PROBABLE HEALING OF OBESITY USING PLANTS AND THEIR PRODUCTS

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ABSTRACT: *The present work targeted, to study the effect of Boswelli serrate(olibanum), Commiphora myrrh (myrrh), Salvia officinals (sage), Coccoloba uvifera (sea grape) and mixture of all plants (as7.5%) on obese rats for reducing body weight and the increase of immunity.For this purpose , the study included 35 rats about 150±10(g) weight.Biological & chemical analysis of serum&blood were carried out. The results indicated that tested herbs reduced obesity and improved health of rats based on determinations of BWG, FI, FER, Serum glucose, Lipids profile, Liver enzymes and blood analysis .The best treatment was mostly that of the commixed herbs (herbs mixture).*

Key words : Obesity, Olibanum, Myrrh, Sage, Sea grape .

INTRODUCTION

Obesity is a medical condition in which excess body fat has accumulated to the extent which may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems. Body mass index (BMI), measurement which compares weight and height, defines people as overweight (pre-obese) if their BMI is between 25 and 30 kg/m2, and obese when it is greater than 30 kg/m2 (Haslam and James, 2005).

Obesity shares with most chronic diseases the presence of an inflammatory component, which accounts for the development of metabolic disease and other associated health alterations (Marti et al., 2001).

Myrrh stimulated phagocytosis in vivo. Its dietary supplementation induced a significant improvement of cellular immune response through stimulation of lymphocyte transformation, phagocytic activity (PA) and phagocytic index (PI) in Pb-intoxicated mice (Ashry and El-Ashmawy,2005).

The gum of *olibanum* has been reported to lower cholesterol and triglyceride levels in rats, and may increase the effects of lipid lowering agents.

Boswellia may interact with immunomodulators, herbs and supplements broken down by the liver, antibiotics, fat soluble drugs, chondroitin, glycosaminoglycans (GAGS) ,and sedatives (Sander et al., 1998).

MATERIALS AND METHODS

This work was carried out in the animal house of the Faculty of Home Economics, Minufiya University.

Materials

This study used four species of herbs *Salvia officinals* (Sage), *Coccoloba uvifera* (Sea grape), *Commiphora myrrh* (Myrrh), and *Boswellia serrata* (Olibanum),which were used individualy and as a mixture of them for treatment of obesity were purchased from the spices shop. Experimental animals: Therty five male albino rats, weighting (150±10g) each obtained from Faculty of Science, Helwan university, were used in this study.

Methods
Preparation of herbs:

All herbs were milled by using mill to give a powder and were kept in plastic bags in a cool and dry location for using

according to (Russo, 2001) who indicated that all herbs and plant are best stored in a cool, dry and dark place to reduce oxidation of their contents.

Experimental design and rats groups

Obese rats were obtained by feeding on high fat diet for 28 days, until reaching about 206g weight. Rats were fed on basal diet for a week as an adaptation period. Obese rats were fed either on basel diet control(-ve) or with addition of 7.5% of *Salvia officinals* (Sage), *Coccoloba uvifera* (Sea grape), *Commiphora myrrh* (Myrrh),and *Boswellia serrata* (Olibanum), equalised mixture of all herbs at 7.5%. After 28 days of feeding blood&serum were obtained.

The experimental groups were classified in to 7 groups each of 5 rats as follows:

1. **Group1 (-Ve):** Negative control group, in which normal rats fed on basal diet for 4 weeks.
2. **Group2(+Ve):** Positive control group, in which obese rats fed on basal diet for 4 weeks.
3. **Group3(Olibanum 7.5%):** Obese rats fed on basal diet plus 7.5% of olibanum powder for 4 weeks.
4. **Group4(Myrrh 7.5%):** Obese rats fed on basal diet plus 7.5% of myrrh powder for 4 weeks.
5. **Group5(Sea grape 7.5%):** Obese rats fed on basal diet plus 7.5% of Sea Grape powder for 4 weeks.
6. **Group6(Sage 7.5%):** Obese rats fed on basal diet plus 7.5% of Sage powder for 4 weeks.
7. **Group7(Mixture of all plants 7.5%):** Obese rats fed on basal diet plus 7.5% of mixture of all plants(at equal proportions) for 4 weeks.

The following parameters were assessed

• Biological and biochemial factors

1. **Body weight gain % (BWG%)** : (Chapman *et al.,*1959).

2. **Feed efficiency rat (FER) :** (Chapman *et al.,*1959).
3. **Serum glucose:** (Trinder ,1969).
4. **Serum triglycerides (T.G):** (Fossati and Principe,1982).
5. **Serum total cholesterol (T.C):** (White *et al.,*1970).
6. **Serum high density lipoprotein cholesterol (HDL-c):** (Lopez ,1977).
7. **Serum very low density lipoprotein cholesterol (VLDL-c) and low density lipoprotein cholesterol (LDL-c):** (Lee and Nieman,1996):

   VLDL(mg/dl) = Triglycerdes/5

   LDL(mg/dl)=Total cholesterol–(HDL+VLDL)
8. **Serum Urea :** Malhotra(2003) .
9. **Serum Creatinine:** (Chary and Sharma, 2004) .
10. **Uric acid:** (Fossatti and Prencipe,1980).
11. **Serum glutamate oxaloacetate transaminase (s.GOT):**(Chawla, 2003).
12. **Serum glutamate pyruvate transaminase (s.GPT):** (Tietz,1976).
13. **Serum alkaline phosphateas (ALP):**(Haussament,1977).

• Blood cell and immunoligcal factors:

14. **Hemoglobin (Hb):** (Dacie and Lewis, 1998).
15. **Mean corpuscular volume(MCV):**(Lee and Nieman.,1996).
16. **White blood cells (WBCs) count :**(Koda- Kimble *et al.,* 2001).

Histopathologicalexamination:

Kidney, liver, and heart samples were fixed in neutral formalin solution10%. Section of (4-6) Mm thickness were prepared and stained with Hematoxylin and Eosin according to (Bancroft *et al* ., 1996).

Statistical Analysis

The data were analyzed using a completely randomized factorial design(SAS, 1988) when a significant main effect was detected, the means were separated with the Dunken Test. Differences between treatment at (P < 0.05) were considered significant.

RESULTS AND DISCUSSION

Biological results:

Table (1) showed the effect of *Olibanum, Myrrh, Sage (mariyamia), Sea grape* and Mixture of all plants as 7.5% of diet for 4 weeks on Body weight gain (BWG%) feed efficiency ratio (FER) and Feed intake (FI) of obese rats .

Body weight gain (BWG%)

It could be observed that the mean value of control (+) group was higher than control (-) group.Numerically group 5(*sage,mariymia* 7.5%) revealed the best group for decreasing BWG level of obese rats when compared to control (-) group.

Feed efficiency ratio (FER)

Nonsignificant differences were noticed between groups 5&6 and revealed the best groups for FER of obese rats when compared to control (-) group(healthy rats).In the work of El –Nagar (2010),FER of control(+) obese rat group fed on basal diet was 0.07, while FER for obese rat fed on *myrrh* diet was – 0.08 in the case of herbal mixture diet of El –Hendawy, Basma(2012),FER was from -0.118 to -0.133%. Al-Gheita,Shaimaa (2012) found that the FI change % of +150 for control(+)ve group and -12.5% for Kombocha tea and Kombocha&plus different tea preparations.Meanwhile in present work FER was ranged from -34.306to -59.124% of control(+)ve.

Feed intake (FI)

It could be noticed that the mean value of control (+) group was lower than control (-) group. Nonsignificant differences were found between groups 1&6. Numerically group 7(7.5% Mixture of all plants)recorded the best group for FI of obese rats when compared to control (-) group.In the work of El –Nagar (2010),FI g/day of control(+) obese rat group fed on basal diet was 21.25 g/day, while for obese rat fed on myrrh diet was – 16.07 g /day showing dereasing in FI .But in the case of herbal mixture diet of El –Hendawy, Basma(2012),FI change was from -20.48 to -46.92%. Al-Gheita,Shaimaa (2012) found that the FI change of control (+) was (-2.52 to -5.50) for Kombocha tea and Kombocha&plus different tea preparations. Meanwhile in present work FI was ranged from +11.219 to -7.926.in differelt treatments Anon(2012- d,e,l), Chenetal, (2012) confirmed the BWG lowerimg effect of *Myrrh* when treating obesity.Triphathi (2008) reported that *Olibanum* used in treatment of obesity in human.Anon(2012-f)suggested that Sea grape ameliorate the development of obesity and enhances the weight loss. Kiyofumi(2004) found that the methanolic extract from the leaves of *salvia officinals* L. sage reduced the body weight gain and accumulation of epididymal fat in high fat diet –fed mice after 14 days.

Table (2) showed the effect of *Olibanum, Myrrh, Sage(mariyamia), Sea grape* and Mixture of all plants on serum glucose in obese rats.

Serum glucose

Nonsignificant differences were noticed between groups 3&6.Group 7 (mixture of all plants)showed nonsignificant difference as compared to control(-) group (healthy rats)and recorded the better treatment for decreasing glucose level of obese rat. In the work of El –Hendawy, Basma(2012),serum glucose change of control (+)was from -14.55 to -29.09% for different herbal tea. Anon(2012d,e)&Anon(2012-b)confirmed the BWG lowerimg effect of *Myrrh* when treating obesity.Triphathi (2008) reported that *Olibanum* used in treatment of obesity in human.

Table (3) showed the effect of *Olibanum, myrrh, Sage, sea grape* and Mixture of all plants on serum total cholesterol, triglycerides, HDL-c, VLDL-c & LDL-c in obese rats.

A-Serum total cholesterol (T.C)

All treatments indicated significant differences when compared to control (+) group . Numerically group 6 (Sage) recorded the best treatment for decreasing cholesterol level of obese rats.

Table 1

Table 2

Table 3

B-Serum triglycerides(T.G.).

All treatments showed significant differences when compared to control (+) group . Nonsignificant differences were noticed between groups 3,4&5. Group 7 (mixture of all plants) recorded the best treatment for decreasing triglycerides level of obese rats when compared to control (-) group.

C-Serum high density lipoprotein-cholesterol (HDLc)

All treatments showed significant differences when compared to control (+) group . Nonsignificant differences were observed between groups 3,4,5&7. Group 3 (Olibanum) recorded the best treatment for increasing HDLc level of obese rats when compared to control (-) group.

D-Serum very low density lipoprotein-cholesterol (VLDLc)

It could be noticed that the mean value of control (+) group was higher than control (-) group. Nonsignificant differences were noticed between groups 3,4&5. Group 7 (mixture of all plants) recorded the best treatment for decreasing VLDLc level of obese rats when compared to control (-) group.

E-Serum low density lipoprotein-cholesterol (LDLc)

It could be observed that the mean value of control (+) group was higher than control (-) group .Groups 3,4&5 showed the better treatment for decreasing LDLc level of obese rats when compared to control (-) group.

In serum control (+) (obese rats)TC,TG,LDL&VLDLwere increased while HDL declined .Such trends of change were also recorded by EL-Nagar (2010),EL-Hendawy,Basma(2012)&Al-Gheita, Shaimaa (2012). when feeding intervention by diet *myrrh* ,herbal tea , Kombocha tea and Kombocha&plus different tea preparations carried out, these changes were reversing indicating health improvemenmt.Lee and Nieman (1996) reported that *myrrh* may reduce cholesterol level.Anon(2012-a) found that *myrrh* is used as an ingredient for one

of and herbal remdies for treating high cholesterol problems.Mao (2012) suggested that *myrrh* is used to treat conditions related to heart.Shen *et al.,*(2012) reported that of *myrrh* resin in India and that of *molmol* in Egypt have been developed as anti hyperlipidemia. Anon (2012-d) indicted that *olibanum* enhanced the function of heart.Tripathi (2008) reported that *olibanum* is used in treatment of hyperlipidemia. Anon (2012-e) found that (*Boswelliaserrata*) was useful for hyperlipidemia.Anon(2012-f)suggested that the extract from *olibanum* had properties that tend to make it effective for lowering cholesterol. Anon (2012-g) recorded that s*ea grape* can reduce cholesterol and lower blood pressure.Anon (2012-h) demonstrated that *sea grape* had hypolipidemic, hypocholesterolemic effect.

Table (4) showed the effect of *Olibanum, Myrrh, Sage, sea grape* and Mixture of all plants on some blood parameters & in obese rats.

1- Hemoglobin (Hb)

It could be noticed that the mean value of control (+) group was lower than control (-) group. Nonsignificant differences were observed between groups 1&7 . Group 7 (7.5% Mixture of all plants) revealed the best group for increasing (Hb) level of obese rats and recorded the same value of control (-) (healthy rats).

2- Mean Cell Volume(MCV)fL

It could be observed that the mean value of control (+) group was lower than control (-) group. Nonsignificant differences were observed between groups 1,3,4,5,6&7. therefore all experimental groups except treatment 2 were statistically similar to that of group 1(heathy rats). Group 7(7.5% Mixture of all plants)revealed the best group for increasing (MCV) level of obese rats .

3- Blood Cell Distribution Width (RDW %)

It could be noticed that the mean value of control (+) group was higher than control (-) group. Nonsignificant differences were observed between groups 1&6 . Group 3(*olibanum*)recorded the best group for decreasing (RDW %) level of obese rats .

Table 4

Table (5) showed the effect of Olibanum, Myrrh, Sage, Sea grape and Mixture of all plants on liver function in obese rats.

A-Serum glutamic oxaloacetate transaminase GOT (AST)

It could be observed that the mean value of control (+) group was higher than control (-) group. Group 7(7.5% mixture of all plants) recorded the best group for decreasing GOT level of obese rats when compared to control (+) group.

B-Serum glutamic pyruvate transaminase GPT (ALT)

It could be observed that the mean value of control (+) group was higher than control (-) group. Numerically treatment 3(7.5% olibanum) indicated the best group for decreasing GPT level of obese rats when compared to control (+) group.

C-Serum alkaline phosphatase ALP

It could be observed that the mean value of control (+) group was higher than control (-) group. Group 7(7.5% Mixture of all plants) revealed the best treatment for decreasing ALP level of obese rats when compared to control (+) group.

Liver function evidently deteriorated in obese rats as indicated by the rise of liver enzymes activities. Meanwhile the nutritional intervention for obese rats using Myrrh, herbal tea and Kombucha& kombucha plus different tea preparations improved liver functions as reported by EL-Nagar (2010), EL-Hendawy, Basma (2012) & Al-Gheita, Shimaa (2012) found that herbs led to pronounced reductions in AST ,ALT&ALP enzymes activities.

Paraskeva (2008) reported that myrrh extract had antioxidant properties which may be useful for hepatitis proplems. Anon(2012-a) found that myrrh is used as an ingredient for olibanum enhanced the function of liver. incense and herbal remedies for treating liver problems.Mao (2012) suggested that myrrh is used to treat conditions related to hepatointoxication. Anon (2012-c) concluded that myrrh was able to stop clinically induced liver damage caused by lead in mice.

Tripathi (2008) reported that olibanum had antioxidant effect and may be used for treatment of liver patient. Anon (2012-d) found that Anon (2012-e)suggested that Bowellia serrata could be used for hepatitis-C toxin –induced liver damage.

Nguyen (2011) determined the total phenolic content and antioxidant activity of sea grape and could be useful for human health. Anon (2012-h) demonstrated that sea grape had hepatoprotetive effect with daily ingestion of tea from sea grape leaves.

Anon (2012-i) reported that sage is used in Chinese medicine for hepatitis patient.

Table (6) showed the effect of *Olibanum, Myrrh,Sage, Sea grape* and Mixture of all plants on kidney function in obese rats.

A-Serum uric acid

It could be observed that the mean value of control (+) group was higher than control (-) group. Group 3 *(olibanum)* recorded the best treatment for decreasing uric acid level of obese rats when compared to control (+) group.

B-Serum urea nitrogen

It could be noticed that the mean value of control (+) group was higher than control (-) group. Group 7 (7.5% mixture plants) recorded the best treatment for decreasing urea nitrogen level of obese rats when compared to control (+) group.

C-Serum creatinine

It could be noticed that the mean value of control (+) group was higher than control (-) group. Group 5(7.5% sage)was found to be the best group for decreasing creatinine level of obese rats when compared to control (+) group.

Inflicting of rats with resulted obesity resulted in the increase of of creatinine,uric acid &urea of serum which were reduced when obese rats fed on diets supplemented with *myrrh* ,herbal tea & kombucha tea and kombocha&plus different tea preparations as reported by EL-Nagar (2010), EL-Hendawy, Basma (2012) & Al-Gheita, Shaimaa (2012).

Table 5

Table 6

Yoga (2012) concluded that myrrh was used as diuretic for centuries (increase the flow of urine)&reported that myrrh had improvement properties for creatinine ,urea &uric acid in hypercholesterolemic albino rat.

Anon (2012-j) reported that olibanum are used for treatment of urinary disorder. Anon(2012-e) found that Boswellia serrata had diuretic effect.

Anon(2012-k) suggested that olibanum are used for urinary infections.

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إمكانية علاج السمنة باستخدام نباتات ومنتجاتها

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الملخص العربي

يهدف العمل الحالي إلى دراسة تأثير بعض النباتات (نبات الكندر "لبان الدكر "،القرسيون " المريمية"، المر " المر الحجازى"، عنب البحر) وخليط من هذة النباتات بنسبة ٧.٥% على الفئران وكيف تساهم فى خفض أوزانهم بالاضافة لزيادة مناعتهم وقد اجريت هذة الدراسة على ٣٥ فأرا تتراوح أوزانهم من١٥٠ جرام±١٠جرام وذلك باستخدام التحاليل البيولوجية والكيميائية لسيرم الدم والفحوص الهستوباثولوجية للاعضاء الداخلية لها . أشارت النتائج بأن النباتات المختبرة خفضت السمنة و حسنت الصحة للفئران وذلك بناءا على تقديرات كل من مؤشر اكتساب الوزن والمأخوذ اليومى من الطعام و معدل كفاءة الاستفادة من الغذاء و مستوى الجلوكوز و انزيمات الكبد وتحاليل الدم.كما وجد ان افضل المعاملات هى غالبا مجموعة الخليط التى تحتوى على خليط الأعشاب .

الكلمات المفتاحية : السمنة ، لبان الدكر ، المر ، القرسيون ، عنب البحر .

Table (1): Effect of *Olibanum, Myrrh, Sage (mariyamia), Sea grape* and Mixture of all plants as 7.5% of diet for 4 weeks on Body weight gain (BWG%) feed efficiency ratio (FER) and Feed intake (FI) of obese rats

Parameter / Groups	BWG%		FI		FER	
	%	%Change of(+ve)	g / day	% change of(+ve)	Ratio	% change of(+ve)
Group (1) Control(-)ve	15.003±1.053 c d	- 51.657	17.500 ± 0.500b	+6.707	0.046 ± 0.0043 d	-99.664
Group (2) Control(+)ve	31.035 ± 1.599 a	---	16.400 ± 0.418c	---	0.137 ± 0.0105 a	---
Group (3) 7.5% olibanum	18.966 ± 1.375 b	- 38.888	15.400 ± 0.821d	- 6.097	0.090 ± 0.0068 b	-34.306
Group (4) 7.5% myrrh	17.111±2.464 b c	- 44.865	16.400 ± 0.547c	---	0.076 ± 0.008 c	-44.525
Group (5) 7.5% sea grape	13.232 ± 1.501 d	- 57.364	18.240 ± 0.559a	+11.219	0.056 ± 0.010 d	-59.124
Group (6) 7.5% sage	13.337 ± 1.883 d	- 57.025	17.400 ± 0.418b	+6.097	0.056 ± 0.070 d	-59.124
Group (7) 7.5% mixture of all plants	16.180 ± 2.693 c	- 47.865	15.100 ± 0.418d	-7.926	0.078 ± 0.012 c	-43.065

Values are denoted arithmetic as means ± standard deviation of the mean.
Means with different letters in the same column differ significantly at $p < 0.05$

Table (2): Effect of *Olibanum, Myrrh, Sage(mariyamia), Sea grape* and Mixture of all plants on serum glucose in obese rats

Groups	Glucose (mg/l)	% Change of C(+ ve) group
Group (1) Control(-)ve	78.400 ± 4.615 d	- 40.749
Group (2) Control(+)ve	132.320 ± 13.385 a	---
Group (3) 7.5% olibanum	100.250 ± 6.609 b c	- 24.236
Group (4) 7.5% myrrh	98.000 ± 5.831 c	- 25.937
Group (5) 7.5% sea grape	110.000 ± 5.049 b	- 16.868
Group (6) 7.5% sage	103.500 ± 6.062 b c	- 21.780
Group (7) 7.5% mixture of all plants	81.400 ± 4.560 d	- 38.482

Values are denoted arithmetic as means ± standard deviation of the mean.
Means with different letters in the same column differ significantly at $p < 0.05$

Table (3): Effect of *Olibanum, Myrrh , Sage(mariyamia), Sea grape* and Mixture of all plants on triglycerides, total cholesterol, HDL-c, LDL-c, and very low density lipoprotein cholesterol as added at 7.5% of diet for 4 weeks

Parameter / Groups	Serum triglycerides (T.G)		Serum cholesterol (TC)		Serum HDL-c		Serum VLDL-c		Serum LDL-c	
	Mg/dl	% change	mg/dl	% change	mg/dl	% change	mg/dl	% change	mg/dl	% change
Group (1) Control(-)ve	54.400± 4.159 d	- 55.409	123.000±3.000c	- 31.666	87.000±2.121 a	+ 97.727	10.880±0.831 d	- 55.409	25.120 ± 5.365 e	- 77.49
Group (2) Control(+)ve	122.000±4.847 a	----	180.000±3.741 a	-----	44.000±3.162 d	---	24.400±0.969 a	---	111.600±3.307 a	----
Group (3) 7.5% olibanum	101.000±4.949 b	- 17.213	146.000±5.099 b	- 18.888	74.000±3.162 b	+ 68.181	20.200±0.989 b	- 17.213	51.800 ± 1.783 d	-53.584
Group (4) 7.5% myrrh	99.600±4.277 b	- 18.360	145.000±6.123 b	- 19.444	72.400±2.302 b	+ 64.545	19.920±0.855 b	- 18.360	52.680 ± 3.579 d	-52.795
Group (5) 7.5%sea grape	96.600 ± 5.029 b	- 21.639	140.000±4.847 b	- 22.222	70.600±2.073 b	+ 60.454	19.320±1.006 b	- 20.819	50.08 ± 8.689 d	-55.125
Group (6) 7.5% sage	81.000 ± 5.916 c	- 33.606	138.750±3.596 b	-22.916	68.000±3.391 c	+ 54.545	16.200 ± 1.183 c	- 33.606	54.550 ± 1.078 c	-51.120
Group (7) 7.5%mixture	59.000 ± 6.041 d	- 51.639	141.892±16.897b	- 21.171	73.000±4.358 b	+ 65.909	11.800 ± 1.208 d	- 51.639	57.092± 3.529 b	-48.842

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Means with different letters in the same column differ significantly at p < 0.05

Table (4): Effect of *Olibanum, Myrrh, Sage(mariyamia), Sea grape* and Mixture of all plants on complete blood count (CBC) & serum analysis of obese rats

Parameter / Groups	Hemoglobin(Hb)		Mean Cell Volume(MCV)		Blood Cell DistibutionWidth(RDW)	
	mg/dl	%Change of (+ve) g	fL	% change	%	% change
Group (1) Control(-)ve	15.50 ± 1.1^a	+46.22	54.90 ± 2.2^{ab}	+10.68	16.80 ± 1.1^b	-16.83
Group (2) Control(+)ve	10.6 ± 0.1^c	---	49.60 ± 1.5^c	---	20.20 ± 1.2^a	---
Group (3) 7.5% olibanum	14.30 ± 1.2^b	+34.90	52.20 ± 1.2^{abc}	+5.24	13.80 ± 1.0^e	-31.68
Group (4) 7.5% myrrh	14.70 ± 1.1^b	+38.67	50.88 ± 2.5^{bc}	+2.59	14.9 ± 1.5^c	-26.24
Group (5) 7.5% sea grape	14.50 ± 1.1^b	+36.79	52.55 ± 1.1^{abc}	+5.95	15.50 ± 1.1^c	-23.27
Group (6) 7.5% sage	14.50 ± 1.3^b	+36.79	53.53 ± 2.1^{ab}	+7.92	16.10 ± 1.2^b	-20.30
Group (7) 7.5% mixture of all plants	15.5 ± 1.1^a	+ 38.482	56.55 ± 2.7^a	+ 14.01	14.80 ± 1.4^d	-26.73

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Means with different letters in the same column differ significantly at $p < 0.05$

Table (5): Effect of *Olibanum, Myrrh, Sage(mariyamia), Sea grape* and Mixture of all plants at7.5% of diet for 4 weeks on liver function in obese rats

Parameter \\ Groups	GOT (AST)		ALT(GPT)		ALP	
	(U/L)	%Change of (+ve)	(U/L)	% change of (+ve)	(U/L)	% change of (+ve)
Group (1) Control(-)ve	23.050 ± 1.806 [d]	- 49.891	20.100 ± 2.355 [c]	- 39.366	24.550 ± 4.302 [e]	- 66.020
Group (2) Control(+)ve	46.000 ± 2.549 [a]	---	33.150 ± 2.342 [a]	---	72.250 ± 4.520 [a]	---
Group (3) 7.5% olibanum	36.600 ± 1.516 [b]	- 20.434	22.650 ± 3.935 [b]	- 31.674	40.500 ± 6.020 [c]	- 43.944
Group (4) 7.5% myrrh	37.720 ± 1.856 [b]	- 18	25.600 ± 2.190 [bc]	- 22.775	48.850 ± 4.872 [b]	- 32.387
Group (5) 7.5% sea grape	34.950 ± 2.648 [b]	- 24.021	25.350 ± 2.233 [b]	- 23.529	48.950 ± 3.675 [b]	- 32.249
Group (6) 7.5% sage	31.600 ± 2.073 [c]	- 31.304	22.800 ± 3.271 [bc]	- 31.221	30.250 ± 2.217 [d]	- 58.131
Group (7) 5% mixture of all plants	31.000 ± 2.915 [c]	- 32.608	24.000 ± 1.870 [b]	- 27.601	24.00 0 ±3.937 [de]	- 66.782

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Means with different letters in the same column differ significantly at $p < 0.05$

Table (6): Effect of *Olibanum, Myrrh, Sage(mariyamia), Sea grape* **and Mixture of all plants at 7.5% of diet for 4 weeks on Body on kidney function of obese rats**

Parameter / Groups	Uric acid		Urea nitrogen		Creatinine	
	(mg/dl)	%Change of (+ve)	(mg/dl)	% change of (+ve)	(mg/dl)	% change of (+ve)
Group (1) Control(-)ve	1.632 ± 0.108 c	-34.72	56.650 ± 2.342 d	-29.539	0.570 ± 0.064 e	- 43
Group (2) Control(+)ve	2.500 ± 0.212 a	---	80.400 ± 8.792 a	---	1.000 ± 0.122 a	---
Group (3) 7.5% olibanum	1.760 ± 0.151 c	-29.6	65.800 ± 3.114 b c	-18.159	0.826 ± 0.082 b c	- 17.4
Group (4) 7.5% myrrh	2.162 ± 0.138 b	-13.52	71.000 ± 3.464 b	-11.691	0.850 ± 0.050 b c	- 15
Group (5) 7.5% sea grape	2.075 ± 0.178 b	-17	67.500 ± 0.500 b	-16.044	0.660 ± 0.054 d e	- 34
Group (6) 7.5% sage	1.980 ± 0.130 b	-20.8	65.120 ± 3.636 b c	-19.004	0.876 ± 0.109 b	- 12.4
Group (7) 5% mixture of all plants	2.040 ± 0.054 b	-18.4	60.280 ± 2.459 c d	-25.024	0.750 ± 0.050 c d	- 25

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Means with different letters in the same column differ significantly at $p < 0.05$

Probable healing of obesity using plants and their products...........................