BIOLOGICAL STUDIES ON SOME HEREBS FOR HYPERLEPIDMIC RATS

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Abstract:

Reducing intake of saturated fat, dietary cholesterol and avoiding excess calories, which can lead to obesity, remain the cornerstone of the dietary approach to decreasing risk of atherosclerotic vascular disease. During the past 20 years, there has been renewed interest in other dietary components that might favorably improve lipid profiles and reduce risk of coronary heart disease (CHD). Herbs, rich sources dietary fiber, have sparked intense interest in both epidemiological studies, which suggest a favorable effect on CHD, and metabolic ward studies, which show a striking improvement in lipid profiles in hyperlipidemic patients. This research aimed to study the biological properties of *Portulacaoleracea, Asparagus officinalis Medicago sativa and Elettaria cardamomum* onhyperlipidemic rats. Thirty male albino rats (30 female) , weighing 140 ±10 g were divided into **6** groups and administered 10% of tested herbs daily for 28 days. Blood samples were taken from each rat and tested for total cholesterol, (LDL),(HDL), triglycerides, liver enzymes activities, kidney functions, LH and PRL hormones. Results showed that triglycerides, total cholesterol, LDL, VLDL, and liver enzymes activities (AST and ALT) were significantly increased, while HDL was significantly decreased in positive control group compared with the negative control rats. Treating hyperlipidemic rats with 10% *Portulacaoleracea, Asparagus officinalis,Medicago sativa and Elettaria cardamomum* in hyperlipidemic diet caused a significant improvement in these biochemical measures and the best results were achieved by using basal diet with 10% *Portulacaoleracea*. So, it could be concluded that *Elettariaca rdamomum* and *Portulaca oleracea* were the most useful for hyperlipidemic patients and for the prevention of heart disease and hardening of the arteries.

Key words: hyperlipidemic rats; Portulacaoleracea; lipid profile.

Introduction:

Hyperlipidemia characterized by hyperlipidemic is the most prevalent indicator for susceptibility to cardiovascular diseases. World health organization reports that high blood cholesterol contributes to approximately 56% of cases of cardiovascular diseases worldwide and causes about 4.4 million deaths each year **(Dhuley *et al.*,1999) .**

Since cholesterol is insoluble in water, it is transported in the blood plasma within protein particles (lipoproteins). Lipoproteins are classified by their density very low density lipoprotein (VLDL), intermediate density lipoprotein (IDL), low density lipoprotein (LDL), and high density lipoprotein (HDL) **(Biggerstaff & Wooten, 2004)**. All the lipoproteins carry cholesterol, but elevated levels of the lipoproteins other then HDL (termed non-HDL cholesterol), particularly LDL-cholesterol are associated with an increased risk of atherosclerosis and coronary heart disease **(Carmena *et al.,* 2004).** In contrast higher levels of HDL cholesterol are protective **(Kontush and Chapman, 2006).** Elevated levels of non-HDL cholesterol and LDL in the blood may be a consequence of diet, obesity, inherited (genetic) diseases (such as LDL receptor mutations in familial hypercholesterolemia), or the presence of other diseases such as diabetes and an underactive thyroid **(Durrington, 2003).** For about 50 000 years plants have been used for treatment purposes by the folk of Anatolia. Species of plants found in graves from the Paleolithic Age in Şanidar Cave (south of Hakkari) provide solid proof to this phenomenon **(Solecki ., 1972).** Phototherapy is administered by experienced persons called "folk healers" using herbal drugs. Folk drugs called healing herbs are used by a large section of the society in Turkey. These are generally plants that grow in the vicinity of the places where people live, and are given local names. It is noteworthy that, although the plants are named differently by the people living in a given area, the designations in different areas are the same. It is necessary to know the local names of wild plants, which comprise an indispensable material for the drug industry. Besides, knowledge which diseases these plants are good for and for which purposes they are used also benefits the humanity. In our country raw drugs are generally obtained from natural plants **(Bağcı, 2000).** Herbal drugs can be used only to treat mild diseases and as a supplement to medical treatment. A doctor should always be consulted about the severe conditions. However, the initial symptoms of some severe diseases are fairly weak. Therefore when symptoms are not cured shortly by phototherapy (incessant abdominal pain, diarrhea, headaches, sweating, continuous cough, etc.), a doctor should be immediately consulted, as these may be the initial symptoms of a severe disease **(Baytop, 1999).** The present study explores plants and fruits used by the folk in Elazığ to reduce high cholesterol, one of the main causes of heart diseases. The way these plants and fruits were used has been also examined, and the ethnobotanic knowledge of the folk has been evaluated.

Purslane (*Portula caoleracea* L.) deserves special attention from agriculturalists as well as nutritionists. Purslane is a common weed in turfgrass areas as well as in field crops **(Kamal-Uddin *et al*.,2009 and Uddin *et al.*,2010).** Many varieties of purslane under many names grow in a wide range of climates and regions. Purslane has wide acceptability as a potherb in Central Europe, Asia, and the Mediterranean region. It is an important component of green salad and its soft stem and leaves are used raw, alone, or with other greens. Purslane is also used for cooking or used as a pickle. Its medicinal value is evident from its use for treatment of burns, headache, and diseases related to the intestine, liver, stomach, cough, shortness of breath, and arthritis. Its use as a purgative, cardiac tonic, emollient, muscle relaxant, and antiinflammatory and diuretic treatment makes it important in herbal medicine. Purslane is a very good source of alpha-linolenic acid. Alpha-linolenic is an omega-3 fatty acid which plays an important role in human growth and development and in preventing diseases. Purslane has been shown to contain five times higher omega-3 fatty acids than spinach. Omega- 3 fatty acids belong to a group of polyunsaturated fatty acids essential for human growth, development, prevention of numerous cardiovascular diseases, and maintenance of a healthy immune system **(Gill and Valivety 1997)**. Our bodies do not synthesis omega-3 fatty acids. Therefore omega-3 fatty acids must be consumed from a dietary source. Omega-3 fatty acids contain 18 to 24 carbon atoms and have three or more double bonds within its fatty acid chain [8]. Cultivated "triguero" asparagus comes from the wild autochthonous asparagus (Asparagus officinalis L.) from Huétor-Tajar (HT) in Andalusia, Spain. It is important to point out that there are studies that have suggested that "triguero" HT asparagus could be a hybrid between cultivated diploid varieties of Asparagus officinalis and the wild species A. maritimus [6], although some other authors did not find evidence to confirm this fact **(Gill and Valivety 1997).** This species contains bioactive constituents such as dietary fiber, polyphenols, saponins, sterols, oligosaccharides, carotenoids and amino acids, all of which may contribute to the functional properties of this vegetable. Among the compounds with antioxidant activity, asparagus contains a large amount of polyphenols, mainly flavonoids **(Whelan and Rust (2006) and Guillén, *et al*., 2008).** The flavonoid rutin constitutes 60%–80% of the total phenolic content of purple and green asparagus extracts, and rutin could be directly related to the antioxidant properties of asparagus **(Maeda, .*et al* 2005).** Moreover, "triguero" asparagus is rich in dietary fiber, particularly fructans (inulin and fructooligosaccharides) and cell wall polysaccharides containing ferulic acid residues, which also provide potential health benefits **(Rodríguez, *et al* 2004)** Concerning the hypolipidemic effect of this vegetable, other authors have previously investigated the cholesterol-lowering properties and hepatoprotective effects of Asparagus racemosus and Asparagus officinalis byproducts also in animal models **(Visavadiya and Narasimhacharya, (2007) and. Zhu, *et al* 2010).** Moreover, in a preliminary investigation, we demonstrated that oral supplementation with 500 mg/kg body weight of "triguero" asparagus was able to prevent increases in plasma lipid concentrations and protect against the liver oxidative damage produced by a high-cholesterol diet in rats **(García, *et al* 2012).**

The Medicago sativa, locally known as Lucern, is a common leguminous forage plant in Indo-Pakistan subcontinent. It is used as a fodder for horses, donkeys and sometimes for cows, buffaloes and goats **(Kalhoro and Memon, 2011).** However, its use in cows and buffaloes seems to decrease the milk yield, most probably due to its phytoestrogen contents. This plant is a rich source of saponins which decrease cholesterol contents in the serum of hypercholesterolemic rabbits **(Asqary *et al* 2008)** and in the breast meat of chickens (**Ponte *et al* 2004).** It is also useful in preventing cardiovascular disorders

(Asqary *et al.* 2008)._Cardamom spice consists of whole or ground dried fruit of Elettariacardamomum (Linn.) Maton, a herbaceous perennial of the ginger family (Zingiberaceae):Ellettaria, commonly known as green cardamom, has small, light green pods; and amomum, known as black cardamom, has larger, dark brown pods. Both species of cardamom can be used in cooking and for their health benefits **(Moreno,*et al* 2008**). It has been traditionally used to treat skin condition and in digestion. Cardamom oil is also used in cosmetics because of its cooling properties and because it's pale to colorless liquid can be easily incorporated into different solutions. Cardamom has been reported to possess antioxidant properties, increase levels of glutathione **(Gill and Valivety 1997).**and reduce LDL susceptibility to oxidation **(Whelan and Rust 2006).**

MATERIALS AND METHODS:

Materials:

Cholesterol, casein, starch, vitamin mixture and salt mixturewere obtained from El-Gornhoriya, Company for Chemical and Medical Equipments, Cairo, Egypt. Portulacaoleracea, Asparagus *officinalis,Medicago sativa and Elettaria cardamomum* were obtained from the local market of Cairo, Egypt.

Animals

Thirty Female albino rats (140 ±10 g) of Sprague Dawley strain were obtained from the Laboratory of Animal Colony, Ministry of Health and Population, Helwan, Cairo, Egypt. The rats were kept under controlled conditions in plastic cages.

Diets

The basal diet consists of casein (12%), com oil (10%), methionin (0.3%) choline chloride (0.2%), vitamin mixture (l %) according to **Campbell (1963),** cellulose (5%), salt mixture(4%) according to **Hegsted *et al* (1941)** and corn starch (up to 100%),

Methods :

Induction of Hyperlipidemia:

High cholesterol diet was prepared by mixing cholesterol 2%, coconut oil 2% or 30 %, with standard powdered standard animal food. The diet was placed in the cage carefully and was administered for seven days **(Pandya *et al*., 2006).**

Experimental design

The experiment was conducted in the Agricultural Research Center, Animal Production Research Institute, Giza - Egypt. Rats were housed in wire cages in a room maintained at 25±2°C and kept under normal healthy conditions. All rats were fed on basal diet for one week before starting the experiment for acclimatization. After one-week period, the rats were fed on the hyperlipidemic diet except the first group fed on basal diet (control negative) and rats divided into 6 groups as follow:

Group1: Rats was fed on basal diet as negative control (healthy rats).

Group2: Rats was fed on hyperlipidemic diet as positive control hyperlipidemicrats).

Group3: hyperlipidemicH rats was fed on basal diet and 10%Portulacaoleracea.

Group4: hyperlipidemic rats was fed on basal diet with10% *Asparagus officinalis*.

Group5: hyperlipidemic rats was fed on basal diet with10% *Medicago sativa*.

Group6: hyperlipidemic rats was fed on basal diet with10% *Elettariacardamomum*.

Collection of blood:

On the 35 day, blood was collected by retero orbital sinus puncture, under mild ether anesthesia after 8 hr fasting and allowed to clot for 30 minutes at room temperature. Blood samples were centrifuged at 3000 rpm for 20 minutes. Serum was separated and stored at -20ºC until biochemical estimations were carried out.

Biological evaluation:

At the end of the experiment, biological evaluation of the different diets carried out by determination of daily feed intake (consumption), body weight gain (BWG) and feed efficiency ratio (FER) according to **Chapman *et al.* (1959)** using the following formula.

BWG = Final weight- initial weight

$$\text{Feed efficiency ratio (FER)} \quad \frac{\text{Body weight gain (g)}}{\text{Feed intake (g)}}$$

Biochemical assay:

The following determinations were carried out on serum samples :Serum cholesterol was determined according to **(Wotton, 1964).**Enzymatic determination of triglycerides in scrum was conducted according to**(VanHandel and Zilversmit, 1957).** HDL-

Cholesterol was determined after separation of high density lipoprotein and determination of cholesterol bound to this fraction**(Farish and Fletcher, 1983).** LDL-Cholesterol was determined according to the method of **Farish and Fletcher, (1983).** Albumin was determined according to the method described by **Doumas and Biggs, (1971).**Uric acid was estimated according to the method described by **Barham and Trinder (1972).** Creatinine was determined according to the method described by **Schimeister, (1971).**Colorimetric determination of the activity of GPT (ALT) and GOT (AST) activity were according to method described by **Reitman and Frankel (1957).** Urea was determined according to the method described by **Fawcett and Scott, (1960).**Prolactine and LH levels were determined according to **Hirai**(1982).

Statistical analysis

Statistical analysis were done using the Statistical Package for the Social Sciences (SPSS for WINDOWS, version 11.0; SPSS Inc, Chicago). Comparative analyses were conducted by using the general linear models procedure (SPSS Inc). Values of $P<0.05$ were considered statistically significant.

Results and discussion:

Biological Evaluation:

-Effect of Portulacaoleracea, Asparagus officinalis,Medicago sativa and ElettariacardamomumonFeed intake (FI), Feed efficiency ratio (FER) and Body weight gain (BWG):

Data in Table (1) indicated that the mean value of feed intake in the negative control group was 14.321 g/day, while the mean value of positive control group that is fed on basal diet containing 2% cholesterol was 12.213 g/day. The mean values of feed intake of hypercholesterolemic group fed on basal diet and 10 % *Portulacaoleracea* and *Asparagus officinalis* were 12.67 and 13.14 g/day respectively. while feed intake of hypercholesterolemic groups fed on 10 % *Medicago sativa and Elettariacardamomum*were 12.642 and 12.53 g/day respectively .From this table, It could be noted that there is no significant changes among all herbs group except the group of Portulacaoleracea , as compared to control group. For FER, there is no significant differences between all groups. BWG of the group fed on positive control showed significant increase as compared to negative group (control -). There is no significant changes between 10% Portula caoleracea and 10% *Asparagus officinalis*as compared with negative control while, there were significant differences between the other treated groups as compared with both control groups. The observed effect of tested herbs on feed intake and body weight (Table 1) in this study was agreed with that reported by **(Ruzickova, *et al* 2004)** who found that patients taking tested herbs at the rate of 10 g/day immediately before or during a meal did not increase their mean weight over 1 year; there is no significant mean change of -0.4 kg from baseline to 1 year. So, metabolic studies suggested tested herbs can reduce adiposity numbers and the contribution of adipose tissue to body mass.

Table (1)

Effect of Portulacaoleracea, Asparagus officinalis,Medicago sativa and Elettariacardamomumon feed intake (FI), feed efficiency ratio (FER) and body weight gain (BWG):

Groups	FI	FER	BWG
Negative control (G1)	14.321 ± 1.05 [a]	0.191 ± 0.011 [a]	42.27 ± 1.2 [b]
Positive control (G2)	12.213 ± 0.91 [b]	0.101 ± 0.01 [a]	47.86 ± 1.34 [a]
Rats fed on 10% Portulacaoleracea(G3)	12.67 ± 1.02 [b]	0.091 ± 0.07 [a]	41.91 ± 2.02 [b]
Rats fed on 10% *Asparagus officinalis* (G4)	13.14 ± 1.11 [a]	0.089 ± 0.08 [a]	41.1 ± 3.14 [b]
Rats fed on 10% *Medicago sativa*(G5)	12.642 ± 2.11 [b]	0.107 ± 0.12 [a]	38 ± 1.31 [c]
Rats fed on 10% *Elettariacardamomum* (G6)	12.53 ± 0.09 [b]	0.96 ±0.01 [a]	34 ± 6.31 [d]

Each value represent the mean of 5 rats ± SD. Values significantly different compared to normal: $P \leq 0.05$. Same letter means non-significant.

- Biochemical Analysis

-Effect of *Portulacaoleracea, Asparagus officinalis,Medicago sativa and Elettariacardamomum*on lipid profile of hypercholesterolemic rats.

Data in Table (2) showed that, total cholesterol and triglycerides levels (mg/dl) increased significant (P≤0.05) for rats fed on hypercholesterolemic diet (control positive), compared to healthy rats fed on basal diet (control negative).Total cholesterol and triglycerides decreased significantly (P≤0.05) when hypercholesterolemic rats fed on basal diet contained 10 % tested herbsin compared topositive control.The statistical analysis showed a significant increase in total cholesterol and triglycerides of all treated groups when compared with negative control. Treatments under study reduced serum cholesterol and triglycerides concentration. However, the highest reduction was achieved by feeding basal diet containing 10%Portulacaoleracea .

In accordance with the present results, Hirako et al. (2011) demonstrated that low-dose tested herbs diets improve lipid metabolism by modifying the expression of lipid metabolism-related genes in the liver and increasing fecal cholesterol excretion, while Carrepeiro et al., (2011) Combining statins and n-3 fatty acids is an excellent strategy to reduce plasma cholesterol and triacylglycerol concentration in women. However, n-3 fatty acids increased the oxidative stress and the pleiotropic effect of statins seemed to be not enough to counterbalance this result. The obtained data also suggested that the mechanism by which n-3 fatty acids interfere in oxidative stress can be associated with antioxidant enzymes expression and activity.The mean values of serum HDL-c of all treated rats with tested herbs were increased significantly ($P \leq 0.05$), as compared to control (+).Concerning the type oftested herbs, the highest mean value of HDL-c was obtained when rats were fed on10%Portulacaoleracea, while the lowest mean values of the same parameter was obtained when rats were fed on basal diet containing 10% Medicago sativa . From the obtained data, which indicated that, feeding rats with hyperlipidemic diet led to significant increase ($P \leq 0.05$) in LDL-c, compared with control negative group that fed on basal diet only.Low density lipoprotein-cholesterol (LDL-c) of hyperlipidemicrats fed on basal diet and 10%tested herbs decreased significantly ($P \leq 0.05$), compared with positive control. The mean values of the ratio between LDL-c/HDL-c of all rats with tested herbs were increased significantly $P \leq 0.05$, as compared to negative control.Rats fed on basal diet containing 10% tested herbs led to significant decrease of the ratio between LDL-c/HDL-c. The best mean value of the ratio between LDL-c/HDL-cwas observed in the group fed on basal diet containing 10% Asparagus officinalis.From the above mentioned data, it could be concluded that, total cholesterol, triglycerides, HDL-c, LDL-c and the ratio between LDL-c/HDL-c were more decreased in rats which fed on bashyperlipidemical diet with10% of tested herbs, and the results of these groups decreased more than the obtained from groups fed on hyperlipidemic diet withouttestedherbs.These results were in the same line of **Lee et al.,(2012)** which suggested that a dietary intervention focused on n-6 and n-3 fatty acids may improve cardiovascular risk factors in patients over and above standard lipid management. Also, Omega-3 polyunsaturated fatty acids (-3 PUFAs) from Portulacaoleracea and Elettariacardamomumhave been strongly associated with cardiovascular protection, even at low doses 5 g/d) **(Burillo et al.,2012)**. **Chen et al. (2012)** concluded that docosapentaenoic acid (DPA n-3), omega- 6 docosapentaenoic acid (DPA n-6) and docosahexaenoic acid (DHA), were beneficial in improving lipoprotein profile with DPA n-3 and DHA having better effect on aortic**.**

Table (2)

Effect of Portulacaoleracea, Asparagus officinalis,Medicago sativa and Elettariacardamomumon lipid profile of hypercholesterolemic rats.

Groups	**Total cholesterol**	**Triglyceride**	**HDL-c**	**LDL-c**	**LDL-C/HDL-c**
Negative control (G1)	89.78 ± 3.2 [e]	39.4 ± 0.9 [f]	60.58 ± 1.2 [a]	20.86 ± 0.2 [f]	0.34 ± 0.01
Positive control (G2)	206.3 ± 1.34 [a]	120.7 ± 3.4 [a]	28.38 ± 3.4	74.1 ± 2.3 [a]	2.61 ± 0.13 [a]
Rats fed on 10% *Portulacaoleracea*(G3)	115.3 ± 4.71 [d]	74.3 ± 1.34 [d]	45.97 ± 1.7 [b]	47.3 ± 5.6 [e]	1.03 ± 0.09 [e]
Rats fed on 10% *Asparagus officinalis* (G4)	133.04 ± 5.3 [c]	52.3 ± 3.4 [e]	40.3 ± 1.2 [c]	60.3 ± 3.5 [c]	1.5 ± 0.43 [c]
Rats fed on 10% *Medicago sativa* (G5)	147.29 ± 3.53 [b]	100.4 ± 2.4 [b]	33.82 ± 3.5 [d]	68.7 ± 1.3 [b]	2.02 ± 0.33 [b]
Rats fed on 10% *Elettariacardamomum* (G6)	121.29 ± 6.9 [d]	85.8 ± 2.8 [c]	40.71 ± 3.2 [c]	53.3 ± 4.7 [d]	1.31 ± 1.0 [d]

Each value represent the mean of 5 rats ± SD. Values significantly different compared to normal: $P \leq 0.05$. Same letter means non-significant.

-Effect of Portulacaoleracea, Asparagus officinalis,Medicago sativa and Elettariacardamomumon liver functions of hypercholesterolemic rats.

Results of aspartate amine transferase (AST) and alanine amine transferase(ALT) are presented in Table (3).hyperlipidemicrats (control+) showed significant increasing in both AST and ALT enzyme levels compared with the healthy rats (control -).Results obtained from this table stated that a significant increasing ($P \leq 0.05$) in the mean values of ALT enzyme in the group fed on hyperlipidemic diet (control +) compared with the other groups. Feeding hyperlipidemic rats with basal diet containing 10% *Portulacaoleracea* and *Elettariacardamomum* were the best mean values which obtained, because these treatments led to highest reduction in AST and ALT enzymes, as compared to other groups. **The obtained results were in parallel with Zhu *et al.*(2012)** found that Post-transplant parenteral nutritional support combined with omega-3 fatty acids can significantly improve the liver injury, reduce the infectious morbidities, and shorten the post-transplant hospital stay.

Table (3)
Effect of *Portulacaoleracea, Asparagus officinalis,Medicago sativa and Elettariacardamomum*on liver functions of hypercholesterolemic rats.

Groups	**AST**	**ALT**
Negative control (G1)	28.05 ± 1.3[c]	10.78 ± 0.94[c]
Positive control (G2)	37.21 ± 2.3[a]	16.01 ± 1.1[a]
Rats fed on 10% *Portulacaoleracea*(G3)	22.4 ± 5.3[d]	10.3 ± 0.91[c]
Rats fed on 10% *Asparagus officinalis* (G4)	29.31 ± 0.39[c]	14.44 ± 0.45[b]
Rats fed on 10% *Medicago sativa* (G5)	33.67 ± 0.9[b]	15.29 ± 0.3[a]
Rats fed on 10% *Elettariacardamomum* (G6)	22.1 ± 2.3[d]	10.43 ± 1.21[c]

Each value represent the mean of 5 rats ± SD. Values significantly different compared to normal: $P \leq 0.05$. Same letter means non-significant.

-Effect of Portulacaoleracea, Asparagus officinalis,Medicago sativa and Elettariacardamomumon kidney functions of hypercholesterolemic rats:

The effect of tested herbs on serum uric acid and urea nitrogen of hyperlipidemic rats fed on basal diet containing with 10 % tested herbs are presented in table (4). The mean values of serum uric acid and urea nitrogen (mg/dl) for experimental group that fed on basal diet only were 0.75 ± 0.32 and 14.7 ± 0.08, respectively, while uric acid and urea nitrogen of hypercholesterolemic rats (positive control) were 1.78 ± 0.31 and 26.6 ± 2.3, respectively.Results revealed that, rats with hyperlipidemicdiet (control +) led to a significant increase ($P<0.05$) in serum uric acid and urea nitrogen, when compared with (control -). The lowest mean values of serum uric acid of tested groups was observed in the groups (3) and (6), while the highest mean values was occurred whenhypercholesterolemic rats fed on hyperlipidemic diet containing 10% *Medicago sativa* **(**G5). Hyperlipidemicypercholesterolemic rats (control +) showed significant increasing in both creatinine and albumin levels as compared with the healthy rats (control -). Data showed that serum creatinine and albumin levels were decreased significantly (P≤0.05) in all tested groups that fed on 10% of tested herbsas compared with the control (+).

On other hand for albumin, there is no significant changes among all tested groups as compared both of control groups. These results matched with **Rossing *et al.* (1996)**whosuggested that dietary supplementation with n-3 polyunsaturated fatty acids (*Elettariacardamomum* and *Portulacaoleracea*) may have beneficial effects on kidney function as albumin and urea, arterial blood pressure, and dyslipidemia.

Table (4)

Effect of Portulacaoleracea, Asparagus officinalis,Medicago sativa and Elettariacardamomumon kidney functions of hypercholesterolemic rats**.**

Groups	**Uric acid**	**Urea Nitrogen**	**Creatinine**	**Albumin**
Negative control (G1)	0.75 ± 0.32 [d]	14.7 ± 0.08 [e]	0.83±0.12□	3.90±1.23□
Positive control (G2)	1.78 ± 0.31 [a]	26.6 ± 2.3 [a]	0.97± 0.03□	3.97±0.87□
Rats fed on 10% *Portulacaoleracea*(G3)	1.04 ± 0.25[c]	18.4 ± 2.2 [d]	0.76±0.31 [b]	3 ±0.44□
Rats fed on 10% *Asparagus officinalis* (G4)	1.23 ± 0.11[b]	21.9 ± 0.6 [c]	0.8±0.11 [b]	3.6±0.94□
Rats fed on 10% *Medicago sativa* (G5)	1.31 ± 0.41[b]	24.6 ± 1.4 [b]	0.9±0.22[a]	3.9±0.32□
Rats fed on 10% *Elettariacardamomum* (G6)	1.01 ± 0.06[c]	18.7 ± 2.7[d]	0.82±0.25 [b]	3.1±0.51□

Each value represent the mean of 5 rats ± SD. Values significantly different compared to normal: $P \leq 0.05$. Same letter means non-significant.

-Effect of *Portulacaoleracea, Asparagus officinalis,Medicago sativa and Elettariacardamomum*on Hormones femininity:

The effect of feeding different levels from tested herbs in hormones femininity (LH and PRL) of hyperlipidemicrats, are presented in Table (5) .The mean value of LH hormone for negative control was28.85±1.23, while it was 9.177±0.98 for hyperlipidemic group as positive control. Results in this table showed decreasing inLH hormone of control (+) as compared to control (-).All groups under test as treatment showed increasing inLH hormone values compared to positive control (+). There is no significant changes between groups (3 and 5) also, among the groups (1,4 and 6) .PRL hormone of the group fed on hyperlipidemic diet (control +) showed increase as compared to negative group (control -). Hyperlipidemic groups that fed on basal diet containing 10% tested herbs as treatment showed decreasing in PRL hormone values compared to the groups fed on hyperlipidemic diet as positive control.

There is no significant changes between groups (2 and 5) also, there is no significant changes among groups (3,4 and 6).**In the same line Staziaki *et al*. (2013)** who statedthat the positive effect of *Portulacaoleracea* and *Elettariacardamomum* supplementation (rich in omega-3 polyunsaturated fatty acids) onfemininity hormones behavior as LH and oxidative stress of Wistar female rats.

Table (5)

Effect of *Portulacaoleracea, Asparagus officinalis,Medicago sativa and Elettariacardamomum*on Hormones femininity**.**

Groups	LH	PRL
Negative control (G1)	28.85 ± 1.23^{a}	0.023 ± 0.002□
Positive control (G2)	9.177 ± 0.98^{c}	0.097 ± 0.01^{a}
Rats fed on 10% *Portulacaoleracea*(G3)	26.57 ± 0.78^{a}	0.037 ± 0.002^{b}
Rats fed on 10% *Asparagus officinalis* (G4)	17.24 ± 0.6□	0.043 ± 0.001^{b}
Rats fed on 10% *Medicago sativa* (G5)	14.66 ± 0.57^{b}	0.067 ± 0.001^{a}
Rats fed on 10% *Elettariacardamomum* (G6)	25.493 ± 0.72^{a}	0.035 ± 0.002^{b}

Each value represent the mean of 5 rats ± SD. Values significantly different compared to normal: $P \leq 0.05$. Same letter means non-significant.

Conclusions:

The study clearly demonstrates that Using ***Elettariacardamomum*** and ***Portulacaoleracea***as supplementation in the therapeutic diet menus during medical care of hyperlipidemic patients to maintain good health and improve of lipid profile, kidney function, liver functions and Hormones femininity levels in blood.

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دراسات بيولوجية على أوراق بعض النباتات على التمثيل الغذائي للدهون في الفئران

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ملخص البحث

الحد من تناول الدهون المشبعة، والكولسترول الغذائي وتجنب السعرات الحرارية الزائدة، التي يمكن أن تؤدي إلى السمنة، تظل حجر الزاوية في النهج الغذائية لخفض مخاطر الإصابة بأمراض الأوعية الدموية تصلب الشرايين .خلال السنوات ال ٢٠ الماضية، كان هناك اهتمام متجدد في المكونات الغذائية الأخرى التي قد تحسن بشكل ايجابي ملامح من المادة الدهنية وتقليل خطر الإصابة بأمراض القلب التاجية .(CHD) الأعشاب، مصادر غنية بالألياف الغذائية، وأثارت اهتماما كبيرا في كل من الدراسات الوبائية، التي تشير إلى تأثير إيجابي على أمراض الشرايين التاجية، والدراسات قسم التمثيل الغذائي، والتي تظهر تحسنا مدهشا في ملامح من المادة الدهنية في المرضى الذين يعانون دهون الدم .هذا البحث يهدف إلى دراسة الخصائص البيولوجية لل OLERACEA الرجلة، المخزنية الهليون، والحجازي ونبات الهال على الفئران دهون الدم .تم تقسيم ثلاثين ذكور الفئران البيضاء (٣٠ ذكور)، وزنها ١٤٠ ± ٥ Gإلى ٦ مجموعات وتدار ١٠٪ من الأعشاب اختبار يوميا لمدة ٢٨ يوما .وتم أخذ عينات الدم من كل فأر واختبار لمجموع الكولسترول في الدم، (LDL)، (HDL)والدهون الثلاثية، والأنشطة إنزيمات الكبد، وظائف الكلى، LH والهرمونات .وأظهرت النتائج أن الدهون الثلاثية، الكولسترول الكلي، الكولسترول، VLDL، والأنشطة إنزيمات الكبد AST) و (ALT وزادت بشكل ملحوظ، بينما انخفضت HDL بشكل كبير في مجموعة مراقبة إيجابية مقارنة مع الفئران السيطرة السلبية .علاج الفئران مفرط كوليستيرول الدم بنسبة ١٠٪ OLERACEAالرجلة، المخزنية الهليون، والحجازي ونبات الهال في النظام الغذائي مفرط كوليستيرول الدم تسبب تحسنا كبيرا في هذه التدابير البيوكيميائية وأفضل النتائج تحققت باستخدام النظام الغذائي القاعدي بنسبة ١٠٪ بقلة حمقاء .لذلك، يمكن أن نخلص إلى أن نبات الهال و OLERACEAالرجلة كانت أكثر فائدة للمرضى دهون الدم والوقاية من أمراض القلب وتصلب الشرايين.

الكلمات المفتاحية: الفئران مفرطة كوليستيرول الدم ، الرجلة ، مستوى الدهون