# Study of The Hypolipidemic Effect Of Mentha Piperita On Female Experimental Rats

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# Study of The Hypolipidemic Effect Of Mentha Piperita On Female Experimental Rats

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***Abstract***

This experiment was designated to study the effect of mentha piperita on hypercholesterolemic female rats. 25 femal rats weighing 139.40±8g were classified into control (-ve) and 4 hypercholesterolemic rat groups fed on unsaturated fats and egg yolk powder. 5 rats of them served as control (+ve) whiles the rest of them were treated with mentha oil, extract and powder. The period of the experiment was 45 days.

In comparing with control (+ve) group, the obtained results revealed that female rat groups which treated with mentha oil, extract and powder showed improvement in nutritional and some kidney and liver function. Also, they showed a significant decrease in total cholesterol, triglyceride, low density lipoprotein cholesterol , very low density lipoprotein cholesterol, total lipids , phospholipids and atherogenic indexes but significant increase in high density lipoprotein cholesterol. Moreover, they showed significant decrease in malondialdehyde and significant increase in superoxide dismutase, glutathione and progesterone but non significant difference of testosterone.

Histopathological results showed pathological changes of liver and ovaries in control (+ve) group but these changes were improved in female rat groups which treated with mentha oil, extract and powder.

Key words: Mentha piperita - hypercholesterolemic - liver and kidney functions - sex hormone- rats.

## *INTRODUCTION*

Cardiovascular diseases are the most common cause of death in western and eastern countries. Atherosclerosis and related complications account for the majority of these deaths. Hypercholesterolemia and low high density lipoprotein cholesterol (HDL-c) levels are very common today and are often associated with endothelium dysfunction and inflammation, which

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are often followed by atherosclerosis. High levels of total cholesterol, low density lipoprotein cholesterol and triglycerol associated with lower HDL-c levels can induce insulin resistance and higher risks of cardiovascular diseases (Willa and Quinones 2003).

Mentha piperita (Family Labiatae; genus Mentha) is commonly used in spasmodic responses, treatment loss of appetite, common cold, bronchitis, fever, nausea, vomiting, antimicrobial and has antioxidant activities (Magdalena et al., 2005). Mentha piperita is used as antihypercholesterolemic and Hypertension (Uncini and Tomei 1999). In mentha piperita leaves, menthol and myrcene have been identified as key volatile components. The phenolic components are responsible, at least in part, for the antioxidant and antiperoxidant effects (Edris et al., 2003 and Ka et al., 2005).

The aim of study was to investigate the effect of mentha piperita oil, extract and powder to reduce hypercholesterolemia and its complications by assessing the nutritional status, analysis of some serum parameters and also examination of liver and ovaries tissues of female rats.

## *MATERIALS AND METHODS*

### *A-Materials:*

Mentha pipertia leaves were collected from local markets, washed, dried by air oven at 50°c, then grinded in blender to obtain powder. Mentha pipertia oil was obtained from local herbs stores. Unsaturated fat as commercial food oil "blend of 25% sunflower oil and 75% soybean oil" and eggs were obtained from local markets, El Dakhlia, Egypt. 25 femal rats weighing 139.40±8g were obtained from Agriculture Research Center, Giza, Egypt. The standard diet prepared according to NRC (1995).

### *B-Methods:*

Mentha pipertia oil was dissolved in saline solution and sonicated just before use and given by stomach tube in dose 400 ml/kg/rat according to Abd El –Ghany (2006). Mentha pipertia extract prepared daily as tea by steeping in boiling water and steeping for 5 to 10minutes at a dose of 0.58 mg/day daily by stomach tube (Sandra et al., 2009). Rats received Mentha piperita powder in dose 1g/kg/day in diet. Eggs had been boiled and yolks were separated, rubbed and distributed in trays then dried at 44° C for 4 h in hot oven. After cooling, yolks were grinded to obtain powder.

Hypercholesterolemic diet was the standard diet with10% of unsaturated fat of diet instead of corn oil beside addition of 10% egg yolks of diet.

- ***Experimental design:***

All rats were housed in well aerated cages under hygienic conditions and fed on basal diet for one week for adaption period before using the experimental diets. Food and water were provided ad-libitum. In this experiment, five rat served as control (-ve) and 20 rats consumed hypercholesterolemic diet all over the period of the experiment which classified into control (+ve) and treated groups with mentha oil , extract and powder .

- ***Biological evaluation:***

The trial period was 45days. Daily food intake and weekly body weight were recorded. Food efficiency ratio (FER) was calculated at the end of experiment as following: FER= Body weight gain (gm) / Food intake (gm)

- ***Biochemical analysis:***

At the end of experimental period, the rats were anaesthetized by diethyl ether and sacrificed. Blood samples were collected in clean test tubes and left for coagulation then centrifuged at 3000 rpm for 15 minutes to obtain serum. Total cholesterol (TC), triglyceride (TG) and high density lipoprotein cholesterol (HDLc) in serum were determined according to the method of Richmond (1973), Fassati and Principe (1982) and Gordon (1977), respectively. Low density lipoprotein cholesterol (LDLc) and very low density lipoprotein cholesterol (VLDLC) was calculated using the method of Hatch and Lees (1968) and Friedewald (1972), respectively. Total lipids (TL) and phospholipid were measured according to Knight et al., (1972) and Friedewald (1972), respectively. Atherogenic indexes were obtained by dividing TC / HDLc or dividing LDLc / HDLc according to Castelli and levitar (1977). Serum alanine aminotransferase (ALT) and aspartate aminotransferase enzymes (AST) were determined according to the method described by Reitman and Frankel (1957). Serum urea and creatinine were determined according to the method described by Fawcett and Scott (1960) and Bartles et al., (1972), respectively. Superoxide dismutase (SOD), glutathione (GSH) and malondialdehyde (MDA) levels were assayed according to Marklund and Marklund (1974), Beutler (1984)

and Stocks and Donnandy (1971), respectively. The total testosterone and progesterone levels were measured, as previously described by Zanato et al. (1994) and Orczyk et al., (1974), respectively.

- ***Pathological examination:***

The liver and ovaries of rats were collected to histopathological studies fixed in 10% neutral buffered formalin, cleared in xylene and embeded in paraffin. Tissue section 4-5 mm thick was prepared and stained with Hematoxylin and Eosin stain (H & E) according to Bancroft et al., (1996).

- ***Statistical analysis:***

All obtained data were statistically analyzed by SPSS computer software. The calculated accorded by analysis of variance ANOVA and follow up LSD (SPSS) Computer program variation.

## *RESULTS AND DISCUSSION*

### *1-Effect of Mentha piperita on body weight, food intake and food efficiency ratio of hypercholesterolemic rats:*

Table (1) showed that the control (+ve) female rat group showed significant increase ($p<0.01$&$0.001$) in final weight, weight gain and weight gain (%) and significant decrease ($p<0.001$) in FER while rat group which treated with mentha oil showed significant decrease ($p<0.01$) in FER compared with control (-ve) group.

The female rat group which treated with mentha extract showed significant decrease ($p<0.01$) in FER but the female rat group which treated with mentha powder showed significant decrease in weight gain and FER at $p<0.01$ compared with control (-ve) group.

Analysis of variance ANOVA and LSD test showed a significant decrease in final weight, weight gain and weight gain (%) and non significant decrease in food intake and significant increase in FER in female rat groups which treated with mentha oil, extract and powder compared with control (+ve) group.

The obtained results were explained by Valentina et al., (2001) who found non significant difference of body weight in control and rats fed on dietary fat. On the contrary, Naila (2011) found that mint treated rats showed significant effect on food intake . Abd El Ghany (2006) showed that

treated rats with mentha showed significant decrease in weight gain and weight gain percent when compared with control negative and showed significant increase in final body weight, body weight gain, body weight gain percentage, food intake and FER when compared with hepatic injury control positive.

***2-Effect of Mentha piperita on serum lipid pattern parameters of hypercholesterolemic rats:***

Table (2) showed that the control (+ve) female rat group showed significant increase ($p<0.05$, 0.01&0.001) in TC, TG, LDLc, VLDLc, TL and phospholipids and significant decrease ($p<0.01$) in HDLc while the female rat groups which treated with mentha oil ,extract and powder showed non significant decrease in TC, TG, LDLc, VLDLc, TL and phospholipids and significant increase ($p<0.05$) in HDLc compared with control (-ve) group.

Analysis of variance ANOVA and LSD test showed a significant decrease in TC, TG, LDLc, VLDLc, TL and phospholipids but significant increase in HDLc in female rat groups which consumed unsaturated fat and egg yolk with mentha piperita oil, extract and powder compared with control (+ve) group.

The obtained results were agreed with Rang et al ., (1995) who explained that the elevated serum cholesterol concentration observed with the mentha oil may be due to an increase in the concentration of acetyl coenzyme-A that arising probably from increased B-oxidation of fatty acids. Acetyl-coenzyme A is a key substrate in the biosynthesis of cholesterol. Phenolic acids, flavonoids and terpenoids, besides their antioxidant effects of mentha piperita leaves may be associated with benefits for triacylglycerol and HDL-c, as found by Choudhury et al., (2006). Mentha showed a reduction in total cholesterol, triacylglycerides and low-density lipoproteins levels and an increase in HDL c indices. The use of peppermint by humans can be considered beneficial in the prevention and treatment of risk factors of chronic degenerative diseases (Sandra et al., (2011).

***3- Effect of Mentha piperita on atherogenic indices of hypercholesterolemic rats:***

Table (3) recorded that the control (+ve) female rat group which consumed unsaturated fat showed significant increase ($p<0.001$) in cholesterol/HDLc and LDLc/HDLc compared with control (-ve) group. The

female rat groups which consumed unsaturated fat and treated with mentha oil, extract and powder showed non significant difference in cholesterol/HDLc and LDLc/HDLc compared with control (-ve) group.

Analysis of variance ANOVA and LSD test showed a significant decrease in cholesterol/HDLc and LDLc/HDLc in female rat groups which treated with mentha oil, extract and powder compared with control (+ve) group.

These results were agreed with Runnie et al., (2004) and Rajendra et al., (2011) who found that peppermint is also used as vasodilator. Treatment with aqueous extract of Mentha piperita leaves extract for 21 days significantly reduced serum total cholesterol, triglycerides and LDL-c associated with concomitant significant increase in HDL-C levels and decrease in atherogenic index in hyperlipidemic rats indicating its potent antihyperlipidemic and antiatherogenic activity. Barbalho et al., (2011) recorded that Mentha piperita can reduce the cholesterol, LDLc and TG levels in diabetic rats. Forester and Waterhouse (2009) and Sharafi et al., (2010) recorded that the health effects of mentha are reported to be due to antiradical and antioxidant properties of phenolics in plants and plant derivatives. Mentha piperita can reduce CHO/HDLc and LDLc/HDLc ratios.

### *4-Effect of mentha piperita on serum aminotransferase enzymes activity (ALT and AST), urea and creatinine.*

Table (4) showed that control (+ve) female rat group showed a significant increase ($p<0.001$) in ALT, AST and creatinine and non significant increase urea in serum while the female rat group which treated with mentha oil showed non significant difference in ALT, AST, creatinine and urea in serum compared with control (-ve) group.

The female rat group which treated with mentha extract showed non significant decrease in ALT, AST and urea but significant increase in creatinine in serum while the female rat group which treated with mentha powder showed non significant differance in urea and creatinine and showed significant decrease of AST in serum but significant increase of ALT compared with control (-ve) group.

Analysis of variance ANOVA and LSD test showed a significant decrease in ALT, AST and creatinine but non significant difference in urea

in rat groups which treated with mentha piperita oil, extract and powder in compared with control (+ve) group.

These results are agreed with Akdogan, (2003) who reported that rats administered Mentha piperita tea for 30 days increased levels of urea and creatinine. Also, Hilary, (2011) reported that rats fed on diet rich in fat showed increases in urea and creatinine. While, Barbalho et al., (2011) reported that mentha can reduce kidney function. The health effects of mentha are reported to be due to antiradical and antioxidant properties of phenolics in plants and plant derivatives.

### *5-Effect of Mentha piperita on malondialdehyde, superoxide dismutase, and glutathione of hypercholesterolemic rats*

Table (5) showed that the control (+ve) female rat group showed significant increase ($p<0.001$) in MDA and significant decrease ($p<0.001$) in SOD and GSH in serum while the female rat group which treated with mentha oil, extract and powder showed non significant decrease in MDA and significant decrease ($p<0.05$ & 0.01) in SOD and GSH compared with control (-ve) group. Analysis of variance ANOVA and LSD test showed a significant decrease in MDA and significant increase in SOD and GSH in female rat groups which treated with mentha oil, extract and powder compared with control (+ve) group.

The obtained results are similar to those reported by Al Seriti et al, (1999) who reported that mentha extract contain eugenol, caffeic acid, rosmarinic acid and α-tocopherol. These compounds have been shown to have antioxidant and antiperoxidant activities. Rosmarinic acid is an ester of caffeic acid and 3, 4- dihydroxyphenyllactic acid that improves the haemodyanamics systems.

Mentha piperita extract pretreated irradiated groups showed a significant elevation in glutathione S-transferase , glutathione peroxidase , glutathione reductase , superoxide dismutase and catalase activities as compared to that of control values .It was observed that leaf extract of Mentha piperita pretreatment significantly lowered the radiation induced lipid peroxidation as measured by the production of malondialdehyde (Ravindra et al., 2006).

Samarth et al., (2005) and Sharma et al., (2007) studied that mentha extract has significantly induced the activities of glutathione peroxidase and superoxide dismutase. It has been revealed that mentha extract can

significantly attenuate radiation induced oxidative stress by modulating cellular enzymatic and non-enzymatic antioxidant defense system. The lipid peroxidation level showed a significant decline with mentha treatment alone and the GSH level shows a significant increase.

### *6- Effect of Mentha piperita on testosterone and progesterone.*

Table (6) showed that the control (+ve) female rat group showed significant decrease ($p<0.01$&$0.001$) in testosterone and progesterone in serum while the female rat group which treated with mentha oil showed significant decrease ($p<0.05$) in testosterone and significant increase progesterone ($p<0.001$) in serum compared with control (-ve) group.

The female rat group which treated with mentha extract and powder showed significant decrease ($p<0.01$) in testosterone and non significant increase in progesterone in serum compared with control (-ve) group.

Analysis of variance ANOVA and LSD test showed a significant increase in progesterone and non significant difference of testosterone in female rat group which treated with mentha oil, extract and powder compared with control (+ve) group.

The same results were recorded with Hafiez et al., (1990) who reported that Mentha piperita contain zinc which considered a key role in the physiology of the reproductive system, and it is known that zinc deficiency in the diet in particular leads to hypogonadism. Actually, Humeny et al. (1999) reporting that zinc was a significant stimulator in estradiol synthesis is a remarkable finding supporting the relation between zinc and estrogen. Unger and Frank (2004) and Vikas et al, (2008) found that other preliminary research indicates that peppermint leaf tea might lower testosterone levels there was a significant decrease in the serum testosterone levels in rats treated with 40 g/l spearmint.

The obtained results are similar to those reported by Akdogan et al., (2004a) who mentioned that mentha piperita has significantly decreases the free testosterone and increases the luteinizing hormone, folicule stimulating hormone and estradiol in patients with polycystic ovary syndrome so can be an alternative to antiandrogenic treatment for mild hirsutism.

### *7-Effect of Mentha piperita on histopathological results of liver and ovary of hypercholesterolemic rats.*

Examined sections from control (-ve) revealed the normal histological structure of hepatic lobule (Pict.1).Meanwhile, liver of female rat from control (+ve) group showed cytoplasmic vacuolization of hepatocytes (Pict. 2). Kupffer cells activation was the only histopathological change obseved in rat liver from the group treated with mentha oil (Pict. 3).Some examined sections for rat liver from the group treated with mentha extract revealed no histopathological changes (Pict. 4). However, liver of rat from the group treated with mentha powder showed kupffer cells activation (Pict. 5).

Microscopically, ovary of rat from control (-ve) revealed normal developing follicles (Pict.6). Meanwhile, ovaries of rat from control (+ve) group showed congestion of interstitial blood vessels associated with interstitial odema (Pict.7). Ovary of rat from the treated group with mentha oil fat revealed no histopathological changes (Pict.8). Ovary of rat from the treated group with mentha extract revealed no histopathological changes (Pict.9). One of the group treated with mentha powder revealed no histopathological changes (Pict.10).

The histopathological results were in parallel with the biochemical results and appeared the advantage of the mentha as hypolipidemic. Triantaphyllou et al., (2001) reported that the extracts of mentha contained bound phenolic acids and flavonoids. The major phenolic acids reported in mentha extract are eriocitrin, luteolin glucoside, rosmarinic acid and caffeic acid. Dorman et al., (2003) recorded that phenolic compounds present in mentha extract is reported to have beneficial effects on chronic diseases.

From this study the biological evaluation of mentha showed a good functional effect on lipid parameters and liver and kidney functions.

Table (1): Body weight gain, food intake and food efficiency ratio of different experimental rat groups treated with mentha oil, extract and powder at the end of study.

| Variables / Groups | Initial weight (g) | Final weight (g) | Weight gain (g) | Weight gain % | Daily food intake(g) | FER |
|---|---|---|---|---|---|---|
| Control (-ve) | a 140.00±5.72 | b 182.16±7.35 | b 42.16±4.84 | b 30.35±5.01 | a 18.20±1.26 | a 0.038±0.001 |
| Control (+ve) | a 148.56±1.16 | a** 223.56±15.66 | a*** 75.56±6.53 | a** 51.108±11.58 | a 19.24±0.20 | c*** 0.004±0.0001 |
| Mentha oil | a 143.80±4.08 | b 188.60±4.87 | b 44.80±8.043 | b 31.28±6.46 | a 18.69±0.53 | b** 0.021±0.002 |
| Mentha extract | a 139.40±5.36 | b 180.20±9.01 | b 40.80±5.97 | bc 29.26±4.10 | a 18.12±0.69 | b** 0.026±0.001 |
| Mentha powder | a 145.80±4.20 | b 177.66±4.79 | c** 31.86±3.66 | b 36.19±5.96 | a 18.93±0.56 | b** 0.031±0.002 |

Significant with control group *p ‹0.05 ** p‹0.01 *** p‹0.001

Mean values in each column having different superscript (a, b, c, d,) are significantly different at p‹0.05.

Table (2): Serum lipid pattern parameters of different hypercholesterolemic rat groups treated with mentha oil, extract and powder at the end of study.

| Variables / Groups | TC (mg/dl) | TG (mg/dl) | HDLc (mg/dl) | LDLc (mg/dl) | VLDLc (mg/dl) | TL (mg/dl) | Phospholipids (mg/dl) |
|---|---|---|---|---|---|---|---|
| Control (-ve) | bc 69.40±6.34 | b 60.60±6.05 | ab 35.20±5.36 | c 22.04±5.94 | b 12.12±2.21 | b 498.80±28.37 | b 368.80±47.39 |
| Control (+ve) | a*** 93.60±13.84 | a*** 84.40±9.27 | c*** 22.20±1.48 | a*** 54.52±8.83 | a** 16.88±1.45 | a*** 596.00±26.04 | a*** 418.00±22.91 |
| Mentha oil | b 79.60±8.20 | b 60.00±7.03 | a 43.40±6.87 | c 24.20±3.39 | b 12.00±1.40 | b 499.60±26.42 | b 360.00±22.03 |
| Mentha extract | b 74.60±7.28 | bc 52.40±8.57 | a 42.00±5.24 | c 22.12±1.66 | bc 10.48±1.55 | b 500.54±27.34 | b 373.54±27.96 |
| Mentha powder | b 80.60±8.71 | bc 55.20±3.56 | ab 38.60±5.77 | bc 30.46±6.02 | bc 11.04±0.71 | b 514.20±24.76 | b 378.4±22.39 |

Significant with control group *p ‹0.05 ** p‹0.01 *** p‹0.001

Mean values in each column having different superscript (a, b, c, d,) are significantly different at p‹0.05.

Table (3): Atherogenic indices of different hypercholesterolemic female rat groups treated with mentha oil, extract and powder at the end of study.

| Variables / Groups | Cholesterol/HDLc | LDLc/HDLc |
|---|---|---|
| Control (-ve) | b 1.97±0.72 | bc 0.62 ± 0.18 |
| Control (+ve) | a*** 4.21± 0.95 | a*** 2.45±0.39 |
| Mentha oil | b 1.83± 0.54 | bc 0.55±0.23 |
| Mentha extract | b 1.77±0.22 | bc 0.52±0.31 |
| Mentha powder | b 2.08±0.70 | bc 0.80± 0.21 |

Significant with control group *p ‹0.05 ** p‹0.01 *** p‹0.001

Mean values in each column having different superscript (a, b, c, d,) are significantly different at p‹0.05.

Table (4): Serum ALT, AST, urea and creatinine of different hypercholesterolemic female rat groups treated with mentha oil, extract and powder at the end of study.

| Variables / Groups | ALT (µ/ml) | AST (µ/ml) | Urea (mg/dl) | Creatinine (mg/dl) |
|---|---|---|---|---|
| Control (-ve) | c 21.60±4.76 | b 19.20±6.14 | a 26.00±3.60 | c 0.62±0.13 |
| Control (+ve) | a*** 44.64±4.53 | a*** 31.10±7.77 | a 27.00±2.54 | a*** 1.66±0.108 |
| Mentha oil | c 21.00±5.29 | bc 18.65±4.62 | ab 22.32±3.18 | c 0.69±0.106 |
| Mentha extract | c 20.25±2.94 | bc 17.00±4.58 | ab 24.74±3.56 | b* 0.92±0.22 |
| Mentha powder | b* 27.74±4.96 | c* 14.25±3.26 | ab 24.74±5.21 | c 0.76±0.15 |

Significant with control group *p ‹0.05 ** p‹0.01 *** p‹0.001

Mean values in each column having different superscript (a, b, c, d,) are significantly different at p‹0.05.

Table (5): Serum MDA, SOD, and GSH of different hypercholesterolemic rat groups treated with mentha oil, extract and powder at the end of study.

| Variables / Groups | MDA (n mol/ml) | SOD (μ /ml) | GSH (μ /ml) |
|---|---|---|---|
| Control (-ve) | c<br>11.26±1.04 | a<br>0.99±0.17 | a<br>9.27±0.63 |
| Control (+ve) | a***<br>18.96±4.51 | c***<br>0.29±0.031 | c***<br>4.24±1.42 |
| Mentha oil | bc<br>13.78±1.86 | b*<br>0.69±0.07 | b**<br>6.16±0.77 |
| Mentha extract | bc<br>13.94±2.35 | b*<br>0.78±0.142 | b**<br>5.66±0.79 |
| Mentha powder | bc<br>14.32±3.03 | b*<br>0.71±0.12 | b**<br>6.17±0.85 |

Significant with control group *p ‹0.05 ** p‹0.01 *** p‹0.001

Mean values in each column having different superscript (a, b, c, d,) are significantly different at p‹0.05.

Table (6): Testosterone and Progesterone of different hypercholesterolemic rat groups treated with mentha oil, extract and powder at the end of study.

| Variables / Groups | Testosterone | progesterone |
|---|---|---|
| Control (-ve) | a<br>0.37±0.04 | b<br>84.02±7.24 |
| Control (+ve) | bc**<br>0.24±0.003 | c***<br>70.02±4.74 |
| Mentha oil | b*<br>0.27±0.10 | a***<br>92.88±3.81 |
| Mentha extract | b*<br>0.25±0.001 | b<br>87.48±5.20 |
| Mentha powder | bc*<br>0.24±0.14 | b<br>85.10±4.63 |

Significant with control group *p ‹0.05 ** p‹0.01 *** p‹0.001

Mean values in each column having different superscript (a, b, c, d,) are significantly different at p‹0.05.

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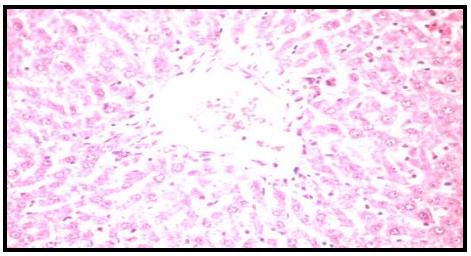
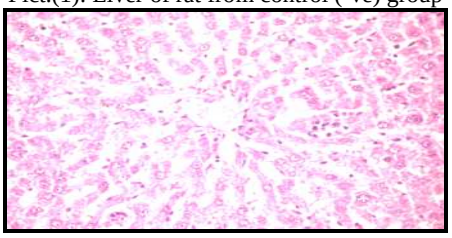
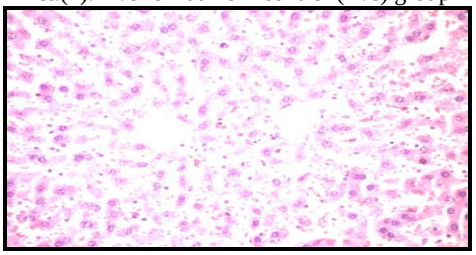


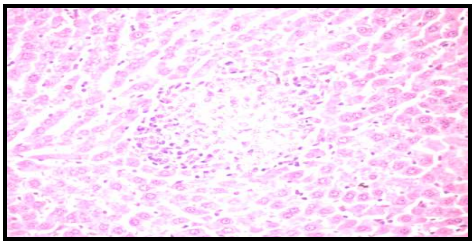
Pict.(1): Liver of rat from control (-ve) group



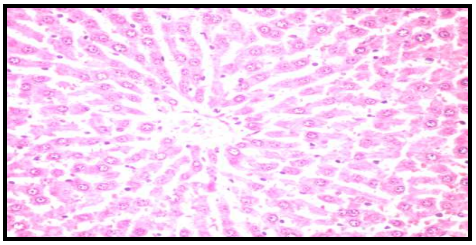
Pict.(2):Liver of rat from control (+ve) group



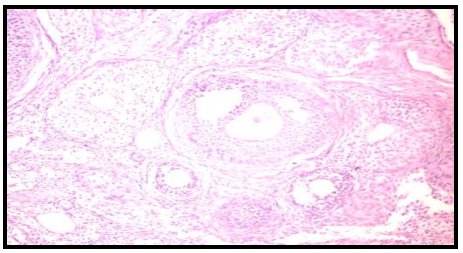
Pict.(3):Liver of rat from group treated with mentha oil



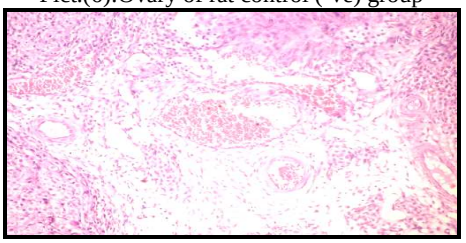
Pict.(4):Liver of rat from the group treated with mentha extract



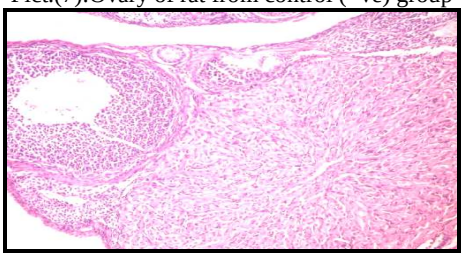
Pict.(5):Liver of rat from the group treated with mentha powder



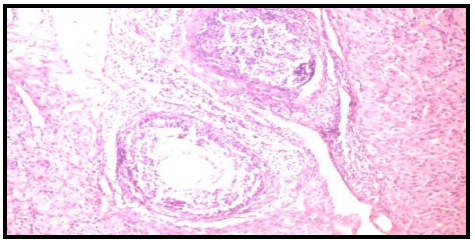
Pict.(6):Ovary of rat control (-ve) group



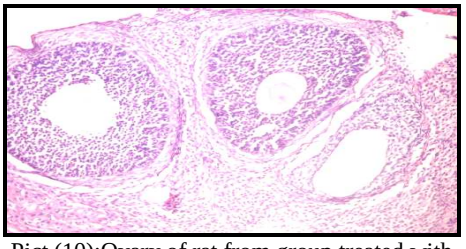
Pict.(7):Ovary of rat from control (+ve) group



Pict.(8):Ovary of rat from group treated with mentha oil



Pict.(9):Ovary of rat from group treated with mentha extract



Pict.(10):Ovary of rat from group treated with mentha powder

# دراسة تأثير النعناع كخافض لدهون الدم على اناث فئران التجارب

عبد الغنى محمود عبد الغنى – لبنى احمد شلباية – فوزيه رفعت عبد الحميد *

**الملخص العربي**

أجريت هذه التجربة لدراسة تأثير تناول النعناع فى صورة زيت و مستخلص و مسحوق على مستويات دهون الدم فى فئران التجارب المصابة بارتفاع الدهون. و أجريت الدراسة على ٢٥ من اناث فئران الالبينو و متوسط اوزانهم ١٣٥ ±٨ جرام حيث تم تقسيمهم الى مجموعه ضابطه سالبه و اربع مجموعات عاليه الدهون ( دهون غير مشبعه وصفار البيض) كالاتى مجموعه ضابطه موجبه و ثلاث مجموعات معالجه بزيت و مستخلص و مسحوق النعناع واستمرت التجربة لمده ٤٥ يوم.

بالمقارنة بالمجموعه الموجبه اظهرت المجموعات المعالجه بزيت و مستخلص و مسحوق النعناع تحسن في النتائج الغذائيه و وظائف الكلي والكبد. و انخفاض معنوى فى مستوى الكوليستيرول والجليسريدات الثلاثيه والليبوبروتينات منخفضه الكثافه والليبوبروتينات منخفضه الكثافه جدا و الفوسفوليبيدات وموشرا تصلب الشرايين كما سجلت نتائج الدراسة ارتفاع معنوى فى الليبوبروتينات مرتفعة الكثافة. و انزيم سوبر اكسيد ديسموتيز والجلوتاثيون و البروجيستيرون و انخفاض معنوى فى المالونالديهيد . كما اظهرت النتائج الهستوباثولوجيه لانسجة كل من الكبد والمبيض وجود تغيرات مرضيه فى المجموعه الضابطه الموجبه بينما اظهرت المجموعات المعالجه بزيت و مستخلص و مسحوق النعناع تحسن فى هذة الانسجة

وتوصى الدراسة بضرورة تناول النعناع لمرضى ارتفاع دهون وكوليستيرول الدم

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