To investigate effects of a shifting high fat diet to normal fat diet supplemented with magnesium, zinc and chromium on biochemical parameters in rats with diabetes

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Several minerals play an important role in modulating blood glucose and thyroid hormones. The aim of this study was to investigate the effect of individual and combined minerals; chromium (Cr), magnesium (Mg) and zinc (Zn) on blood glucose, lipid profile, kidney and liver functions, T₃, T₄ and TSH among obese diabetic rats. The study was carried out on 66 male Wistar rats (150-160g) for 90 days on two stages. First stage included 66 rats (6 of which were control) which were fed on a high fat diet (19% hydrogenated fats and 1% corn oil as a source of essential fatty acids) for 45 days. Second stage of the study included the same 66 rats (6 of which were control) which were injected with (150 mg Alloxan / kg b.w) to induce experimental diabetes and were then fed normal levels of dietary fat supplemented with individual and combined minerals; Cr, Mg and Zn at two levels (high and low). Results indicate that in the positive control rat group (PC) there was elevated cholesterol and triacylglycerol levels. While, rat groups supplemented with combined elements (at low and high levels) led to lowering cholesterol and triacylglycerol significantly (p < 0.05). In particular, Cr had improved triacylglycerol status. The vice versa was noticed in rat groups fed on diets supplemented with individual trace elements. Lipoprotein levels were increased in individual supplementation with zinc (20mg) and at higher levels of Mg, Zn and Cr. Cr, at higher levels (200 µg) led to significant reduction of the VLDL-C compared with negative control (NC) group. Uric acid, urea nitrogen and creatinine were decreased significantly with diets supplemented with individual Zn at higher levels (20mg/ kg b.w). The combination at high levels showed reduction of uric acid, urea nitrogen and creatinine compared to NC. Conclusion: our results indicate that diets supplemented with combined elements led to improving the tested parameters in this study.

Key words: diabetes mellitus, rats, alloxan, lipid profile, liver function, thyroid hormones
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Is There a Relationship between the Types of Oil Consumed and Brain and Serum Lipid Profile of Hyperlipidemic Rats?

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Abstract

The aim of this study is looking at the effects of olive, flaxseed, and sesame oils on brain and serum cholesterol and triacylglycerol levels of hyperlipidemic rats. In the first place oils were chemically analysed for fatty acid composition. Rats were then fed on a diet containing 10% of the oils for a period of 12 weeks apart from positive control group which fed on standard high fat diet. The rats were then decapitated; brains were removed, and weighed, blood was collected for analyses. Cholesterol and triacylglycerol levels in the serum of all animals received different dietary oils were decreased significantly (P=0.05) relative to the negative control group. On the other hand, brain cholesterol and triacylglycerol levels of all animals received the dietary oils were not significantly affected. Serum cholesterol level of the rats fed on olive oil was significantly lower than that of the other groups. Moreover, those fed on flaxseed oil diet had the lowest level of triacylglycerol comparing with other groups. Furthermore, it is concluded that brain lipid levels of rats are not connected with serum levels that differently affected by various dietary oils. Histological results showed a marked to slight improvement of brain tissues responding to flaxseed oil, and olive oil respectively. But slight histopathological changes were noticed in sesame oil diet group.

Keywords: Olive oil, flaxseed oil, sesame oil, cholesterol, triacylglycerol, rats, Hyperlipidemia, brain, serum.
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Carbon tetrachloride-induced liver disease in rats: the potential effect of supplement oils with vitamins E and C on the nutritional status

Leberschädigung durch Tetrachlorkohlenstoff bei Ratten: der Einfluss von Nahrungsöl sowie Vitamin E und C auf den Ernährungsstatus

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Abstract

The aim of the present investigation was to study the effects of olive oil (OO), corn oil (CO), and flaxseed oil (FO), with or without supplementation of vitamins E and C, on food intake, body weight gain %, liver weight to body weight %, total lipids, liver functions, and liver histology in male rats intoxicated with carbon tetrachloride (CCl₄). Forty-two rats were divided into two main groups. The first main group was fed on basal diet (BD) as a negative control group (NC). The second main group received subcutaneous injections of CCl₄ in paraffin oil (50% v/v 2ml/kg) twice a week to induce chronic damage in the liver. The group was then divided into six subgroups, three of which were fed on 4% unsupplemented oils (CO, FO, and OO) as positive control for the three oils used. The rest of the groups were fed on 4% of the same oils supplemented with vitamins E and C. The results of the flaxseed oil rat group indicate that supplementing vitamin E and C led to a significant reduction in the mean values of total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), and liver alanine amino transferase enzyme (ALT). Moreover, it caused an increase of the mean value of high-density lipoprotein cholesterol (HDL-C) as compared to the negative control group (NC). The olive oil group supplemented with the same vitamins showed a significant decrease in the mean value of serum TC and significant (P<0.05) increase in the mean value of serum HDL-C as compared to NC. The results of the corn oil group supplemented with vitamins showed a significant increase in the mean value of serum HDL-C as compared to the negative control group. The histology results confirmed that the group hepatically injured with CCl₄ treatment and fed on supplemented FO or OO showed apparently normal hepatocytes. Conclusion: The most effective treatment was observed with oils supplemented with vitamins E and C. Hierarchically FO achieved the best results compared to other additives, followed by OO and finally CO showing the least effective treatment among the observed groups.

Keywords: chronic liver disease, rats, vitamin E, vitamin C, lipid profile, liver functions
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Switching to Black Rice Diets Modulates Low-Density Lipoprotein Oxidation and Lipid Measurements in Rabbits

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Abstract:
The effect of white and black rice consumption on lipid profile, hydroperoxides, thiobarbituric reactive substances and oxidized low-density lipoprotein (LDL) induced by hypercholesterolemia was investigated in 24 male rabbits; a purified normal diet (NC, n = 6), a high fat/cholesterol (1.0 g/100 g) diet (PC group, n = 6), a high fat/cholesterol diet with 25 g/100 g white ground rice (PCWR group, n = 6), 25 g/100 g black ground rice (PCBR group, n = 6) for 10 weeks. Blood samples were collected for lipid measurements. Results indicate that serum high-density lipoprotein-cholesterol was higher (P <0.05) in the PCBR compared with the PC and PCWR groups. Hydroperoxides and thiobarbituric reactive substances were significantly lower (P< 0.05) in the PCBR compared with PCWR and PC groups. Cyanidin-3-glucoside (Cy-3-Glu) and peonidin-3-glucoside have been tested in vitro against copper-mediated low-density lipoprotein. Cy-3-Glu was excelled peonidin-3-glucoside by increasing the lag time of NC from 80 to 500 minutes in the presence of 2.0 µM of Cy-3-Glu. Hierarchically, black rice rabbits group was given the best results compared with other groups. The results may be indicating to a suggested mechanism (anthocyanins protection; Cy-3-Glu) of the cardioprotective effect of black rice.

Key Indexing Terms: Rice; Lipid profile; Rabbits; Oxidized LDL; Anthocyanins.

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Re-Evaluation of Individual and Combined Garlic and Flaxseed Diets on Hyperlipidemic Rats

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Abstract:
The aim of this study was to re-evaluate the effect of individual garlic and flaxseed and for the first time, we studied the effect of combined consumption of 10% of flaxseed and garlic, for 30 days on biochemical and histological factors of hyperlipidemic rats. The feeding trial was conducted on rats with high levels of serum cholesterol and triacylglycerol. Histological results showed a marked improvement of kidney tissues responding to garlic alone and a combined flaxseed and garlic diet but a slight histopathological change were noticed in flaxseed diet group. Garlic results showed no histopathological changes in aorta kidneys and liver that may illustrate the healing effect of fresh garlic on tissues. Biochemical results indicated that the mean of blood total cholesterol, triacylglycerol were reduced, as the effect of fresh garlic (FGD) flaxseed (FD) and combined fresh garlic and flaxseed diet (FFGD) but HDL-C was increased in fresh garlic diet only. Best results were obtained from flaxseed diets that reduced cholesterol levels markedly to 115 % over negative control group. Slight reduction of serum levels of LDL-C has noticed in flaxseed (FD) and fresh garlic diets (FGD). These results may support the Mediterranean diet consumption that is rich in fresh food such as fresh garlic and seeds that may protect from heart disease.

Key words: Flaxseed, garlic, hyperlipidemia, histology, rats, Mediterranean diet

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Do diets supplemented with common herbs alleviate the symptoms of rich fructose diet in rats?

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Abstract:
The objective of this study was to determine whether the adverse effects of rich fructose diet can be modulated in the presence of common herbs specifically the effects on lipid profile, liver and kidney functions in male albino rats. The rats were divided into two main groups, the first main group (6 rats) fed on basal diet containing starch, while the second main group (66 rats) was divided into eleven subgroups (6 rats each) and fed on fructose-rich diet supplemented with different herbs for 15 days. Rats were sacrificed; food intake and organ weight/body weight% were recorded, liver and kidney functions and lipid profile were estimated. A significant reduction (P<0.05) of cholesterol has been noticed among rat groups that fed on fenugreek 2%, nutmeg 2%, and combined herbs 2% compared to positive control. Rat groups that fed on nutmeg 2%, cardamom 2% and combined herbs 2%, showed a significant reduction of triacylglycerol (P<0.05). Liver and kidney functions were also improved. Microscopically examined liver and kidney of rats from ginger 2%, nutmeg 1%, cardamom 2% and combined herbs showed normal hepatocytes and fenugreek seeds 2%, cardamom 1%, nutmeg 1%, ginger 2% and combined herbs were revealed to normal renal cells.

Key Words: rats, fructose, herbs, kidney and liver functions

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