LEAFY HERBS AS A TOOL FOR ANTI-OBESITY

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Research Journal Specific Education

Faculty of Specific Education

Mansoura University

ISSUE NO. 56, OCTOBER , 2019

مجلة بحوث التربية النوعية - جامعة المنصورة

العدد السادس والخمسون - أكتوبر ٢٠١٩

Leafy herbs as a tool for anti-obesity

*EL-Sayeda G. E. EL-Sahar** *Abor M. M. Abd EL- Rahman***

Abstract

Obesity is disease life -threatening human; therefore, the aim of use leaves from different herbs as the leaves from mallow (Malva parviflora), sage (Salvia officinalis) and senna (Cassia angustifolia) to reduce the obesity in rat groups fed on the mixture of these herbs al level 5.0 and 10.0% and other groups were taken orally at level 50.0 and 100.0 mg/kg rat/ day from the mixture in these herds. Biological and histological experimental were determined in different obesity rat groups and compared with control negative and positive.

At the end of biological experimental (six week period of experimental) the results showed that the gain body weights and in the obesity different groups were decreased than control positive and nearly from control negative.

The results from glucose and lipid profile showed that the highest in control positive in glucose, triglycerides, total cholesterol and LDL and the lowest in control negative, whilst, the HDL was oppositely results. The results from obesity rat groups were taken the mixture herbs orally at 50 and 100 mg/kg rat/ day give the best results than other groups. Moreover the liver and kidney functions in obesity rat groups were taken orally from the mixture herbs extract at level 50 and 100 mg/kg rat/ day led to improvement the parameters on liver and kidney followed by the obesity rat groups fed on 5.0 and 10% from the mixture herbs. The results from the histological experiment showed that the obesity rat organs as heart, spleen, liver, and kidney were confirmed the previous results and preservation of the different organs.

It could be concluded and recommended that the different herbs are improvement the parameters of lipid profile, liver and kidney functions in

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the obesity different rat groups may be due to these herbs had contained rich amounts of polyphenolic and dietary fiber.

Keywords: mallow (Malva parviflora), sage (Salvia officinalis) and senna (Cassia angustifolia ,obesity rats

Introduction

As previous research found that a greater propagation of obesity in high-income countries (HICs), obesity has been significant HICs problem (**Merino Ventosa and Urbanos-Garrido, 2016).** In the HICs, consumption of the food joined with sedentary work the highest danger of developing obesity (**Ng *et al.,* 2014)**. In low-income countries (LICs), obesity has not been impedance may be due to food shortage and hard work with higher energy expenditure (**Sartorius *et al.,* 2015)**

The increased propagation of obesity and posed a significant public health worry for the reason that the obesity is recognized to be a danger agent for many chronic diseases, like type 2 diabetes, cancer, hypertension, asthma, and other conditions (**Hu, 2008 and Dixon, 2010).**

Among vegetables, the green leafy vegetables occupy an important position. The green leafy vegetables are rich source of macro and micro nutrients, such as proteins, dietary fibers, pigments, vitamins (beta-carotene, ascorbic acid, etc.), as well as nonnutrient bioactive phytochemicals as polyphenols and flavonoids, which offer many functions for health benefits **(Khan *et al.,* 2015).**

Many species of Salvia, including *Salvia officinalis* (common sage), and it has been utilized worldwide as a spice in addition to traditional herbal medicine (**Smidling *et al.,* 2008)**. Sage is also a natural source of flavonoids and polyphenolic compounds possessing strong antioxidant, radical-scavenging, and antibacterial activities (**Baranauskiene *et al.,* 2011).** In many research on antiobesity using traditional medicine, the influences of *S. officinalis* and its active ingredient on the pancreatic lipase activity and lipid digestion were investigated by **Ninomiya *et al.* (2004).** The methanolic extract from the leaves of *S. officinalis L.* sufficiently great

inhibited the pancreatic lipase activity and inhibited serum triglyceride in mice (**Ninomiya** *et* ***al.*, 2004).**

Concerning the senna leaves that are utilized for medication, senna has been utilized as an effective cathartic property owing to the obvious presence of elements and ingredients like dianthrone glycosides, main sennosides A and B in addition with minor amounts of sennosides C and D and other components **(Balasankar *et al.*, 2013).**

Malva spp. had contained chemical constituents like polysaccharides, coumarins, antioxidants, vitamins, terpenes, and tannins that were found in leaves and flowers. Also, it have as antimicrobial activity, high anti-inflammatory and wound healing activities, strong antioxidant activity, and anticancer characteristics. **(Sharifi-Rad *et al.*, 2019).**

At the present time, traditional Chinese medicals utilize herbal remedies that generally are collections from various herbs to treat obese patients. This is maybe due to herbal materials are a great category of anti-obesity products (**Park *et al.*, 2011).**

The target of this research has been achieved to investigate some leaves herpes as mallow (*Malva parviflora*), sage (*Salvia officinalis*) and senna (*Cassia angustifolia*) had contained rich amounts polyphenolic, minerals, fiber and total carbohydrates. Theses herpes were used at level 5.0 and 10.0% for fed rats and 50 and 100 ppm/kg rat/day from their extract were taken orally to reduce obesity and benefit health.

MATERIALS AND METHODS

Materials

Mallow (*Malva parviflora*), sage (*Salvia officinalis*) and senna (*Cassia angustifolia*) were obtained local market.

Kits for determination of the parameters were purchased from Sigma-Aldrich Corp., MO, USA, for use in analysis at King Abdul-Aziz Chemistry Lab., Medical Research Center.

Male Wister albino weaning rats (36 rats) with weight ranging from 150-160g were purchased from National Organization For Drug and Control Research, Giza, Egypt.

Rats were housed in individual cages with screen bottoms and fed ad *libitum* on a basal diet for one-week for acclimatization, which containing casein (20 %), corn oil (8%), corn starch (31%), sucrose (32%), mgcellulose (4%), salt mixture (4%) and vitamin mixture (1%) according to the method **Pell *et al*. (1992).**

Methods

Experimental rats were fed on fat and basal diet for 15 days and randomly divided into six groups six rats for each. The 1st main group was fed on basal diet for another 6 weeks and considered as control negative rats.

The five rat groups which induction of obesity by fed with basal diet substituted with 20% fat from the corn oil and starch are namely fatty basal diet. These groups were reclassified into control positive +(ve) as a group (2), also, the rats of 3^{ed} and 4^{ed} groups were fed separately on fatty basal diet and mixture from some leaves herbal as mallow (*Malva parviflora*), sage (*Salvia officinalis*) and senna (*Cassia angustifolia*) at 5.0 and 10.0% level for six week storage period. The rats of 5th and 6th groups were fed separately on fatty basal diet and taken orally 50 and 100 mg/kg rat/ day for six weeks storage period from the mixture herpes aqueous extract.

The body weight and food consumption were recorded every three days for six week. At the end of experimental, the blood samples were taken with drawn from the orbital plexus and centrifuged at 3000 rpm to obtain the sera after that, the sera were kept in a deep - freezer at -20°C until their analysis. The organs such as liver, heart, kidney, spleen and lung were immediately removed from the scarified rats and it was gently pressed during filter paper to free it from surface blood and weight.

Triglycerides, total cholesterol, HDL and (LDL) were determined according to the method of **Fossati and Principe (1982), Allain *et al.* (1974)**, **Lopes-Virella *et al*. (1977)** and **Steinberg (1981),** respectively.

Liver function as Alanine (ALT) and Aspartate (AST) transaminoferase were determined according to the method described by **Reitman and Frankel (1957).** Alkaline phosphates activity (ALk) was determined using modified kinetic method of **Belfied and Goldberg (1971).**

Kidney function as uric acid, Albumin, creatinine, urea and total protein were estimated according to the method described by **Barham and Trider (1972)**, **George (2009), Schirmeister (1964) and Patton and Crouch (1977) and Bjorsten *et al*. (2007),** respectively**.** Moreover, total bilirubin is assessed using caffeine benzoate to split bilirubin from the unconjugated bilirubin protein complex according to **Vinchi et al. (2008)** and also serum glucose was determined according to **Tietz (1986).**

Histological examination of some organs

The post-mortem examination was done as soon as possible and the organ as liver, kidney and heart were collected. Fixation was done in 10% natural formalin dehydrated cleared, and ended paraffin then sectioned at 7µm and stained with harries hematoxylin and eosin for hestopathological examination (**Carleon, 1967)**.

Statistical analysis

The obtained data were exposed to the analysis of variance. Duncan's multiple range tests at ($P \leq 0.05$) level was used to compare between means. The analysis was carried out using the ANOVA procedure of Statistical Analysis System **(SAS, 2004).**

RESULTS AND DISCUSSION

Effect of different diets on body weight in the rat groups

Table (1) observed that effect of mixture herbs at level 5.0 and 10.0% in basal diet and taken orally from herbs extract at levels 50.0 and 100ppm/kg/day on body weight different groups' rate. From the results it could be noticed that the gain body weight was increased in the control positive (156.6g) followed by control negative was 126.5g, this may be due to the control positive was fed on basal diet and 1% fat, whilst control negative was fed on basal diet only. Moreover, the different obesity rat

groups were decreased than control positive and nearly from control negative. This variation may be that these herbal leaves had contained polyphenols and dietary fiber in the diet for healthy eating and were taken orally from their extract, which may help to prevent obesity and to maintain ideal body weight. Phenolic acids and flavonoids compounds have been found to have a useful influence on obesity. Illustrating, dietary natural antioxidants as polyphenols were a regulator for adipocyte metabolism to prevent the growth of adipose tissue (**Badimon et al., 2010).**

Table (1) some nutritional indicators of negative control and obesity rats group during the experimental period.

Groups	Initial (g)	Finial (g)	Gain (g)	Daily gain(g)
Negative control	153.2 ± 7.58^{a}	279.7 ± 14.43^{a}	126.5 ± 2.44^{b}	2.81 ± 0.04^{b}
Positive control	155.0 ± 7.70^{a}	312.0 ± 11.58^{d}	156.6 ± 2.70^{a}	3.48 ± 0.05^{a}
5% Herbs	153.8 ± 6.49^{a}	264.2 ± 11.92^{b}	110.4 ± 5.10^{b}	2.54 ± 0.08^{b}
10% Herbss	157.5 ± 5.91^{a}	262.5 ± 12.38^{b}	105.0 ± 3.28^{b}	2.33 ± 0.04^{b}
50 ppm Herbs extract	155.4 ± 6.6^{a}	262.4 ± 12.34^{c}	107.0 ± 4.04^{c}	2.38 ± 0.07^{b}
100 ppm Herbs extract	$158.3 \pm \pm 5.38^{a}$	258.3 ± 13.25^{c}	100.0 ± 2.45^{c}	2.22 ± 0.02^{b}

The row with the letter are significantly different at 0.05 levels.

Effect of different diets on organs weight in the rat groups

The results present in Table (2) showed that the different diets were fed and it was taken orally on organs weight rat groups. From the results it could be observed that the organs weight in control positive was the highest in liner, heart, and kidney were 4.01, 0.65, 1.41g, followed by control negative was 3.56, 0.59 and 1.32g, respectively. Whereas, the different groups fed at mixture herbs at 5 and 10% and other groups was taken orally at 50 and 100 mg/kg rat/ day were lower gradually in weight organs in obesity rat groups. Moreover, the weight of lung was no significant differences among the control and different groups. These results are confirmed by **Nemani *et al.* (2011)** reported the significantly higher organ weights of heart, liver, and kidney, and no difference lung weights in the obesity rats.

Ninomiya *et al.* (2004) showed that the extract from *Sage officinalis* leaves has been inhibitory influence against the pancreatic lipase activity and it was effective in reducing body weight and obesity**.**

Table (2): Organs weight of negative control and obesity rats group consumed the experimental herbs at the end of study

Groups	Liver (g)	Heart (g)	Kidney (g)	Lung (g)
Negative control	3.56 ±1.60a	0.59 ±0.01a	1.32 ± 0.36a	1.20 ±0.15a
Positive control	4.01 ±1.14b	0.65 ±0.16b	1.41 ± 0.26b	1.22 ±0.16a
5% Herbs	3.86 ±0.51a	0.54 ±0.12ab	1.27 ± 0.22a	1.17 ±0.12 a
10% Herbs	3.75±0.41 a	0.50±0.11 ab	1.24±0.24 a	1.15±0.15 a
50 ppm Herbs extract	3.80±0.35 a	0.53±0.13ab	1.22±0.21 a	1.16±0.13 a
100 ppm Herbs extract	3.70 ±0.14a	0.51 ±0.05ab	1.20± 0.14a	1.13 ±0.14 a

The row with the letter are significantly different at 0.05 levels.

Effect of different diets on glucose and lipid profile in the rat group

Glucose and lipid profile as triglycerides, total cholesterol, LDL and HDL were determined in the obesity different rat groups fed on a different diet from mixture herbs at 5 and 10% level and taken orally at 50 and 100 mg/kg rat/ day from the extract their herbs and the results are reported in Table (3). The results showed that the highest in control positive in glucose, triglycerides, total cholesterol and LDL were 240, 245.7, 190.0 and 131.7mg/dl, and the lowest in control negative were 105.0, 112.3, 85.0 and 25.0 mg/dl, respectively. Whilst, the HDL was the lowest in control positive 27.3mg/dl and the highest in control negative was 53.7mg/dl. Moreover, the results from obesity different rat groups observed that the rat groups were taken the mixture herbs orally at 50 and 100 mg/kg rat/ day give the best results and nearly control negative followed by the obesity rat groups were fed on basal diet fortified with 5.0 and 10 % from mixture herbs. These results are similar with several studies have demonstrated that the uniquely high level of polyphenols in the different herbal may play an important role in contributing to the health benefit such as lowering glucose, LDL cholesterol level, and reducing the risk of cardiovascular diseases

(Constantinou *et al*. 2008). Extracts from some sage species have been found to be effective in the prevention of cardiovascular disease due to inhibition of LDL-C oxidation **(Sa, 2009).** The methanolic (MeOH) extract from the leaves of *Salvia officinalis* L. significantly inhibited the pancreatic lipase activity, and suppressed serum triglyceride (TG) elevation in olive oil-loaded mice **(Ninomiya *et al.*, 2004).**

Several clinical and epidemiological studies showed that Hyperlipidemia is being a significant danger factor for chronic heart disease, is a dangerous public health trouble in the world **(Jaffer *et al.*, 2004).** Hyperlipidemia also has a vicarious function by activating the production of oxygen free radicals (OFRs) from polymer leukocytes (PMNLs) and monocytes **(Prasad, 2005).** Regarding is treatment, now a day there is an increasing interest towered the potential health benefits of medicinal plants like herbs.

Table (3): Fasting levels of some serum lipid patterns and glucose of negative control and obesity rats group after treated by different experimental herbs at the end of the study

Groups	Triglycerides (mg/dl)	T. cholesterol (mg/dl)	HDL (mg/dl)	LDL (mg/dl)	Glucose (mg/dl)
Negative control	112.3 ±6.1c	85.0 ±11.1c	53.7 ±4.10a	25.0 ±2.56d	105.0 ± 5.00 c
Positive control	245.7 ±17.9a	190.0 ±16.5a	27.3 ±2.42c	131.7 ±10.2a	240 ± 10.00 a
5% Herbs	181.0 ±10.0b	147.0 ±17.0b	34.0 ±2.53c	79.67 ±8.10b	131.2 ± 1.59 b
10% Herbs	150.0 ±12.28b	123.0 ±10.38 b	41.0 ±2.30b	45.3 ± 4.03 c	123.0 ± 3.00 b
50 ppm Herbs extract	160.0 ±9.45 b	134.0 ±11.59 b	46.0 ±2.45 b	52.0 ±3.79c	127.0 ±2.11 b
100 ppm Herbs extract	120.7 ±9.07c	115.0 ± 13.5c	51.0 ±3.11a	34.0 ±2.82d	108.0 ± 1.00 c

The row with the letter is significantly different at 0.05 levels.

Effect of different diets on liver function in the rat group

Liver functions as alanine (ALT) and aspartate (AST) transaminoferase, and alkaline phosphates (ALk) were determined in rat groups fed on different diets and the results are reported in Table (4). The results illustrated that the highest activity in the enzyme ALT, AST, and ALK in control positive ware55.0, 15.0 and 65.0 mg/dl, respectively than the control negative was the lowest. Whereas, the groups fed on 10% fed from mixture herbs were higher 35.5, 10.3 and 40.0 mg/dl than group was taken the mixture orally at100ppm was 28.9, 8.0 and 39 mg/dl, respectively, these results showed that the different herbs had contained rich amounts of natural antioxidant which status improve liver enzymes activity. These results confirmed by **Farhan *et al.* (2012)** found that the extract of polyphenols from leaves of *Malva parviflora* contain different amounts of phenols, flavonoid, saponin, alkaloid, resin and tannin. The methanol fraction showed high antioxidant potential. Traditionally *Malva parviflora* is used for the treatment of inflammation, pain and liver injuries (**Afolayan *et al.*, 2010).**

Senna leaves are used as liver activators, anthelmintic, cholagogue, expectorant, and febrifuge. It was beneficial in abdominal disorders, leprosy, skin disorders, leucoderma, splenomegaly, hepatomegaly, dyspepsia, cough, and bronchitis **(Balasankar *et al.*, 2013).**

After drinking sage tea for two weeks the liver antioxidant status became better, maybe caused that the aqueous extract of *Salivia officinalis* has found to have an antioxidant and antiviral influence **(Stanojevic, 2010).**

Table (4) Liver function parameters of negative control and different experimental obesity rats group at the end of the study

Groups	ALT (mg/dl)	AST (mg/dl)	ALK (mg/dl)
Negative control	20.0± l.0c	8.0± 1.00c	35.0±3.28 c
Positive control	55.0 ± 2.65 a	15.0 ± 0.97 a	65.0±4.16a
5% Herbs	49.0 ± 0.91 a	13.0 ± 0.99 a	53.0±4.47 b
10% Herbs	35.5 ± 0.90 b	10.3 ± 1.13 b	40.0±5.02 c
50 ppm Herbs extract	37.4 ± 1.00 b	10.7 ± 1.00 b	50.0±4.91 b
100 ppm Herbs extract	28.9 ± 1.00 c	8.2± 1.71 c	39.0±3.27 c

Alanine (ALT) and Aspartate (AST) transaminoferase, alkaline phosphates (ALk),

The row with the letter are significantly different at 0.05 levels.

Effect of different diets on kidney function and glucose in the rat groups

The results from Table (5) showed that the effect of different diets on urea, creatinine, uric acid, bilirubin, albumin and total protein on rat groups. The results found that the highest in urea, creatinine uric acid and bilirubin in control positive were 62.6, 1.13, 5.73 and 0.70 mg/dl, respectively, the increased in these parameters means the disorder in kidney functions. These results confirmed by **Cameron and Greger (1998)** who found that the serum urea is an important test for knowing the conditions of the kidneys; therefore the increase in the urea level may indicate impairment of renal functions. Moreover, the results from the rat group fed on basal diet plus fortified with 5.0 and 10.0% different mixture herbs and rat groups fed on basal diet plus 1% fat and the extract from different mixture herbs was taken orally 50 and 100 ppm/kg rat/day were decreased and equal nearly from control negative. These decreases in the rat group due to the different herbs had contained high amounts from natural antioxidant and dietary fiber lead to improve kidney functions.

The leaves of *Malva parviflor*a are used for drawing swollen, inflamed purulent wounds. Pharmacological studies have shown that *M. parviflora* possesses antibacterial, antidiabetic, antifungal, hepatoprotective, neuroprotective, anti-irritant, antioxidant, anti-ulcerogenic, analgesic and

other activities. It is well known that *M. parviflora* have been a major source of natural antioxidants. *M. parviflora* contains flavonoids and phenolic compounds **(Ajeet Singh, 2017).**

Arrieta-Baez *et al.* (2002) isolated a peroxidase and confirmed that it could participate in the biogenesis of anthraquinone. Cassia Angustifolia extract may be regulated disorders of the gastrointestinal tract after abdominal operations **(Wang *et al.*, 1998).** The extracts possess topical anti-inflammatory stimulate **(Cuellar *et al.*, 2001)** and virucidal effects **(Sydiskis *et al.*, 1991).**

Sage is also a natural source of flavonoids and polyphenolic compounds possessing strong antioxidant, radical-scavenging and antibacterial activities **(Baranauskiene, 2011).**

From the results in the same table reported that the total protein and albumin the lowest in control positive were 5.8 and 3.0 mg/dl, these means the liver and kidney functions were disorder and poor functions. Total serum protein consists of albumin and globulins and gives information regarding the nutritional status and malnutrition of animals (**Adeyemi, 2013).** Low serum albumin, therefore, indicates poor liver function **(Naganna, 1989).** The different rat groups were fed on the mixture from mallow (*Malva parviflora*), sage (*Salvia officinalis*) and senna (*Cassia angustifolia*) the results showed that improvement of kidney functions and confirmed improvement of the liver function too due to these herbs had contained rich amounts polyphenolic, minerals, fiber, and total carbohydrates.

Table (5). Renal function parameters of negative control and different experimental obesity rats group at the end of the study

Groups	Urea (mg/dl)	Ceatinine (mg/dl)	Uric acid (mg/dl)	Bilirubin mg/dl	Albumin (mg/dl)	Total protein (mg/dl)
Negative control	26.5 ±4.4c	0.5 ±0.1c	2.96 ±0.25 d	0.30 ± 0.01 c	5.6 ± 0.11 a	9.3 ± 0.21 a
Positive control	62.6 ±1.0a	1.13 ±0.2a	5.73 ±0.61a	0.70 ± 0.02 a	3.0 ± 0.22 c	5.8 ± 0.24 c
5% Herbs	35.2 ±5.3b	0.8 ± 0.1b	4.30 ±0.43b	0.46 ± 0.05b	4.5 ± 0.21 b	7.9 ±0.11 c b
10% Herbs	28.4 ±2.6c	0.7 ±0.1b	3.53 ±0.35c	044 ± 0.04 b	5.0 ±0.23 a	7.9 ± 0.12 b
50 ppm Herbs extract	31.5 ±2.18 b	0.7 ±0.1b	3.70 ±0.24c	0.48 ±0.03b	4.9 ± 0.14 a	8.0 ± 0.13 a
100 ppm Herbs extract	27.3 ±2.26 c	0.6 ±0.1c	3.10 ±0.18d	0.35 ± 0.02 c	5.3 ± 0.13 a	8.4 ± 0.21 a

The row with the letter are significantly different at 0.05 levels.

Histological experimental

Histopathological examination of heart:

Microscopically, heart of rats from group 1 revealed normal cardiac myocytes (Fig. 1). Meanwhile, examined sections from group (2) showed intermyocardial oedema and focal necrosis of cardiac myocytes associated with inflammatory cells infiltration (Fig. 2). However, heart of rats from group 3 revealed improved pictures as examined sections showed no changes except slight intermuscular oedema in some examined sections (Fig. 3). Moreover, heart from groups 4, 5 & 6 showed marked improved histopathological picture, sections from those groups revealed no histopathological changes (Figs. 4, 5 & 6.

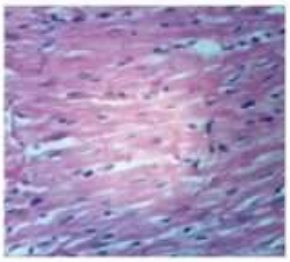

Fig. (1): Heart of rat fed on basal diet as control negative showing normal cardiac myocytes (H & E X 400).

Fig. (1): Heart of rat fed on basal diet as control negative showing normal cardiac myocytes (H & E X 400).

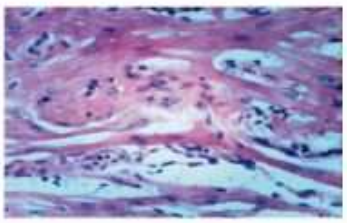

Fig. (2): Heart of rat fed on basal diet plus 1% fat as positive control showing intermyocardial oedema and focal necrosis of cardiac myocytes associated with inflammatorycells infiltration (H & E X 400).

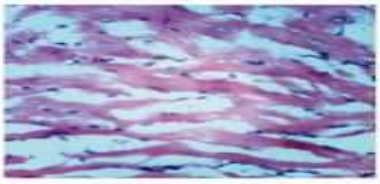

Fig. (3): Heart of rat fed on basal diet plus 1% fat and 5% different mixture herbs showing slight intermuscular oedem dispersed the cardiac myocytes (H & E X 400).

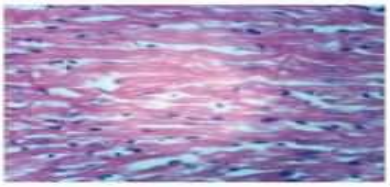

Fig. (4): Heart of rat fed onbasal diet plus 1% fat and 10% different mixture herbs showing no histopathological changes (H & E X 400).

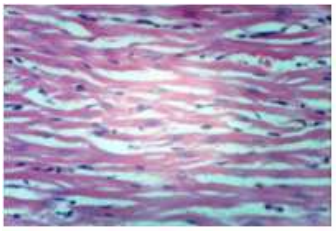

Fig. (5): Heart of rat from group 5 showing no histopathological changes (H & E X 400).

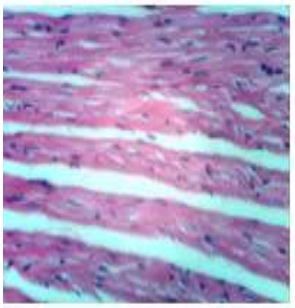

Fig. (6): Heart of rat from group 6 showing no histopathological changes (H & E X 400).

Histopathological examination of kidneys:

Microscopically, kidneys of rats from group 1 revealed normal histological structure of renal parenchyma (Fig. 1). On the other hand, kidneys of rats from group 2 revealed congestion of renal blood vessel, atrophy of glomerular tuft with distension of Bowman's capsule and focal inflammatory cells infiltration (Fig. 2). However, sections from groups 3 & 4 showed cystic dilatation of renal tubules, atrophy of glomerular tuft and distension of Bowman's space (Figs. 3 & 4). Meanwhile, kidneys from

group 5 showed congestion of intertubular blood capillaries (Fig. 5). However, improved picture was noticed in kidneys from group 6, examined sections revealed cystic dilatation of renal tubules and vacuolation of epithelial lining some renal tubules (Fig. 6)

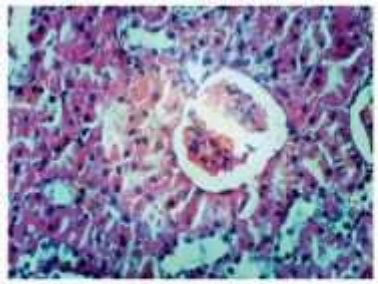

Fig. (1): Kidney of rat fed on basal diet as control negative showing the normal histological structure of renal parenchyma (H & E X 400).

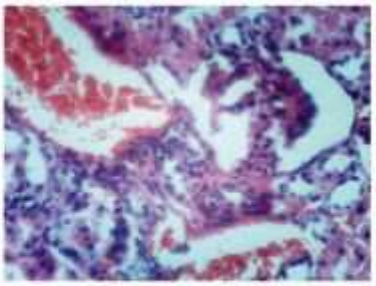

Fig. (2): Kidney of rat fed on basal diet plus 1% fat as control negative showing congestion of renal blood vessel, atrophy of glomerular tuft with distension of Bowman's capsule and focal inflammatory cells infiltration (H & E X 400).

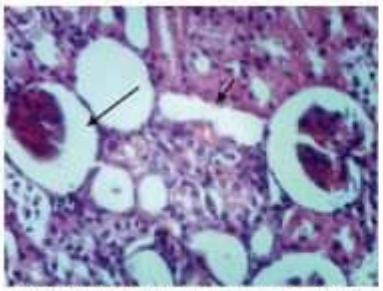

Fig. (3): Kidney of rat fed on basal diet plus 1% fat and 5% different mixture herbs showing cystic dilatation of renal tubules, atrophy of glomerular tuft and distension of Bowman's space (H & E X 400).

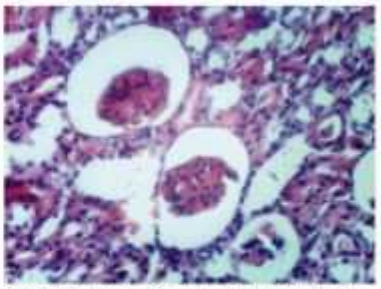

Fig. (4): Kidney of rat fed on basal diet plus 1% fat and 10% different mixture herbs showing cystic dilatation of renal tubules, atrophy of glomerular tufts and distension of Bowman's space (H & E X 400).

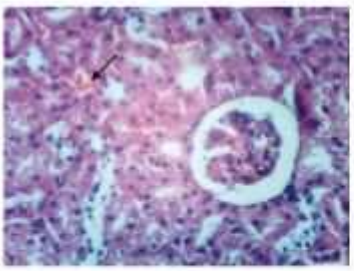

Fig. (5): Kidney of rat fed on basal diet plus 1% fat and taken orally 50ppm/kg/day different mixture herbs showing congestion of intertubular blood capillaries (H & E X 400).

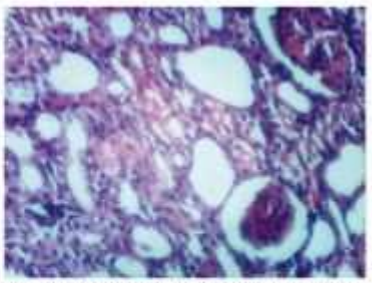

Fig. (6): Kidney of rat fed on basal diet plus 1% fat and taken orally100ppm/kg/day different mixture herbs showing cystic dilatation of renal tubules and vacuolation of epithelial lining some renal tubules (H & E X 400).

Histopathological examination of liver:

Microscopically, liver of rats from group 1 revealed the normal histological structure of hepatic lobule (Fig. 1). Meanwhile, liver of rats from group 2 showed Kupffer cells activation, cytoplasmic vacuolization of some hepatocytes and small focal hepatic necrosis associated with inflammatory cells infiltration (Fig. 2). Liver of rats from group 3 & 4 showed the same histopathological changes, examined sections revealed Kupffer cells activation and sinusoidal leukocytosis (Figs. 3 & 4). Meanwhile, liver of rats from group 5 showed no changes except slight Kupffer cells activation (Fig. 5). However, liver from group 6 revealed slight vacuolation of hepatocytes, Kupffer cells activation and sinusoidal leucocytosis (Fig. 6).

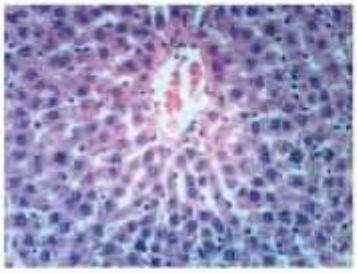

Fig. (1): Liver of rat fed on basal diet as control negative showing the normal histological structure of hepatic lobule (H & E X 400).

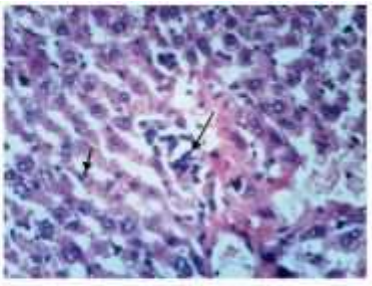

Fig. (2): Liver of rat fed on basal diet plus 1% fat as control positive showing, Kupffer cells activation, cytoplasmic vacuolization of some hepatocytes and small focal hepatic necrosis associated with inflammatory cells infiltration (H & E X 400)

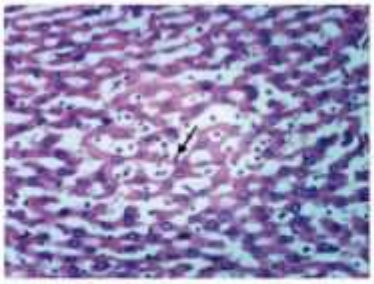

Fig. (3): Liver of rat fed on basal diet plus 1% fat and 5% different mixture herbs showing Kupffer cells activation and sinusoidal leukocytosis (H & E X 400).

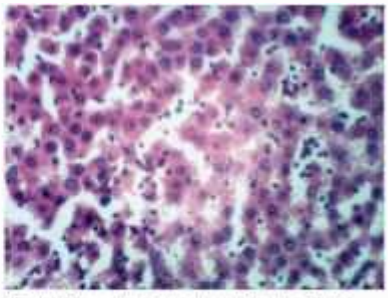

Fig. (4): Liver of rat fed on basal diet plus 1% fat and 10% different mixture herbs showing Kupffer cells activation and sinusoidal leukocytosis (H & E X 400).

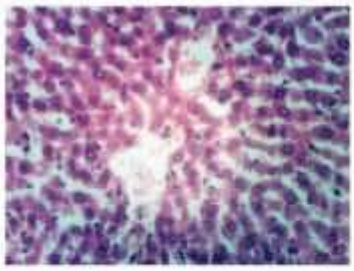

Fig. (5): Liver of rat fed on basal diet plus 1% fat and taken orally 50ppm/kg/day different mixture herbs showing slight Kupffer cells activation (H & E X 400).

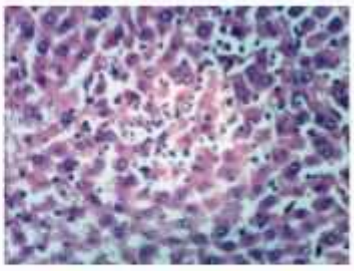

Fig. (6): Liver of rat fed on basal diet plus 1% fat and taken orally 100ppm/kg/day different mixture herbs showing slight vacuolation of hepatocytes, Kupffer cells activation and sinusoidal leucocytosis (H & E X 400).

Histopathological examination of spleen:

Spleen of rat from group 1 showed normal lymphoid follicle (Fig. 1). Moreover, all examined sections from all experimental groups revealed no histopathological changes (Figs. 2, 3, 4, 5 & 6)

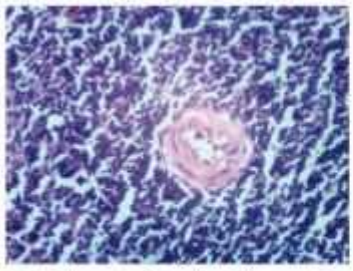

Fig. (1): Spleen of rat fed on basal diet as control negative showing normal lymphoid follicle (H & E X 400).

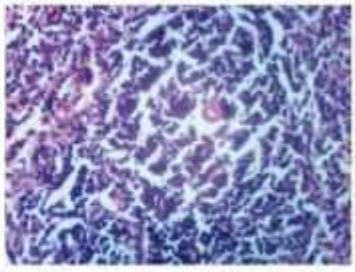

Fig. (2): Spleen of rat fed on basal diet plus 1% fat as control positive showing no histopathological changes (H & E X 400).

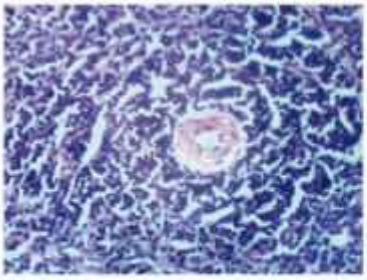

Fig. (3): Spleen of rat fed on basal diet plus 1% fat and taken orally 50ppm/kg/day different mixture herbs showing no histopathological changes (H & E X 400).

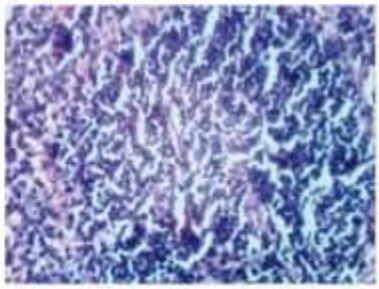

Fig. (4): Spleen of rat fed on basal diet plus 1% fat and 10% different mixture herbs showing no histopathological changes (H & E X 400).

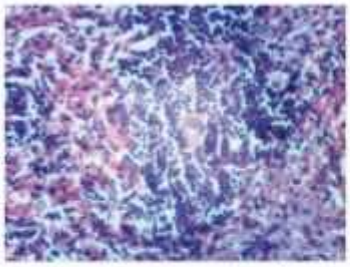

Fig. (5): Spleen of rat fed on basal diet plus 1% fat and taken orally 50ppm/kg/day different mixture herbs showing no histopathological changes (H & E X 400).

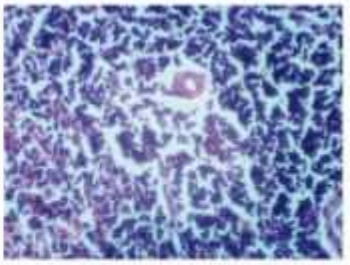

Fig. (6): Spleen of rat fed on basal diet plus 1% fat and taken orally 100ppm/kg/day different mixture herbsshowing no histopathological changes (H & E X 400).

CONCLUSION

From the results it could be concluded that the leaves from mallow (*Malva parviflora*), sage (*Salvia officinalis*) and senna (*Cassia angustifolia*) had contained rich amounts polyphenolic, minerals, fiber, and total carbohydrates from the literature.

Therefore, these herbs led to improvement the lipids profile, liver and kidney functions in rats' different groups fed on the mixture these herbs at 5.0 and 10% and also, the extract from these herbs in the mixture taken orally at level 50.0 and 100.0 mg/kg rat/ day led to improve the previous parameters in the obesity rats, these means these herbs as tool antiobesity. Moreover, the results from the histological experiment showed that the obesity rat organs as heart, spleen, liver, and kidney were confirmed the previous results and preservation of the different organs.

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الأعشاب الورقية كأداة لمكافحة السمنة

إعداد

السيدة الغندور السحار * عبور محمد محمد عبد الرحمن*

الملخص

السمنة هي احد الأمراض التي تهدد حياة الإنسان حيث تزيد من احتمالية الإصابة بالعديد من الأمراض المصاحبة لها وخاصةً أمراض القلب، وسكري النمط الثاني، وصعوبات التنفس أثناء النوم، وأنواع من السرطان، وعادةً ما تنتج السمنة من مزيج من زيادة في السعراتٍ الحراريةٍ و استهلاك كمية زائدة من الدهون مع قلةٍ في النشاط البدني والعوامل الوراثية واضطرابات الغدد الصماء، والأدوية، والأمراض النفسية

أجريت هذه الدراسة بهدف دراسة استخدام بعض الأعشاب الورقية كأوراق ألخبيزه و المريمية و السنا كمضادات للسمنة في مجموعات الفئران التي تتغذى على مزيج من هذه الأعشاب. واستمرت الدراسة لمدة ٤٥ يوم

وأسفرت نتائج الدراسة علي إن هناك زيادة معنوية في سكر الجلوكوز ودهون الدم الثلاثية الكوليسترول ونقص معنوي في الدهون منخفضة الكثافة وذلك بالمقارنة في المجموعة الضابطة الموجبة بالمجموعة الضابطة السالبة وكان هماك نقص معنوي سكر الجلوكوز ودهون الدم الثلاثية الكوليسترول وزيادة معنوي في الدهون مرتفعة الكثافة مع تحسن وظائف الكبد والكلي في المجموعات المتناولة للاعشاب الدراسة بالمقارنة بالمجموعة الضابطة الموجبة وأكدت والفحص الهستوباثولجي النتائج البيولوجية في مجموعات فئران السمنة المختلفة ومقارنتها مع المجموعات الضابطة والموجبة نهاية التجربة البيولوجية بعد ٦ أسابيع كانت نتيجة تناول هذه الأعشاب المحتوية على كميات كبيرة من الألياف والمركبات الفينوليه

التوصية وتوصي الدراسة باستخدام كلا من الأعشاب الورقيه كأوراق الخبيزه و المريمية و السنا كمضادات لحدوث السمنة

الكلمات المفتاحية : السمنة ومضادات الأكسدة والإعشاب الورقية ألخبيزه و المريمية و السنا .

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