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Anti-obesity Effect of Some Herbal Mixtures (Anise, Fennel, Mint and Black Seed) in a high fat diet - Induced Obese Rats

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Abstract

Stoutness is a complex persistent illness where strange or overabundance of muscle versus fat (adiposity) debilitates well-being, expands the danger of unexpected long-haul issues and diminishes life length. The current research aimed to examine the counterweight impact of some home-grown blends (Anise, Fennel, Mint and Black Seed) on prompted fat rats. Thirty adult male albino Sprague-Dawley rats were partitioned into two main groups. As an ordinary benchmark group, the first group (6 rats) benefited from a basal diet (BD). The second main group (24 rats) was benefited from a high-fat eating regimen that incited corpulence then, at that point, characterized into four equivalent sub gatherings as follows: group (2), as a positive control group, fed on BD and groups (3-5) fed on BD containing 2.5, 5.0 and 7.5% (w/w) the tried home-grown blends (anise, fennel, mint and black Seed) for 28 days, individually. Results showed that obesity-induced disturbance in BWG, FI, FER and organs (liver, kidney and spleen) weight of obese rats. Also, liver and kidney functions, serum lipid profile and serum glucose levels were affected. Treatment of the obese rats with tested herbal mixtures (anise, fennel, mint and black Seed) led to improvements in all of those parameters, and a dose-response behavior was recorded. Finally, the histological examination data agreed with the biological and biochemical results obtained. In conclusion, these discoveries give a premise to utilizing natural combinations (anise, fennel, mint and black seed) for the early treatment of obesity.

Keywords: *Body weight, liver capacities, kidney capacities, serum glucose, serum lipid profile, histological examination*

Introduction

Weight is a complex ongoing illness where unusual or abundance muscle versus fat (adiposity) that impedes wellbeing builds the danger of long-haul unexpected issues and diminishes life range. Notwithstanding, because of individual contrasts in body structure, muscle to fat ratio circulation and capacity, the edge to which adiposity disables wellbeing is exceptionally factor among grown-ups [1]. Epidemiological and populace studies characterize stoutness utilizing the weight file (BMI, weight/height²). BMI is a genuinely solid anthropometric estimation to delineate heftiness related wellbeing hazards at the populace level. Corpulence is functionally characterized as a BMI surpassing 30 kg/m² and is subclassified into class I (BMI 30–34.9), class II (BMI 35–39.9) and class III (BMI <40) [2]. The weight loss has beneficial effects on blood pressure, glucose, lipids and psychological status. In addition, other benefits include (1) Improvement in quality of life (2) Relief in symptoms of dyspnea and chest pain and (3) reduction in number of days of sick leave [3].

Spices blend comprising of (anise, fennel, black seed and mint) were utilized in present work. Anise organic products, called anise seed, contain around 1.5 to 5.0% fundamental oil, which is made out of over 90% unpredictable phenylpropanoids like transanethole followed by γ -himachalene, methyl chavicol (estragol), anisaldehyde, β - himachalene and α -zingiberene 30. The vitally fundamental oil presence in anise seeds is anethole, estragol, p-anisaldehyde, anise liquor, acetophenone, pinene and limonene [4].

Both seeds and fundamental oils of anise is promising for safe use as super food enhancements and crude constituents in both drug and food ventures [5]. The anise oil prompted an increment in body weight. It has been referenced that anise oil positively affects the assimilation of food , notwithstanding the anise oil prompted decline in the degree of cholesterol, fatty oils , LDL-c levels [6].

Fennel (*Foeniculum vulgare*) is considered as a native Mediterranean plant yet is presently developed in many regions of the planet on dry soils close to the coast or stream banks. Key fennel creating nations are India, Egypt, Turkey, Syria and Iran [7]. It contains flavonoids, glycosides and other phytoconstituents present in it which utilized in therapeutic diseases reason. Phenolic intensifies present in fennel can elevate to the human wellbeing. Trans-anethole, estragole, fenchone and bioactive mixtures kaempferol, quercetin, rosmarinic corrosive have been disengaged from this plant and a few partner with planned human body instruments [8]. Trypsin inhibitors in fennel lessen food allow and animate cholecystokinin discharge, expanding satiety and that is the justification for fennel's relationship with weight control. Weight reduction Fennel builds the digestion of fats and sugars in liver and pancreas. It disintegrates fat stores in circulation system likewise and permits it to be utilized as an energy source. These viewpoints joined with its regular diuretic impact and a standing as

a hunger suppressant makes it a superb solution for weight reduction [9]. Black seeds incorporate fifteen unique sorts of amino acids out of which 9 are basically significant, carbs, some crucial unsaturated fats like oleic, linolenic, linoleic acids, niacin, nutrient (A, B1, B2 and C) alongside some fundamental minerals [10]. Black seeds alone or in mix with honey, have been utilized for quite a long time to treat different human conditions, including obesity, hyperglycemia, raised plasma lipids, cardiovascular problems, fundamental irritation, irresistible illnesses and wounds [11]. Peppermint (*Mentha piperita*) is a half breed mint, a combination of water mint and spearmint. It is otherwise called *Mentha balsamea* Wild. The plant is generally dispersed and developed in numerous districts of the world. the sort *Mentha* includes in excess of 25 species and among this multitude of species, peppermint is the most well-known one [12]. Peppermint plants contain ~3% unpredictable oils, comprising of >50 various mixtures. The major EO parts, which make up ~60% of its complete oil volume, are limonene, linalool, menthone, menthol, and pulegone [13]. The peppermint remove contains a few bioactive fixings with known antiobesity properties and is conceivably helpful in treatment of stoutness and overweight related difficulties (e.g., diabetes and cardiovascular sicknesses). These mixtures incorporate flavonoids like catechin, epicatechin, rutin, myricetin, luteolin, apigenin, naringenin, kaempferol, and quercetin and phenolic acids, for example, rosmarinic, gallic, chlorogenic, and caffeic acids [14]. The current review completed to explore the counterweight impact of some home-grown blends including anise, fennel, mint and black Seeds on initiated fat rats.

Material and Methods

Ethical approval

Organic investigations for this review were morally endorsed by the Scientific Research Ethics Committee (Animal Care and Use), Faculty of Home Economics, Menoufia University, Shibin El-Kom, Egypt (Approval no. 02-SREC-08-2018).

Materials

Seeds of Anise, Fennel, Mint and Black Seed were gotten from Harraz for food industry and Natural Products, Bab ALkhalq, Cairo, Egypt. casein as main source of protein obtained from Morgan company Cairo, Egypt. vitamins mixture and salt mixture were purchased from El-Gomhoria company Cairo, Egypt.

Thirty male albino rats, weighting 150 ± 10 g were bought from Medical Insects Research Institute, Dokki, Cairo, Egypt.

Methods

Preparation of plant parts

All dried seeds were crushed into powder by utilizing high velocity combination (Moulinex Egypt, Al-Araby Co., Egypt) and kept in gloomy stoppered glass bottles in a cool and dry area until use according to Russo, [15].

Biological experiments

Preparation of basal Diet (BD)

The BD arranged by the accompanying equation as referenced by AIN, [16].

Experimental design

The experimental was done in the Faculty of Home Economics, Menoufia University, Shibin El-Kom. Rats were housed in wire confines in a room temperature 25°C and held under ordinary solid conditions. All rats were fed on BD for one-week prior to beginning the analysis for acclimatization. Following one-week time frame, the rats were separated into two main groups. First group (6 rats), as a normal control group were fed on BD. b Second main groups (24 rats) were fed on high fat eating routine (35% creature lipid) enhanced in the basal eating regimen then, at that point, characterized into four equivalent subgroups as follow: group (2), as a positive control group, fed on BD and groups (3-5) fed on BD containing 2.5, 5.0 and 7.5% (w/w) the tried home-grown combinations, individually. Every one of the above groups were kept in a solitary enclosure for 28 days. Rats were weighted toward the start of exploratory then week by week and toward the finish of the test time frame.

Biological evaluation

During the test time frame, the eating routine burned-through was recorded double a week after week and body weight was recorded each week. The body weight gain (BWG, %), feed admission (FI) and feed productivity proportion not really settled by Chapman et al., [17], using the following equations: $BWG\% = \frac{\text{Final weight} - \text{Initial weight}}{\text{Initial weight}} \times 100$; $FER = \frac{\text{gain in body weight (g/28 day)}}{\text{feed intake (g/28 day)}}$.

Blood sampling

Toward the finish of examination period, a month, blood tests were gathered following 12 hours fasting utilizing the stomach aorta and rats were scarified under ether anesthetized. Blood tests were gotten into clean dry axis cylinders and left to clump at room temperature, then, at that point, centrifuged for 10 minutes at 4000 rpm to isolate the serum. Serum was cautiously suction, moved into clean want tubes and put away frozen at - 20oC until examination.

Histology examination

Simultaneously, the organs: The various organs of rats (liver and heart) were painstakingly eliminated, washed in saline arrangement, dried between 2 channel papers and promptly weighted kept in cushioned formalin arrangement (10%) for histological assessment.

Analytical Methods

Serum lipid profile

Fatty substances, absolute cholesterol and HDL-cholesterol was done by the strategies for [18-20], respectively. VLDL (exceptionally low-thickness lipoproteins) and LDL

were determined by the technique for [21], as follows: VLDL (mg/dl) = Triglycerides/5, LDL (mg/dl) = (Total cholesterol – HDL) – VLDL

Blood glucose

Enzymatic assurance of plasma glucose was done calorimetrically as indicated by the strategy for [22].

Renal functions

Urea, creatinine and uric Acid was determinate as indicated by the enzymatic techniques for Patton and Crouch [23] and Henry [24], individually.

Liver functions parameters

Serum alanine aminotransferase (ALT) and serum aspartate amino-transferase (AST) exercises were estimated in serum utilizing the altered motor strategy for Clinica Chimica Acta, [25] and Hafkenschied [26] by utilizing unit provided by Biocon Company, separately. Basic Phosphatase (ALP) not set-in stone utilizing altered active technique for Belfield and Goldberg [27].

Histopathological examination

Little examples of the organs (liver and heart) were taken from each test bunch, fixed in impartial cradled formalin, got dried out in climbing centralization of ethanol (70, 80, 90%), cleared in xylene and installed in paraffin. Areas of (4-6) μ m thickness were ready and stained with Hematoxylin and Eosin according to Bancroft et al., [28].

Statistical analysis

Factual investigation were performed by utilizing PC program (COSTAT) when a critical primary impact was recognized, the means were isolated with the understudy new mankeuls test [29].

Results and Discussion

Impact of various convergences of blend spices powder on body weight gain (BWG), feed admission (FI) and feed proficiency proportion (FER) of obese rats Information introduced in Table (1) showed the impact of combination spices as powder on BWG, FI and FER of obese rats. The acquired outcomes showed that the BWG of positive control recorded the most elevated worth when contrasted and negative control with huge distinction. The mean qualities were 58.23 and 20.15g, separately. From obese rats' groups, it is obvious to see that the most noteworthy BWG recorded for 2.5% blend spices powder separate, while the least BWG g recorded for 7.5% combination spices powder with critical distinction ($P \leq 0.05$). The mean qualities were 50.65 and 33.62%, separately. But the quality of the group 4 (5%) is 39.41g/day. If there should arise an occurrence of FI, it very well may be notice that the FI of positive control recorded the most noteworthy worth when contrasted and negative control with critical distinction. The mean qualities were 24.75 and 18.45 g/day, individually. From obese rats' groups, clearly the most

noteworthy feed consumption recorded for 2.5% combination spices powder extricate, while the least FI recorded for 7.5% blend spices powder with huge contrast ($P \leq 0.05$). The mean qualities were 22.70 and 17.27 g/day, individually. There were not huge contrasts between gatherings (3 and 4). The got results shown that the most noteworthy feed productivity proportion recorded for positive control group, while the least worth recorded for negative control group with critical contrasts. The mean qualities were 0.084 and 0.039%, individually. Then again, the most elevated feed effectiveness proportion of treated gathering recorded for 2.5% combination spices powder separate, while the least FER recorded for 7.5% blend spices powder with huge contrasts. The mean qualities were 0.080 and 0.044%, individually. But the quality of the group 4 (5%) is 0.76%. These outcomes are in concurrence with [30]. Also, [31, 9] observed that the body weight of the gathering which treated with fennel spice fundamentally diminishes. In this regard, it very well may be suggested that trypsin inhibitors in fennel lessen food consumption and animate cholecystokinin discharge, expanding satiety and that is the justification behind fennel's relationship with weight control.

Table (1). Impact of various groupings of blend spices powder on body weight gain (BWG), feed consumption (FI) and feed effectiveness proportion (FER) of large rats

Parameters	BWG (g)	FI (g/day)	FER (%)
Control group (-)	20.15±0.20d	18.45±1.24b	0.039d ± 0.002
Control group (+)	58.23±0.32a	24.75±1.23a	0.084a ± 0.004
G3(2.5% Mixture herbs)	50.65±0.61b	22.70±1.12a	0.080b ± 0.003
G4(5 % Mixture herbs)	39.41±0.11b	18.48±1.10b	0.076b ± 0.001
G5(7.5% Mixture herbs)	33.62±0.50c	17.27±1.25b	0.044c ± 0.002
LSD	3.56	1.57	0.02

Each value is represented as mean ± standard deviation (n = 3). Mean under the same column bearing different superscript letters are significantly different at $p \leq 0.05$.

Information introduced in Table (2) showed the impact of combination spices powder on relative organs weight in the fat rats. It is obvious to see that the liver load of positive control group recorded the most elevated worth when contrasted and negative control group with huge distinction ($P \leq 0.05$). The mean qualities were 37.32 and 14.12 g, individually. While bunch rats benefited from 2.5% blend spices powder recorded the most noteworthy liver weight, while the least worth recorded for 7.5% combination spices powder extricate with no huge contrast ($P \leq 0.05$). The mean qualities were 23.17 and 15.79g, individually. But the quality of group 5% was 20.05. Then again, kidney weight of positive control group recorded the most noteworthy worth when contrasted and negative control group with huge distinction ($P \leq 0.05$), 8.34 and 3.11 g, individually. While bunch benefited from 2.5% blend spices powder and 5% combination spices powder remove recorded the most noteworthy kidney weight however the least worth

recorded for 7.5% blend spices powder with no huge distinction ($P \leq 0.05$). The mean qualities were 4.09 and 3.18 g, separately. But the quality of group 5% was 4.09. In the event of spleen weight, positive benchmark group recorded the most noteworthy worth when contrasted and negative benchmark group, which were 4.47 and 1.94 g, separately. While bunch benefited from 2.5% combination spices powder and 5% blend spices powder extricate recorded the most elevated spleen weight yet the least worth recorded for 7.5% blend spices powder remove with no critical distinction ($P \leq 0.05$). The mean qualities were 2.56 and 1.72 g, individually. But the quality of group 5% was 2.18

Table (2): Effect of different concentration of mixture herbs powder on relative organs weight in obese rats

Treatment/Parameter	Liver (g)	Kidney (g)	Spleen (g)
Control group (-)	14.12±0.12b	3.11±0.05 b	1.94±0.03 b
Control group (+)	37.32±0.20a	8.34±0.03a	4.47±0.02 a
G3(2.5% Mixture herbs)	23.17±0.13 b	4.61±0.02b	2.56±0.04 b
G4(5 % Mixture herbs)	20.05±0.23 b	4.09±0.04	2.18±0.03 b
G5(7.5% Mixture herbs)	15.79±0.10 b	3.18±0.03b	1.72±0.01 b
LSD	0.26	0.17	0.02

Each value is represented as mean ± standard deviation (n = 3). Mean under the same column bearing different superscript letters are significantly different at $p \leq 0.05$.

Information given in Table (3) showed the impact of blend spices powder on serum glucose of obese rats. The acquired outcomes showed that the serum glucose of positive control group recorded the most elevated worth when contrasted and negative control group with huge distinction ($P \leq 0.05$). The mean qualities were 178.50 mg/dl. The tried spices combination actuated huge ($P \leq 0.05$) in serum glucose with portion reaction impact. These outcomes are in concurrence with [32-34] who observed that anise seeds were shown greater improvement in glucose, and treatment with anise seeds altogether diminished the exercises and levels of glucose individually. Also, Zaahkoug et al., [35] and Alghamdi [36] observed that fennel seeds showed a lessening in fasting blood glucose. In glucose-stacked mice model methanolic concentrate of fennel essentially decreased the blood glucose level. Moreover, Cam et al., [37] and Bayani et al., [38] saw that powdered peppermint separate and powdered spearmint extricate showed huge restraint against key catalyts of type 2 diabetes (α -glucosidase) and hypertension). At long last, [39,40] observed that black seeds were efficacious for dropping insulin level in blood, this is fundamental to treat diabetic confusions.

Table (3): Effect of different concentrations of mixture herbs powder on glucose level of obese rats

Treatment/Parameter	Glucose level (mg/dl)
Control group (-)	94.50±2.13c
Control group (+)	178.50±1.21a
G3(2.5% Mixture herbs)	105.0±2.30b
G4(5 % Mixture herbs)	102.50±1.25b
G5(7.5% Mixture herbs)	98.00±2.13c
LSD	4.25

Each value is represented as mean \pm standard deviation ($n = 3$). Mean under the same column bearing different superscript letters are significantly different at $p \leq 0.05$.

Information given in Table (4) showed the impact of combination spices powder on liver capacities (ALT, AST and ALP) of obese rats. The acquired outcomes demonstrated that the ALT liver chemical of positive control group recorded the most noteworthy worth when contrasted and negative control group with critical distinction ($P \leq 0.05$). The mean qualities were 71.00 and 40.00 U/L, individually. While the most elevated ALT liver protein of treated gathering recorded for bunch benefited from 2.5% combination spices powder yet, the least worth recorded for bunch benefited from 7.5% blend spices powder remove with critical distinction ($P \leq 0.05$). The mean qualities were 67.50 and 52.50 U/L, individually. Then again, AST liver chemical of positive control group recorded the most elevated worth when contrasted and negative benchmark group with huge distinction ($P \leq 0.05$). The mean qualities were 86.75 and 20.90 U/L, separately. While the most noteworthy AST liver catalyst of treated gathering recorded for bunch benefited from 2.5% combination spices powder in any case, the least worth recorded for bunch benefited from 7.5% blend spices powder extricate with huge distinction ($P \leq 0.05$). The mean qualities were 53.60 and 43.55 U/L, separately. If there should be an occurrence of ALP liver protein of positive control rats bunch recorded the most elevated worth when contrasted and negative benchmark group with huge distinction ($P \leq 0.05$). The mean qualities were 74.15 and 32.71 U/L, individually. While the most elevated ALP liver compound of treated gathering recorded for bunch benefited from 2.5% combination spices powder at the same time, the least worth recorded for bunch benefited from 7.5% blend spices powder remove with critical distinction ($P \leq 0.05$). The mean qualities were 60.62 and 44.27 U/L, separately. The best treatment noticed the most noteworthy decrease in liver proteins recorded for 7.5% blend spices powder remove. These outcomes are in concurrence with Ibrahim. [33] who observed that anise seeds have powerful medical advantages. they worked on liver, kidney work tests as they decreased the significant boundaries including AST. Additionally, [41] tracked down that degree of liver chemicals (AST and ALT) were decreased in bunches treated with various degrees of natural blend

powder (anise seeds, peppermint and dark seeds). Moreover, Elghazaly et al., [31] detailed that the fat rats which treated with fennel spice shows critical reduction in the liver capacity (ALT, AST and ALP). Moreover, Bellassoued et al., [42] explored the impacts of peppermint natural oil. Oral organization of 15 and 40 mg/kg altogether decreased serum (ALT), (AST) and (ALP).

Table (4): Effect of different concentrations of mixture herbs powder on liver functions of obese rats

Treatment/Parameter	ALT (U/L)	AST (U/L)	ALP (U/L)
Control group (+)	40.00± 1.90e	20.90 ± 1.20e	32.71± 1.60e
G3 (2.5% Mixture herbs)	71.00 ± 2.13a	86.75 ± 1.12a	74.15± 1.11a
G4 (5 % Mixture herbs)	67.50 ± 1.63b	53.60 ± 1.10b	60.62±1.30 b
G5 (7.5% Mixture herbs)	61.50 ± 1.21c	47.51 ± 1.25c	51.55±2.23 d
G5 (7.5% Mixture herbs)	52.50 ± 2.10d	43.55 ± 2.31d	44.27± 1.16c
LSD	3.25	1.19	2.12

Each value is represented as mean ± standard deviation (n = 3). Mean under the same column bearing different superscript letters are significantly different at $p \leq 0.05$.

The impact of spices combination powder on the serum lipid profile (HDL-c, LDL-c, VLDL-c, TC and TG) level of obese rats are displayed in Table (5). The acquired outcomes showed that the high-thickness lipoprotein (HDL-c) levels of positive benchmark group recorded the most lowest value when contrasted and negative control group with huge distinction ($P \leq 0.05$). The mean qualities were 38.50 and 46.50 mg/dl, separately. While the most minimal (HDL-c) levels recorded for bunch benefited from 2.5% blend spices powder separate in any case, the most noteworthy worth recorded for bunch benefited from 7.5% combination spices powder with huge distinction ($P \leq 0.05$). The mean qualities were 52.00 and 68.00 mg/dl, individually. Information additionally showed that the low-thickness lipoprotein (LDL-c) levels of positive benchmark group recorded the most elevated worth when contrasted and negative benchmark group with critical distinction ($P \leq 0.05$). The mean qualities were 62.6 and 31.70mg/dl, separately. While the most noteworthy (LDL-c) levels recorded for bunch benefited from 2.5% combination spices powder be that as it may, the least worth recorded for bunch benefited from 7.5% blend spices powder extricate with huge contrast ($P \leq 0.05$). The mean qualities were 27.50 and 10.80mg/dl, separately. If there should be an occurrence of extremely low-thickness lipoprotein (VLDL-c) levels, the positive benchmark group recorded the most noteworthy worth when contrasted and negative benchmark group with huge distinction ($P \leq 0.05$). The mean qualities were 27.40 and 20.80 mg/dl, separately. While the most noteworthy (VLDL-c) levels recorded for bunch benefited from 2.5% combination spices powder in any case, the least worth recorded for bunch benefited from 7.5% blend spices powder extricate with huge distinction ($P \leq 0.05$). The mean qualities

were 26.00 and 13.70 mg/dl, separately. Information likewise showed that the cholesterol levels of positive benchmark group recorded the most elevated worth when contrasted and negative benchmark group with huge distinction ($P \leq 0.05$). The mean qualities were 128.5 and 99.00 mg/dl, separately. While the most elevated cholesterol levels recorded for bunch benefited from 2.5% combination spices powder however, the least worth recorded for bunch benefited from 7.5% blend spices powder remove with huge contrast ($P \leq 0.05$). The mean qualities were 105.00 and 98.50 mg/dl, individually. Then again, the fatty substance of positive benchmark group recorded the most elevated worth when contrasted and negative benchmark group with critical distinction ($P \leq 0.05$). The mean qualities were 137.00 and 104.00 mg/dl, individually. While the most elevated fatty substance recorded for bunch benefited from 2.5% combination spices powder at the same time, the least worth recorded for bunch benefited from 7.5% blend spices powder separate with huge distinction ($P \leq 0.05$). The mean qualities were 130.0 and 98.50 mg/dl, separately. These outcomes are in concurrence with [33, 34] who observed that anise seeds diminished Lipid profile (cholesterol, LDL and TG). Additionally, Yakhchali et al., [43] saw that as the greater part of blend spices of powder (anise seeds and peppermint) have cancer prevention agent, Anti-dyslipidemia (by diminishing cholesterol, fatty oil, LDL and expanding HDL). Besides, Bhatti, [44] who revealed that dark seeds brought down altogether the degrees of complete cholesterol (TC), low thickness lipoproteins (LDL) and fatty oils (TGs) following 30 days of treatment. At last, Badr, [45] who concentrated on the impact of fennel seeds by item at various levels in bunny takes care of, she showed that There was huge diminished for treated eating regimens of lessening in LDL, TC, HDL and VLDL-C levels for treated weight control plans.

Table (5): Effect of different concentrations of herbs mixture powder on lipid profile level of obese rats

Treatment/Parameter	(HDL-C) (g/dl)	(LDL-C) (g/dl)	(VLDL-C) (g/dl)	Total cholesterol (mg /dl)	Triglycerides (mg /dl)
Control group (-)	46.50±2.60d	31.70±1.77b	20.80±0.13d	99.00±5.18c	104.00± 2.61d
Control group (+)	38.50±4.50e	62.6± 1.74a	27.40±0.21a	128.5±4.74a	137.00±3.24a
G3 (2.5% Mixture herbs)	52.00±4.28c	27.50±1.75c	26.00±0.20b	105.00±4.23b	130.0±4.38b
G4 (5 % Mixture herbs)	66.00±5.26b	12.00±1.87d	23.5±0.42c	101.5±5.66c	117.50±4.61c
G5 (7.5% Mixture herbs)	68.00±5.11a	10.80±1.75e	13.70±0.10e	98.50± 4.26c	98.50± 2.51e
LSD	1.27	1.18	0.76	3.26	4.11

Each value represents mean ± standard deviation (n = 3). Mean under the same column bearing different superscript letters are significantly different at $p \leq 0.05$.

Information introduced in Table (6) showed the impact of blend spices powder on the kidney capacities (uric corrosive, urea and creatinine) level of obese rats. It is obvious to see that the uric corrosive degrees of positive control group recorded the most elevated

worth when contrasted and negative control group with huge distinction ($P \leq 0.05$). The mean qualities were 3.78 and 2.25 mg/dl, individually. While the most elevated uric corrosive levels recorded for bunch benefited from 2.5% combination spices powder in any case, the least worth recorded for bunch benefited from 7.5% blend spices powder remove with critical distinction ($P \leq 0.05$). The mean qualities were 2.91 and 2.38 mg/dl, individually. Information additionally showed that the urea levels of positive benchmark group recorded the most elevated worth when contrasted and negative benchmark group with critical distinction ($P \leq 0.05$). The mean qualities were 34.52 and 23.03 mg/dl, individually. While the most elevated urea levels recorded for bunch benefited from 2.5% blend spices powder at the same time, the least worth recorded for bunch benefited from 7.5% combination spices powder separate with huge contrast ($P \leq 0.05$). The mean qualities were 20.71 and 19.49 mg/dl, individually. If there should be an occurrence of creatinine levels, information showed that the positive benchmark group recorded the most elevated worth when contrasted and negative benchmark group with huge distinction ($P \leq 0.05$). The mean qualities were 1.08 and 0.75 mg/dl, individually. While the most elevated urea levels recorded for bunch benefited from 2.5% blend spices powder in any case, the least worth recorded for bunch benefited from 7.5% combination spices powder remove with huge contrast ($P \leq 0.05$). The mean qualities were 0.95 and 0.80 mg/dl, separately. These outcomes are in concurrence with [33] observed that anise seeds had improvement impact on the kidney work compounds, particularly urea and creatinine. Additionally, Ashour et al., [41] who concentrate on the impacts of dietary in addition to natural blend powder (anise, peppermint and dark seed) on serum metabolites of oven chicks, they tracked down that centralizations of serum urea and creatinine diminished in all chick gatherings. Besides, Elghazaly et al., [31] who saw that Fennel huge abatement creatinine and uric corrosive. At last, Agrawal et al., [40] who showed that thymol, a functioning compound of dark seeds decreased urea and creatinine levels fundamentally to approach typical on streptozotocin incited diabetic rats.

Table (6): Effect of different concentrations of herbs mixture as powder on uric acid, urea and creatinine of obese rats

Treatment/Parameter	Uric acid (mg/dl)	Urea (mg/dl)	Creatinine (mg/dl)
Control group (-)	2.25±0.10c	23.03±0.20b	0.75±0.01e
Control group (+)	3.78±0.12a	34.52±0.21a	1.08±0.03a
G3 (2.5% Mixture herbs)	2.91±0.21b	20.71±0.30c	0.95±0.05b
G4 (5 % Mixture herbs)	2.44±0.30c	20.32±0.15c	0.90±0.02c
G5 (7.5% Mixture herbs)	2.38±0.20c	19.49±0.33c	0.80±0.03d
LSD	0.25	0.16	0.03

Each value represents mean ± standard deviation ($n = 3$). Mean under the same column bearing different superscript letters are significantly different at $p \leq 0.05$.

Minutely, liver of rats from control negative gathering uncovered the typical histological construction of hepatic lobule (Figure 1, Photo 1). Then again, liver of rats from control positive gathering uncovered large scale vesicular steatosis of hepatocytes (Photos 2 and 3), mononuclear cells penetration (Photo 2) and oval cells multiplication (Photo 3). In addition, liver of rats from bunch 1 showed either full scale vesicular steatosis of hepatocytes (Photo 4) or miniature vesicular steatosis of hepatocytes (Photo 5). Additionally, analyzed segments from bunch 2 showed large scale vesicular steatosis of hepatocytes (Photos 6 and 7). In the interim, liver of rats from bunch 3 uncovered miniature vesicular steatosis of hepatocytes (Photos 8 and 9).

Heart

Microscopical assessment of heart of rat from control negative gathering uncovered the typical histological design of cardiovascular myocytes (Figure 2, Photos 1 and 2). In opposite, analyzed areas from control positive gathering showed clog of myocardial veins (Photo 3), vacuolation of the sarcoplasm of heart myocytes and central putrefaction of myocytes (Photo 4). A few segments from bunch 1 uncovered clog of myocardial veins (Photo 5), though, different areas from this gathering showed no histopathological changes (Photo 6). Notwithstanding, heart of rats from bunches 2 and 3 uncovered no histopathological changes (Photos 7-10).

Taking everything into account, the current review has shown that the power of the chose home grown combinations (Anise, Fennel, Mint and Black Seed) to improve the difficulties/messes in corpulent rats. Applying of such chosen home-grown combinations prompts further develop the organic, biochemical and histological boundaries brought about by corpulence. These discoveries give a premise to the utilization of the chose natural blends in the counteraction and early treatment of weight. Additionally, the information support the advantages of dietary/drinks adjustment, remembering bioactive mixtures for the chose home grown blends supplementation, in easing the complexities related weight. At last, more exploration should be done on the future to explain the acknowledged advantages from dietary plant parts admission, such spices, on heftiness infection and its inconveniences.

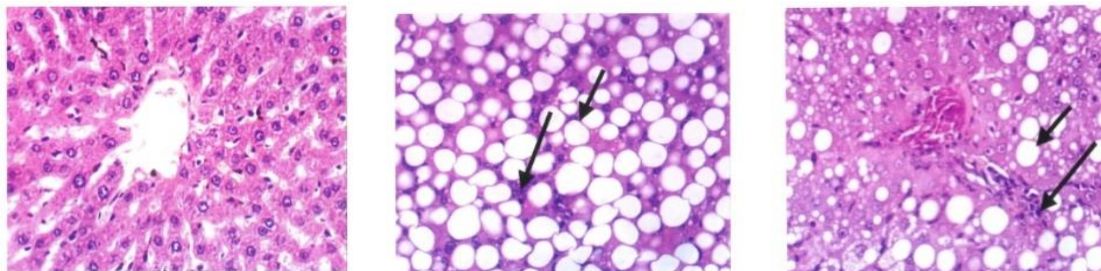


Photo (1): Liver of rat from control negative group showing the normal histological structure of hepatic lobule

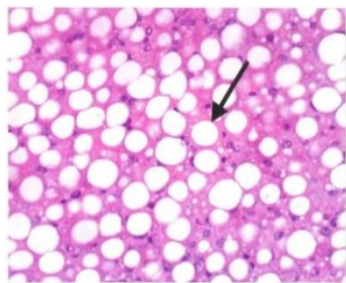


Photo (2): Liver of rat from control positive group showing macro-vesicular steatosis of hepatocytes and mono-nuclear cells infiltration

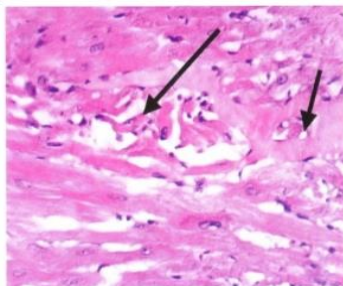


Photo (3): Liver of rat from control positive group showing macro-vesicular steatosis of hepatocytes and oval cells proliferation

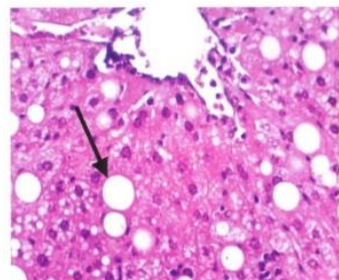


Photo (4): Liver of rat from group 1 showing macro-vesicular steatosis of hepatocytes

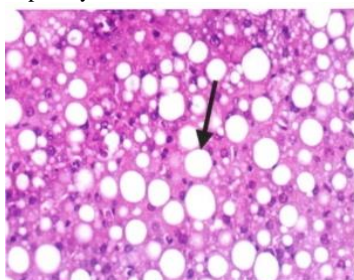


Photo (5): Liver of rat from group 1 showing micro-vesicular steatosis of hepatocytes

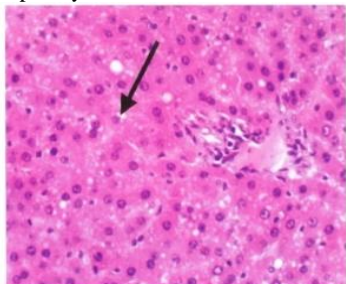


Photo (6): Liver of rat from group 2 showing macro-vesicular steatosis of hepatocytes

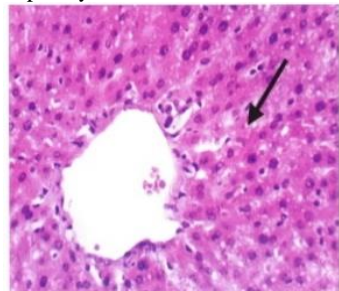


Photo (7): Liver of rat from group 2 showing macro-vesicular steatosis of hepatocytes

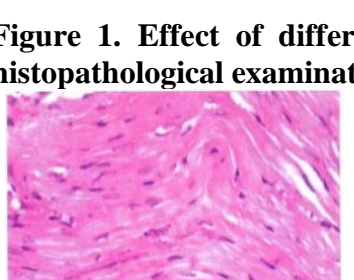


Photo (8): Liver of rat from group 3 showing micro-vesicular steatosis of hepatocytes

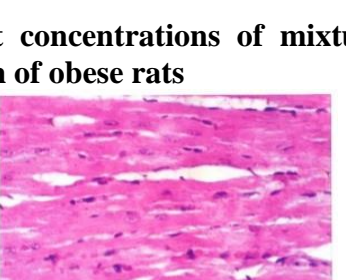


Photo (9): Liver of rat from group 3 showing micro-vesicular steatosis of hepatocytes

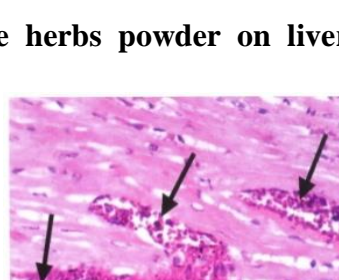


Figure 1. Effect of different concentrations of mixture herbs powder on liver histopathological examination of obese rats

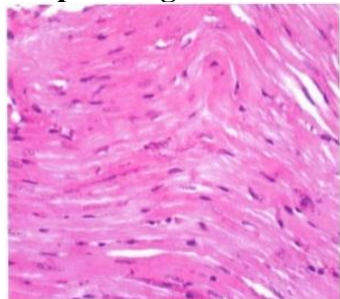


Photo (1): Heart of rat from control negative group showing the normal histological structure of cardiac myocytes).

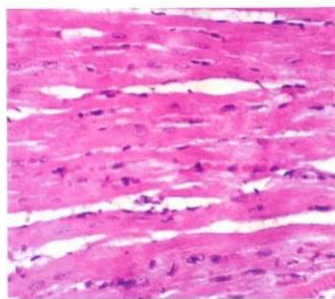


Photo (2): Heart of rat from control negative group showing the normal histological structure of cardiac myocytes

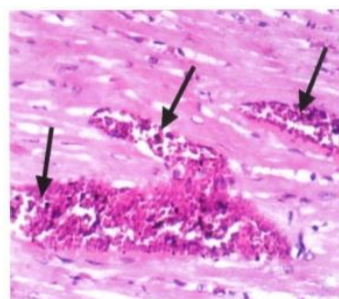


Photo (3): Heart of rat from control positive group showing congestion of myocardial blood vessels

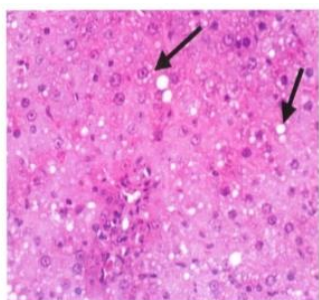


Photo (4): Heart of rat from control positive group showing vacuolation of the sarcoplasm of cardiac myocytes and focal necrosis of myocytes

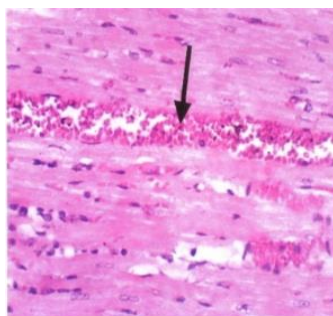


Photo (5): Heart of rat from group 1 showing congestion of myocardial blood vessels

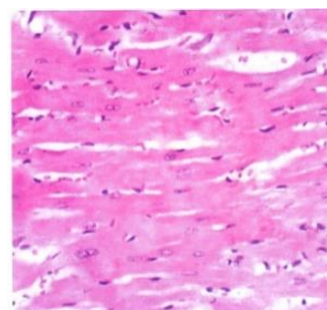


Photo (6): Heart of rat from group 1 showing no histopathological changes

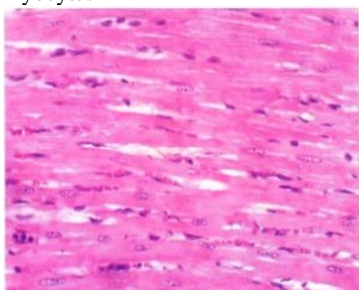


Photo (7): Heart of rat from group 2 showing no histopathological changes

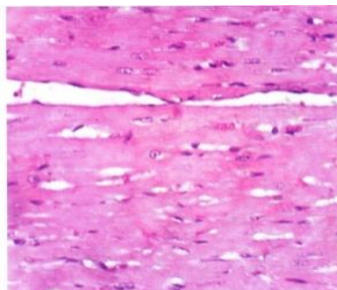


Photo (8): Heart of rat from group 2 showing no histopathological changes

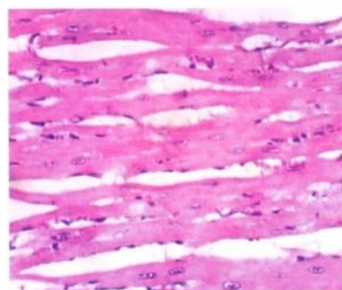


Photo (9): Heart of rat from group 3 showing no histopathological changes

Figure 2. Effect of different concentrations of mixture herbs powder on heart histopathological examination of obese rats

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التأثير المضاد للسمنة لبعض الخلطات العشبية (اليانسون والشمر والنعناع والحبة السوداء) في نظام غذائي عالي الدهون على الفئران المصابة بالسمنة

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الملخص العربي:

تعد السمنة من الأمراض المزمنة والمعقدة حيث تزيد الدهون غير الطبيعية في الجسم والتي تضعف الصحة وتؤدي الى حدوث مضاعفات طبية طويلة الأمد كما تقلل من العمر الافتراضي. تهدف الدراسة الحالية إلى استكشاف التأثير المضاد للسمنة لبعض الخلطات العشبية (اليانسون والشمر والنعناع والحبة السوداء) على الفئران المصابة بالسمنة. التصميم التجريبي: تم تقسيم ثلاثين ذكور فئران من سلالة سبراج-داولي إلى مجموعتان رئيسيتان، تم تغذية المجموعة الأولى (6 فئران) كمجموعة ضابطة طبيعية على نظام غذائي أساسي (BD)، المجموعة الرئيسية الثانية (24 فأر) تم تغذيتها على حمية غنية بالدهون ثم تصنيفها إلى أربع مجموعات فرعية متساوية على النحو التالي: المجموعة (2)، كمجموعة ضابطة موجبة والتي تغذت على BD، والمجموعات (3-5) تغذي على BD لتي تحتوي على 2.5، 5، 7.5% (وزن/وزن) من الخلطات العشبية المختبرة (يانسون، شمر، نعناع وحبة سوداء) لمدة 28 يومًا، على التوالي. النتائج: أحدثت السمنة العديد من الاضطرابات الجسمية والتي تشمل زيادة في الوزن، والمتناول من الغذاء، ونسبة كفاءة الغذاء ووزن الأعضاء (الكبد والكلى والطحال). كما تأثرت وظائف الكبد والكلى ونسبة الدهون في الدم ومستويات الجلوكوز في الدم. أدى علاج الفئران البدينة بالمخاليط العشبية المختبرة (يانسون، شمر، نعناع، حبة البركة) إلى تحسن في جميع هذه المعايير، وكانت بيانات الفحص النسيجي متوافقة مع النتائج البيولوجية والكيميائية الحيوية التي تم الحصول عليها. الخلاصة: توفر هذه النتائج أساسًا لاستخدام الخلطات العشبية (اليانسون والشمر والنعناع والحبة السوداء) للعلاج المبكر من السمنة.

الكلمات المفتاحية: وزن الجسم، وظائف الكبد، وظائف الكلى، جلوكوز الدم، صورة دهون الدم، الفحص النسيجي.