic lipoproteins. Oxidation of LDL in the walls of arteries may lead to an impaired endothelial relaxation in isolated arterial segments, thereby causing atherosclerosis⁽³²⁾. HDL is often called “good” because it is a lipoprotein that transports lipids from the periphery to all the liver. HDL particles enhance the net removal of cholesterol from a variety of cells such as smooth muscle cells, fibroblasts, and cholesterol-laden macrophages⁽²⁸⁾ HDLs also prevent the oxidation of LDL by virtue of its antioxidant and anti-inflammatory properties⁽¹⁶⁾. The low levels of HDL in the blood will increase the risk of atherosclerosis and coronary heart disease⁽²²⁾. Flaxseed contain alpha linolenic acid (ALA 18:3 n3) which is converted by the body into eicosapentaenoic acid (EPA) and docosa hexaenoic acid (DHA)⁽⁹⁾. After the results we founed a deficiency in the enzyme (ALP) , This may be due to the effect of alpha linolenic acid(ALA), oleic acid and some polyunsaturated fatty acids the ingredient of flax seed and which decrease conjugation of bilirubin content of mice liver.⁽¹¹⁾ Suggested that,

the activities of serum marker enzymes glutamate oxaloacetate transaminase (GOT), glutamate pyruvate transaminase (GPT) were elevated significantly in carbon tetrachloride induced mice. Administration of flaxseed chutney (15%, w/ w) resulted in depletion of serum marker enzymes and exhibited recouplement thus showing significant hepatoprotective effect. It was observed that flaxseed chutney supplemented diet could lower the serum cholesterol and as a potential source of antioxidants it could exert protection against hepatotoxic damage induced by carbon tetrachloride (CCl₄) in mice⁽¹⁾. Albumin and The total protein decrease in liver because albumin are composed of single polypeptide chain with low molecular weight of 16-18 and flaxseed composed of alpha linolenic acid and oleic acid⁽¹¹⁾ and because decrease in the rate of amino acids. They further commented that because of the anti-food Linatin in flaxseed, which reduces the availability and absorption of vitamin B6 that is required in the formation of protein in the body through the removal of the carboxyl groups of amino acids and transfer to amines, which in turn is reflected in the concentration of a protein in the blood, thus reduces the rate of protein synthesis in the body^(3,4).

Conclusion

The result of this study explained that *Linum Usitatissimum* had a hypolipidic effect on HDL_cholesterol concentration, decrease effect on Albumin, GOT, GPT, ALP and there's no effects on other factors.

Conflict of Interest: None

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Ethical Clearance: Not required

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