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Effect of feeding some herbs on serum liver enzymes, total cholesterol, triglycerides and lipoproteins in hypercholesterolemic rats

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ABSTRACT

The present work was carried out to study effects of feeding hypercholesterolemic rats with 3 herbs viz.: ginger, psyllium and coriander herbs, alone and in combination, mixed with the basal diet on serum liver enzymes, total cholesterol, triglycerides (TG) and lipoproteins. This study was conducted on 50 adult male rats divided into 10 equal groups. One group was fed on the basal diet only (control –ve). The other group was fed on the basal diet mixed with 1.5% cholesterol (control +ve). The remaining groups were fed on the basal +1.5% cholesterol + the studied herbs at 5 % and 10 %. After 6 weeks feeding on the experimental diets, all rats were weighed for calculation of body weight gain and food efficiency ratio. Blood samples were collected for estimation of liver enzymes, cholesterol, TG and lipoproteins in the serum. Histopathology of liver was also carried out. The obtained results revealed that feeding hypercholesterolemic rats on diets mixed with each of these herbs, alone or in combination at 5% and 10 %, improves the liver function as it lowers the elevated serum. AST and ALT enzymes. It induces also hypocholesterolemic and hypolipidmic effects. Moreover, it alleviates the histopathological changes in the liver induced by cholesterol feeding. However, it reduces daily food intake, body weight gain, food efficiency ratio and liver weight in the tested rats. It was concluded that feeding combined formula of ginger, psyllium, coriander each or combined at 5% and 10 % for 6 weeks may be useful in the management of cases suffering from hypercholesterolemia associated with elevated liver enzymes.

Key words: Ginger - Psyllium - Coriander - Liver enzymes - Histopathology - Rat

Introduction

Hypercholesterolemia which leads to atherosclerosis represents a major risk factor to coronary artery disease which develops as a result of increased plasma total cholesterol and LDL-c levels as well as LDL-c modification, such as oxidation or aggregation ***(Aviram, 1995 and Aviram and Fuhrman, 1998).*** In familial hypercholesterolemia, the lowering of serum cholesterol should be

started in childhood in order to prevent coronary artery disease in life ***(Gylling et. al., 1995).*** Preventative measures for lowering cholesterol should be started even in childhood to retard development of atherosclerosis ***(Waterlow, 1999 and Vuoria et.al., 2000).*** Dietary consumption of nutrients rich in polyphenolic flavonoids has been shown to be inversely associated with morbidity and mortality from coronary heart disease ***(Muldoon and Kritchevsky, 1996 and Fuhrman et.al., 2000).*** However, the antioxidant activity of different flavonoids is related to their different chemical structure as ***reported by Rice-Evan et.al. (1996).***

Different classes of flavonoids are present in medicinal plants, herbs, spices, fruits and vegetables. Polyphenolic flavonoids may prevent coronary heart disease by reducing platelets aggregation, by reducing damage from ischemia, by reducing plasma cholesterol levels or by inhibiting LDL-c ***oxidation (Aviram, 1996 and Aviram and Fuhrman, 1998).***

Ginger, psyllium and coriander are popular culinary and medicinal herbs commonly used in Egypt. It has been reported that ginger extract consumption produces an antioxidant activity, reduces plasma cholesterol and LDL-c levels and attenuates atherosclerosis ***(Tanabe et.al., 1993; Bhandari et.al., 1998 and Fuhrman et.al, 2000).*** Psyllium feeding was found to lower plasma cholesterol and lipids by altering hepatic and bile acid metabolism in rats ***(Stoy et.al., 1993 and Daggy et.al., 1995) and in guinea pigs (Romero et.al., 2002).*** Feeding hypercholesterolemic rats diet contained coriander seeds caused hypolipidmic and hypocholesterolemic effects by enhanced hepatic bile acid synthesis. Moreover, the increased degradation of total cholesterol to fecal bile acids appeared to account for its hypocholesterolemic effect ***(Chithra and Leelamma, 1997 and Chithra and Leelamma, 1999).***

The purpose of this work is to study the effect of feeding experimental diets mixed with ginger, psyllium and coriander herbs, alone and in combination at 5 % and 10 %., on serum liver enzymes and lipid profile in hypercholesterolemic rats.

Material and Methods

Materials:

Plants:

The studied herb samples are ginger roots (Zingiber officinalis, Family Zingibaracae), psyllium seed husks (Plantago ovata Forks, Family Plantaginaceae) and coriander seeds (Coriandrum sativum, Family Apiaceae). These herbs were obtained from the local market.

Cholesterol:

It was purchased from El-Gomhorya Company for Chemical Industries, Cairo, Egypt as a pure white powder packed in plastic bottles.

Rats:

Male mature albino rats (150 – 200 gm b.wt. and 14 – 16 weeks age) of Sprague Dawley strain were obtained from the Laboratory Animal Colony, Helwan, Egypt. Rats were kept in plastic cages under strict hygienic conditions, fed on the basal diet and water was supplied ad libitum. Animals were left for one week before start of the experiment for acclimatization. Rats were weighed after one week separately then were weighed once a week for six weeks during the experimental period.

METHODS:

Preparation of basal diet:

The basal diet was prepared according to ***Reeves et.al. (1993).*** It consisted of 20 % protein (casein), 10% sucrose, 4.7% corn oil, 2% choline chloride, 1% vitamin mixture, 3.5 % salt mixture and 5% fibers (cellulose). The remainder was corn starch up to100 %.

Experiment:

Fifty mature male albino rats were divided into two main groups; the first group (5 rats) was fed on basal diet and kept as a negative control (C-ve).

The second group (45 rats) was fed on basal diet mixed with cholesterol at 1.5 % concentration for 4 weeks before feeding the tested herb supplemented diets for induction of hypercholelesterolemia according to the method of Shinnick *et.al.* (1990). Hypercholesterolemic rats were divided into 9 groups and fed experimental diets for six weeks as follow:

Group 1: hypercholesterolemic standard, control (+ ve) group
Group 2: Fed on basal diet + 5 % ginger powder
Group 3: Fed on basal diet + 10 % ginger powder
Group 4: Fed on basal diet + 5 % psyllium powder
Group 5: Fed on basal diet + 10 % psyllium powder
Group 6: Fed on basal diet + 5 % coriander powder
Group 7: Fed on basal diet + 10 % coriander powder
Group 8: Fed on basal diet + 5 % mixture of the 3 tested herbs
Group 9: Fed on basal diet + 10 % mixture of the 3 tested herbs

Blood sampling:

At the end of the experiment, rats were fasted overnight and anesthetized with chloroform. Blood samples were collected from hepatic portal vein into clean dry centrifuge tubes. Blood was centrifuged for 10 minutes at 3000 r.p.m. to separate serum which was kept in tubes at -18 °c till biochemical analysis. Liver, kidneys, spleen and heart were taken, washed with saline solution (10% NaCl) and dried with filter paper, then weighed and kept in 10% neutral buffered formalin till histopathological examination.

To calculate body weight gain (BWG) and food efficiency ratio (FER), the following equations were used:

$$\text{BWG \%} = \frac{\textbf{Final weight – Initial weight}}{\text{Initial weight}} \times 100$$

$$\text{FER} = \frac{\text{Gain in body weight (g)}}{\text{Food intake (g)}}$$

Chemical analysis of herbs:

Crude protein, fat, moisture and ash were determined in ginger, psyllium and coriander according to the methods described in A.O.A.C. (1994). The fiber content was determined according to the method described by Pearson (1970). Carbohydrates were estimated by difference as follows:

% carbohydrate = 100 – (% protein + % fat + % fibers + % moisture + % ash)

Biochemical analysis:

Serum aspartate and alanine amino transferase enzymes (AST and ALT) were determined according to ***Bergmeyer et.al. (1978)*** and alkaline phosphatase enzyme ***according to King (1965).*** Serum total cholesterol was calorimetrically determined according to ***Richmond (1973)*** and triglycerides according to ***Wahlefeld (1974).*** High density lipoprotein cholesterol (HDL-c) was determined spectrophotometrically according to ***Richmond (1973).*** Very low density lipoprotein cholesterol (VLDL-c) and low density lipoprotein cholesterol (LDL-c) were carried out according to method of Lee and ***Nieman (1996)*** as follow:

$$\text{VLDL-c} = \frac{\text{Triglycerides}}{5}$$

LDL-c = Total cholesterol – (VLDL-c + HDL-c)

Histopathological examination:

Specimens from the livers were taken immediately after sacrificing the rats and immersed in 10 % neutral buffered formalin. The fixed specimens were then trimmed, washed and dehydrated in ascending grades of alcohol then cleared in xylene, embedded in paraffin, sectioned at 4-6 micron thickness and stained with Hematoxylen and Eosin according to the method described by ***Carleton (1979)*** then examined microscopically.

Statistical analysis:

Data were presented as means ± SEM and statistically analyzed using one way ANOVA test according to Snedecor and ***Cochran (1980).***

Results and Discussion

Chemical Composition:

Chemical composition of ginger, psyllium and coriander (g/100g w/w) was presented in Table (1). Data showed that ginger, psyllium and coriander contain 10.0g , 15.67g and 12.0g crude protein ; 6.1g , 0.0g and 18.0g fat ; 14.2g, 7.6g and 42.0g fibers ; 6.1g , 2.45g and 6.0g ash ; 9.0g , 9.4g and 9.1g moisture and 54.6g , 64.88g and 12.9g carbohydrates.

Effect on food intake, body weight gain and food efficiency ratio:

Data in Table (2) denotes the growth performance caused by diets mixed with the studied herbs in terms of food intake, body weight gain and food efficiency ratio. Food intake in the control + ve group (12.3 g/day) was less than that in the control –ve group (14.4 g/day). Rats consumed more diet when mixed with ginger, psyllium or coriander at 5 % and 10 % (ranged from 13.4 to 14.7 g/day), while consumed less diet when mixed with all studied herbs at 5 % (12.2 g/day) or 10 % (12.1 g/day). Body weight gain of hypercholesterolemic rats fed on 10 % ginger or 5 % and 10 % psyllium or 10 % coriander showed a significant ($P< 0.05$) decrease as compared to the control +ve group. Rats fed on a mixture of all 3 studied herbs at 5% and 10 % significantly gained less weight as compared to the control +ve group. Food efficiency ratios were significantly lower in the groups

fed on ginger, psyllium or coriander either alone or in combination at 5% and 10 % as compared to the control +ve group. Nearly similar results were obtained by previous studies on ginger ***(Uma et.al.1993; Bhandari et.al., 1998 and Weidner and Sigwart, 2000),*** on psyllium ***(Anderson et.al. 1994, Daggy et.al., 1995 and Arjmandi et.al., 1997)*** and on coriander ***(Chithra and Leelamma, 1995 and Chithra and Leelamma 1999).***

Effect on organs weight /body weight:

It is clear from Table (3) that dietary intake of the studied herbs either alone or in combination did not affect the weights of kidneys, heart and spleen. Dietary intake of cholesterol significantly increased the liver weight of hypercholesterolemic rats, whereas dietary intake of ginger, psyllium and coriander significantly decreased the liver weight of these rats. These results were similar to those reported by ***Weidner and Sigwart (2000)*** on ginger, by ***Buhman et.al., (2000)*** on psyllium and by ***Chithra and Leelamma (1999)*** on coriander. The authors reported that feeding ginger, psyllium or coriander at 10 % significantly decreased the relative weight of liver in rats.

Biochemical Analysis:

From data presented in Table (4) it could be noticed that serum aspartate and alanine aminotransferase (AST and ALT) enzymes significantly decreased in serum of hypercholesterolemic rats fed basal diet mixed with ginger, psyllium or coriander alone and in combination at 5% and 10 % as compared to the control +ve group. There were no significant changes in levels of alkaline phosphatase (ALP) enzyme between herb- fed groups and the control +ve group. Dietary intake of mixture of all studied herbs at 5% and 10 % caused the highest reduction in levels of both AST and ALT enzymes. These findings agree with those reported by ***Bhandari et.al. (2003) and Yemitan and Izegbu (2006)*** who concluded that ginger induces a hepatoprotective effect in Ccl4-hepatotoxified rats as it reduces both AST and ALT enzymes. Concerning psyllium, ***Arjmandi et.al. (1997)*** reported that dietary intake of psyllium significantly reduced both AST and ALT enzymes in rats. Studies by ***Jelodar and Nazifi (1998) and Chithra and Leelamma (1999)*** showed that feeding coriander to rats lowered AST and ALT enzymes in the serum.

Results recorded in Table (5) show that feeding basal diet mixed with ginger, psyllium or coriander alone and in combination at 5% and 10 % to hypercholesterolemic rats significantly decreased the levels of total cholesterol and triglycerides in the serum as compared to the control +ve group. The hypocholesterolemic effect of ginger was similar to that reported by ***Fuhrman et.al. (2000) and Thomson et.al. (2002) in rats. Concerning psyllium, Anderson et.al. (1994), Daggy***

et.al. (1995), Arjmandi et.al. (1997) and Anderson et.al. (2000) reported the cholesterol lowering effect of psyllium intake in rats, men and women. Regarding coriander, ***Chithra and Leelamma (1995) and Chithra and Leelamma (1997)*** found that coriander seeds produced both hypolipidmic and hypocholesterolemic effects in rats.

Table (6) shows that feeding ginger or psyllium or coriander at 10 % and combination of all these herbs at 5% and 10 % to hypercholesterolemic rats caused significant decreases in levels of HDL-c and LDL-c in the serum. These findings agree with those obtained by ***Fuhrman et.al. (2000)*** who concluded that ginger extract consumption inhibits LDL-c oxidation and attenuates development of atherosclerosis in atherosclerotic, apolipoprotein E-deficient mice. Moreover, ***Bhandari et.al. (2003)*** reported that feeding of ginger to rats produced a hepatoprotective effect and reduced serum LDL-c in Ccl4-hepatotoxified rats. Regarding psyllium, Turley and ***Dietschy (1995)*** concluded that LDL-cholesterol lowering action of psyllium in the hamster is mediated through two mechanisms, the major effect is exerted at the level of LDL-c production. Concerning coriander, ***Chithra and Leelamma (1995) and Chithra and Leelamma (1997)*** found that coriander seeds induced a hypolipidmic effect and caused changes in the levels of lipid peroxides and activity of antioxidant enzymes in experimental animals.

Histopathological examination:

Microscopic examination of liver of control - ve untreated rats revealed the normal histological picture of hepatic lobule which consists of central vein surrounded by normal hepatocytes as shown in Fig (1). Examination of liver of hypercholesterolemic rats showed vacuolar degeneration of the hepatocytes, activation of epithelial lining of bile duct and few leucocytic infiltrations in portal area as shown in Fig. (2). When ginger was fed to rats, the examination of liver revealed no histopathological lesions (Fig. 3).This finding agrees with that obtained by Al-***Naqeeb et.al. (2003)*** who found that oral (500mg/kg) or intraperiotonial (50mg/kg) administration of ginger aqueous extract to female rats caused no toxicity and no histopathological changes in liver and lungs.

In hypercholesterolemic rats fed on psyllium at 5% and 10 %, the liver showed only little hydropic degeneration in some hepatocytes as shown in Fig (4). This finding agrees with conclusion of ***Anderson et.al. (1994) and Arjmandi et.al. (1997)*** who mentioned that psyllium is a plentiful source of soluble fibers and its consumption caused an improvement of liver function and histology. When coriander was fed to hypercholesterolemic rats, the examination of liver revealed vacuolar degeneration of hepatocytes (Fig.5). No available data concerning the effect of coriander on histology of liver could be obtained. In hypercholesterolemic rats fed on a combined formula of

ginger, psyllium and coriander at 5% 10 %, the liver examination revealed apparently normal hepatic lobule as shown in Fig.(6).

In conclusion, feeding hypercholesterolemic rats on basal diet mixed with each of ginger, psyllium or coriander alone or in combination at 5% and 10 % for 6 weeks improves liver function as it lowers the elevated AST and ALT enzymes in the serum. It also causes hypocholesterolemic and hypolipidmic effects as it lowers serum levels of total cholesterol, triglycerides, HDL-c and LDL-c. Moreover, it alleviates the histopathological changes induced by cholesterol feeding. Therefore, consumption of combined formula of ginger, psyllium and coriander at 10 % for 6 weeks may be useful in management of cases of hypercholesterolemia associated with elevated liver enzymes.

Table (1): Chemical composition of ginger, psyllium and coriander (g/100g, w/w).

COMPOSITION / HERBS	Protein	Fat	Fibers	Ash	Moisture	Carbohydrates
Ginger	10.00	6.1	14.20	6.1	9.00	54.6
Psyllium	15.67	0.0	7.60	2.45	9.40	64.88
Coriander	12.00	18.0	42.0	6.0	9.10	12.90

Table (2): Effect of diets supplemented with some herbs on food intake (FI), body weight gain (BWG) and food efficiency ratio (FER) of hypercholesterolemic rats. (n = 5 rats)

Groups	Paramers		
	Mean FI (g/day)	BWG (%) Mean ± SEM	FER Mean ± SEM
Control – ve	14.401	8.60 ± 0.23 c	0.597 ± 0.03 c
Control + ve	12.312	10.88 ± 0.31 a	0.883 ± 0.04 a
Ginger at 5%	13.433	10.72 ± 0.21 a	0.725 ± 0.07 b
Ginger at 10 %	14.744	9.52 ± 0.53 b	0.704 ± 0.01 b
Psyllium at 5%	13.521	8.95 ± 0.26 c	0.628 ± 0.03 c
Psyllium at 10%	14.231	8.95 ± 0.26 c	0.628 ± 0.03 c
Coriander at 5%	14.225	10.53 ± 0.42 a	0.740 ± 0.02 b
Coriander at 10 %	14.511	8.62 ± 0.16 c	0.594 ± 0.05 c
Mixture of all herbs at 5%	12.223	8.65 ± 0.25 c	0.566 ± 0.02 c
Mixture of all herbs at 10%	12.123	8.65 ± 0.26 c	0.625 ± 0.02 c
L.S.D.	——	1.325	0.073

significantly at P< 0.05

L.S.D.: Least significant difference

Table (3): Effect of diets supplemented with some herbs on weights of some internal organs relative to body weight of hypercholesterolemic rats. (n = 5 rats) Values in each column with different letters differ significantly at $P< 0.05$

Groups	Relative internal organs weights (gm)			
	liver	kidneys	spleen	heart
Control – ve	7.18 ± 0.02 c	1.50 ± 0.01 a	0.94 ± 0.03 a	1.00 ± 0.03 a
Control + ve	9.02 ± 0.03 a	1.52 ± 0.04 a	0.84 ± 0.01 a	0.84 ± 0.04 a
Ginger at 5%	8.88 ± 0.01 b	1.56 ± 0.02 a	0.86 ± 0.04 a	0.86 ± 0.02 a
Ginger at 10 %	5.92 ± 0.04 d	1.62 ± 0.04 a	0.86 ± 0.02 a	0.86 ± 0.03 a
Psyllium at 5%	6.68 ± 0.03 d	1.54 ± 0.02 a	0.85 ± 0.05 a	0.86 ± 0.02 a
Psyllium at 10%	5.78 ± 0.01 d	1.52 ± 0.05 a	0.88 ± 0.04 a	0.82 ± 0.04 a
Coriander at 5%	6.69 ± 0.02 d	1.56 ± 0.04 a	0.82 ± 0.01 a	0.87 ± 0.03 a
Coriander at 10 %	6.72 ± 0.04 d	1.58 ± 0.04 a	0.88 ± 0.01 a	0.88 ± 0.01 a
Mixture of all herbs at 5%	6.80 ± 0.01 d	1.58 ± 0.02 a	0.90 ± 0.03 a	0.78 ± 0.01 a
Mixture of all herbs at 10%	5.64 ± 0.03 d	1.54 ± 0.06 a	0.88 ± 0.02 a	0.88 ± 0.04 a

Table (4): Effect of diets supplemented with some herbs on serum levels of aspartate aminotransaminases (AST), alanine amino- transferase (ALT) and alkaline phosphatase (ALP) enzymes in hypercholesterolemic rats. (n = 5 rats)

Groups	AST (IU/L)	ALT (IU/L)	ALP (IU/L)
Control – ve	66.6 ± 1.8 d	35.5 ± 1.6 e	85.5 ± 1.9 a
Control + ve	130.6 ± 2.1 a	69.5 ± 2.4 a	86.4 ± 2.7 a
Ginger 2.5%	125.6 ± 2.3 b	64.5 ± 2.8 b	85.7 ± 2.5 a
Ginger at 5%	115.3 ± 2.4 c	45.7 ± 2.2 c	86.3 ± 2.8 a
Psyllium at 5%	124.8 ± 2.1 b	63.5 ± 2.6 b	84.8 ± 2.2 a
Psyllium at 10 %	114.5 ± 1.6 c	44.5 ± 1.9 c	86.5 ± 1.2 a
Coriander at 5%	126.7 ± 2.6 b	65.3 ± 2.2 b	86.2 ± 2.8 a
Coriander at 10%	106.3 ± 2.5 c	46.6 ± 2.2 c	85.8 ± 2.6 a
Mixture of all herbs at	105.4 ± 2.3 c	34.6 ± 2.5 d	86.1 ± 2.6 a
Mixture of all herbs at 10 %	100.7 ± 2.4 d	29.3 ± 2.7 d	86.7 ± 2.2 a

Values denote means ± SEM.

Means with different letters in the same column differ significantly at $p < 0.05$ using one way ANOVA test, while those with similar letters are non significant

Table (5): Effect of diets supplemented with some herbs on serum levels of total cholesterol and triglycerides in hypercholesterolemic rats. (n = 5 rats)

Groups	Total cholesterol (mg/dL)	Triglycerides (mg/dL)
Control – ve	90.98 ± 1.4 d	53.33 ± 1.5 b
Control + ve	105.95 ± 1.6 a	56.62 ± 1.9 a
Ginger 5%	101.97 ± 1.8 b	52.60 ± 1.4 b
Ginger 10%	98.90 ± 1.2 c	49.50 ± 1.2 c
Psyllium 5%	102.26 ± 1.3 b	53.30 ± 1.4 b
Psyllium 10%	95.90 ± 1.5 c	46.50 ± 1.3 c
Coriander 5%	101.68 ± 1.3 b	52.90 ± 1.5 b
Coriander 10%	101.86 ± 1.4 b	51.80 ± 1.2 b
Mixture of all herbs at 5%	93.45 ± 1.2 d	42.50 ± 1.4 d
Mixture of all herbs at 10%	91.45 ± 1.1 d	40.50 ± 1.4 d

Values denote means ± SEM.
Means with different letters in the same column differ significantly at $p < 0.05$ using one way ANOVA test, while those with similar letters are non significant.

Table (6): Effect of diets supplemented with herbs on serum lipoprotein fractions (HDLc. LDLc and VLDLc) in hypercholesterolemic rats. (n = 5 rats)

groups	Lipoprotein fractions (mg/dl)		
	HDLc.	LDLc.	VLDLc.
Control - ve	63.96 ± 1.1 c	16.35 ± 1.2 b	10.67 ± 1.1 a
Control + ve	75.69 ± 1.2 a	19.94 ± 1.4 a	10.32 ± 1.6 a
Ginger at 5%	74.75 ± 1.3 a	17.70 ± 2.3 a	9.52 ± 2.8 a
Ginger at 10 %	72.80 ± 1.3 b	16.10 ± 1.3 b	9.90 ± 1.1 a
Psyllium at 5%	74.70 ± 1.7 a	17.80 ± 1.3 a	9.86 ± 1.8 a
Psyllium at 10%	70.10 ± 1.2 b	16.50 ± 1.4 b	9.30 ± 2.1 a
Coriander at 5%	74.20 ± 1.7 a	18.50 ± 1.3 a	10.98 ± 1.8 a
Coriander at 10 %	72.30 ± 1.8 b	16.60 ± 2.3 b	12.16 ± 1.2 a
Mixture of all herbs at 5%	70.35 ± 1.4 b	14.60 ± 1.3 c	8.50 ± 3.1 a
Mixture of all herbs at 10%	68.85 ± 1.6 c	13.50 ± 1.3 c	8.10 ± 2.2 a

HDLc. = High density lipoprotein cholesterol

LDLc. = Low density lipoprotein cholesterol

VLDLc. = Very low density lipoprotein cholesterol

Values denote means ± SEM.

Means with different letters in the same column differ significantly at $p < 0.05$ using one way ANOVA test, while those with similar letters are non significant.

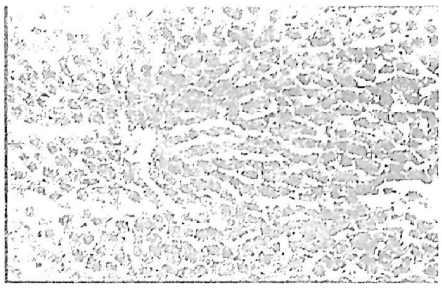

Fig (1): liver of normal control – ve rats showing normal histology of hepatic lobule (H&E X 200)

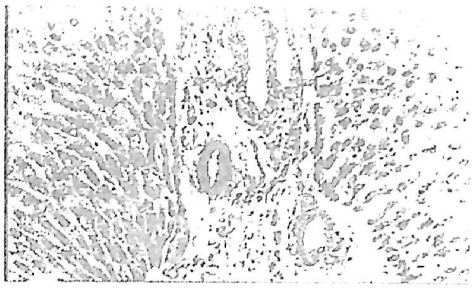

Fig (2): liver of

hypercholesterolemic rats showing vacuolar degeneration of the hepatocytes, activation of epithelial lining of bile duct and few leucocytic infiltration in portal area (H&E X 200)

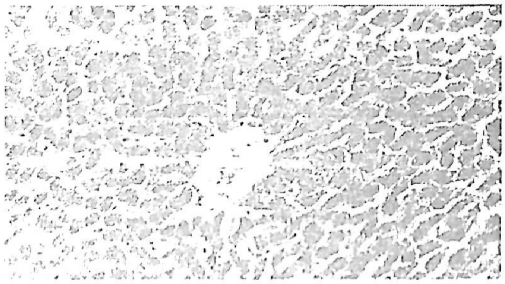

Fig (3): liver of rats fed on ginger 10% showing no histopatnologierul lesions (H&E X 200)

Fig (4): liver of rats fed on psyllium 10% showing little hydropic degeneration of some hepatocytes degeneration of some hepatocytes (H&E X 200)

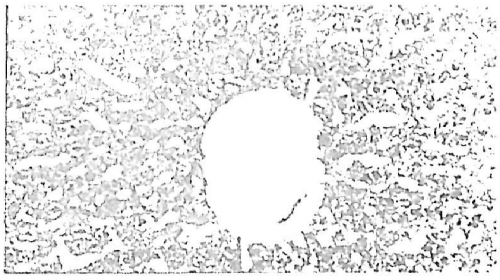

Fig (5):liver of rats fed on coriander 10% showing vacuolar degeneration of hepatocytes (H&E X 200)

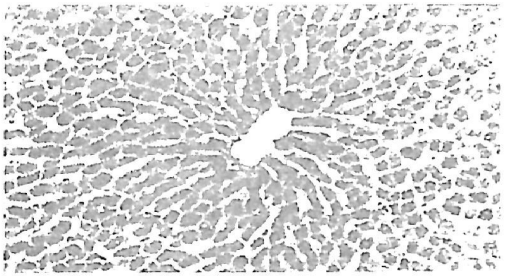

Fig (6): liver of rats fed on basal diet mixed with 10% of ginger+ 10% psylliumt +10% coriander show no histopatholgical lesions

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تأثير التغذية ببعض الأعشاب على إنزيمات الكبد ، الكوليسترول الكلى ،الجلسريدات الثلاثية واللبيوبروتينا ت فى مصل الفئران المصابة بارتفاع مستوى الكوليسترول

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الملخص العربى

أستهدف هذا البحث دراسة تأثير التغذية بثلاثة أعشاب هى الزنجبيل ، القطونة والكزبرة – إما منفردة أو مجتمعة بتركيز ٥٪ أو١٠٪ عند إضافتها الى الغذاء الاساسى– على إنزيمات الكبد، الكوليسترول الكلى ، الجلسريدات الثلاثية واللبيوبروتينا ت فى مصل الفئران المصابة بارتفاع مستوى الكوليسترول. أجريت الدراسة على ٥٠ فأر ذكر تم تقسيمها الى ١٠ مجموعات . مثلت المجموعة الضابطة السالبة ٥ فئران وتم تغذيتها على العليقة الاساسية فقط ، واحدى المجموعات مثلت المجموعة الضابطة الموجبة وتم تغذيها على العليقة الاساسية مضافا إليها الكوليسترول بتركيز ٥،١ ٪ ، وباقى المجموعات تم تغذيها على العليقة الاساسية مضافا إليها الكوليسترول واعشاب الدراسة اما منفردة أو مجتمعة بتركيزى ٥٪ و١٠٪ ، وتمت التغذية لمدة٦ اسابيع . وفى نهاية التجربة تم حساب معدل الزيادة فى وزن الجسم ومعدل كفاءة تحويل الغذاء وكذا الوزن النسبى للأعضاء الداخلية ، و ثم إجراء الفحص الهستوباثولوجى للكبد . وتم أخذ عينات دم لقياس مستوى إنزيمات الكبد، الكوليسترول الكلى ، الجلسريدات الثلاثية واللبيوبروتينا ت فى المصل. وأظهرت النتائج أن تغذية الفئران المصابة بإرتفاع مستوى الكوليسترول على عليقة مضاف إليها الزنجبيل ، القطونة أوالكزبرة بتركيز ٥٪ و١٠٪ لمدة ٦ اسابيع أدت الى نقص معنوى فى مستوى إنزيمات الكبد (أسبرتات أمينوترانسفيريز و ألانين أمينو ترانسفيريز) فى المصل . كما أدت الى نقص معنوى فى مستويات الكوليسترول الكلى ، الجلسريدات الثلاثية و اللبيوبروتين منخفض الكثافة (الكوليسترول السيئ) . وبالإضافة الى ذلك فإن تغذية الفئران على هذه الأعشاب أدت الى قلة أوإختفاء التغيرات الهستوباثولوجية فى كبد الفئران المصابة بإرتفاع مستوى الكوليسترول. كما أدت التغذية لمدة ٦ اسابيع على أعشاب الزنجبيل ، القطونة والكزبرة المضافة على العليقة الى نقص معنوى فى معدل إستهلاك الغذاء، معدل الزيادة فى وزن الجسم ، معدل كفاءة تحويل الغذاء والوزن النسبى للكبد. ويتضح من هذه التجربة أن تناول تركيبة مكونة من أعشاب الزنجبيل ، القطونة والكزبرة بتركيز ٥%، ١٠% منفردة أو مجتمعة لمدة ٦ أسابيع قد يفيد فى التعامل مع الحالات المصابة بإرتفاع كوليسترول الدم المصاحب بإرتفاع إنزيمات الكبد .