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Potential Effect of Kiwifruits and Their Extract on Side Effects in Obese Rats

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Abstract

The present investigation aimed to study the effect of supplementation kiwifruit and their extracts on obese albino rats. Thirty six male Sprague Dawley rats were divided into two main groups. The first main group (6 rats) was fed on basal diet as a (control negative group-ve) (group1) , while the second main group (30 rats) was fed on high fat diet for six weeks. The second main group was divided into five groups (6 rats each). Group (2) was fed on high fat diet (control positive group +ve). Groups (3-6) fed on high fat diet containing 5% kiwi, 10% kiwi; kiwi extract 100mg/kg and 200mg/kg, respectively. At the end of the experimental period (8weeks) rats were fasted over- night before sacrificing, blood was collected then centrifuged to separate the serum. Results revealed that, feeding rats on high fat diet led to significant increase in serum glucose, cholesterol, triglycerides, LDL-c, VLDL-c, urea nitrogen, creatinine and decreased HDL-c. As conclusion, obese rats treated with 200 mg/kg kiwifruit extract had improved the lipid profile, liver and kidney functions compared with kiwi fruit as powder.

Key words: Obese rats, kiwi fruit, extracts, high fat diet and Biochemical analysis.

Introduction

Obesity occurs when the body's energy intake exceeds the body's energy consumption for a prolonged period of time. The degree of obesity is characterized by the volume and number of adiposits, which is regulated in the so called adipocyte life cycle **(Rayalam *et al*., 2008)**.

According to **Calle *et al*., (2003)** obesity is a major public health concern because it increases the risk for many chronic conditions, such as cardiovascular diseases, diabetes, hypertension, coronary artery disease, and cancer.

Obesity is a major health problem in the United States and worldwide. It is associated with metabolic syndrome, which is characterized by hyperglycemia, abdominal obesity, hypertension, elevated plasma triglyceride, and reduced plasma high density lipoprotein cholesterol levels **(Alberti *et al*., 2009).**

Weight loss in obese persons of any age can decrease the obesity-related medical complications and increase physical function and quality of life. The current therapeutic tools used for weight management are lifestyle interventions, pharmacotherapy, and surgery. Historically, there has been little success in anti-obesity drug development because of the low efficiency and undesired side effects. Although surgical weight loss procedures are on the rise, the occurrence of nutritional deficiencies of micronutrients and macronutrients arising from bariatric surgery has been recognized for decades, but the prevalence and severity depend on the type of surgery **(Yuliana *et al*., 2011)**.

Obesity can be reduced at individual level through limiting energy intake from total fats, increasing consumption of fruit and vegetables, as well as legumes, whole grains and nuts. Limiting the intake of sugars and engaging in regular physical activity achieve energy balance and a healthy weigh**t (WHO, 2012)**.

At an individual level, a combination of excessive food energy intake and a lack of physical activity is thought to explain most cases of obesity. A limited number of cases are due primarily to genetics, medical reasons, or psychiatric illness **(Raj and Kumar, 2010)**.

Kiwifruit (*Actinidia deliciosa*) is one of the most popular fruits worldwide and is cultivated in many countries, such as New Zealand, Italy, Japan, Greece and France **(Larocea *et al.*, 2010)**.

Tavarini *et al.*, (2008) recent studies, describe the beneficial effects of kiwifruit on intestinal functions confirming the numerous anecdotal reports on the laxative properties of the kiwi fruit. These advantages are ascribed to its rich dietary fiber content (3.4g/100g), although other constituents may contribute partly to its laxative effect.

Kiwi fruits are good sources of folate and potassium and contain large amounts of vitamin E in the seed, although the bioavailability of this fat-soluble vitamin may be potentially diminished because of limited human digestibility of the seed. This fruit also contains about 2% to 3% dietary fiber. Sensory acceptance of kiwifruit is also dependent on the presence of calcium oxalate in all varieties, although variation in oxalate content among species has been noted **(Pero, 2010).**

Duttaroy and Jorgensen (2009) mentioned that consumption of kiwi fruit lowered blood triglycerides levels by 15% compared with control ($P<0.05$), whereas no such effects were observed in the case of cholesterol levels. All these data indicate that consuming kiwi fruit may be beneficial in cardiovascular disease

Chang and Liu (2009) reported that after 8 weeks of consumption of kiwifruit, the HDL-C concentration was significantly increased and the LDL cholesterol/HDL-C ratio and total cholesterol/HDL-C ratio were significantly decreased. In addition, regular consumption of kiwifruit might exert beneficial effects on the ant oxidative status and the risk factors for CVD in hyperlipidemic subjects.

Leontowicz *et al.*, (2013) studies indicated that kiwifruit 'Hayward' can be a very good ingredient of the diet, especially for patients suffering from hypercholesterolemia and with other cardiovascular diseases, but not for diabetic patients.

Shehata and Soltan (2013) suggested that consumption of kiwifruit and avocado might have some cardiovascular protective properties and beneficial effects on atherosclerosis, CVD risks in hypercholesterolemia rats.

Materials And Methods

Materials

Kiwifruits (*Actinidia deliciosa)* were obtained from local market, Shebin El-Kom City, Menoufia Governorate, Egypt.

Casein, cellulose, choline chloride, and DL- Methionine

Casein, all vitamins, minerals, cellulose, Dl-methionine and choline chloride and starch were from Middle East Company, Giza and Cairo, Egypt. While, sheep fat used: was purchased from the local market at Kafr EL-Sheikh, Egypt.

Experimental animals

A total of 36 adult normal male albino rats Sprague Dawley strain weighing 140±10 g were obtained from Experimental Animal House of Food Technology Research Institute, Agric. Research Center, Giza, Egypt.

The chemical kits

Chemical kits used for determination the (TC, TG, HDL-c, ALT, AST, ALP, urea, uric acid and creatinine) were obtained from Al-Gomhoria Company for Chemicals Medicals and Instruments, Cairo, Egypt.

Methods

Biological experiment

Preparation of kiwifruits

Kiwifruits were cleaned thoroughly by washing, then minced and sun dried, flowed by milling. The kiwi powder was extracted with ethanol by cold maceration method of **Anthony *et al.*, (2017)**.

The induction of experimental obesity

Obesity was induces in normal healthy male albino rats by feeding on high fat diet (20% animal lipids) supplemented in the basal diet and used as a positive control group, applying
the method of**(Lane-Peter and Pearson1971)** and **(Min *et al.*, 2004),**

Experimental design

Thirty six adult male white albino rats, Sprague Dawley Strain, weighing (140±10g) were used in this experiment. All rats were fed on basal diet (casein diet) prepared according to **AIN(1993)** for 7 consecutive days. After this adaptation period, rats are divided into 5 groups, each group consists of six rats as follows: group (1): Rats fed on basal diet as negative control.

Group (2): Obese rats induced by fed on high fat diet (20% animal lipids) supplemented in the basal diet and used as a positive control (group2). Group (3): A group obese rats fed on kiwifruit as powder by 5% of the weight of basal diet. Group (4): A group of inflicted obese rats fed on kiwifruit as powder by 10% of basal diet. Group (5): A group of inflicted obese rats fed on kiwifruit extract by 100 mg/kg of the weight of the rat. Group (6): A group inflicted obese rats fed on kiwi- fruit extract by 200 mg/kg of the weight of the rat. The experimental period, continued for 56 days. At the end of the experimental period each rat weighted separately then, rats are slaughtered and blood sample collected. Blood samples were centrifuged at 4000 rpm for ten minute to separate blood serum, and then kept in deep freezer till using.

Blood sampling:

After fasting for 14 hours, blood samples in initial times were obtained from retro orbital vein, while it obtained from hepatic portal vein at the end of each experiment. Blood samples were collected into a dry clean centrifuge glass tubes and left to clot in water bath (37°C) for 30 minutes, then centrifuged for 10 minutes at 4000 rpm to separate the serum, which was carefully aspirated and transferred into clean cuvette tube, and stored frozen in deep freezer till analysis according to method described by **Schermer (1967)**.

Biochemical analysis:

All serum samples were analyzed for determination the following parameters: Plasma glucose according to the method of **Tietz (1976) and Trinder (1969),** triglycerides according to **Fossati and Prencipe (1982)**, total cholesterol according to the method of **Ratliff and Hall (1973)**, HDL-c according to the method of **Fnedewaid (1972)** and **Gordon and Amer (1977)**, VLDL-c and LDL-c according to the method of **Lee and Nieman, (1996)**, urea according to the method described by **Malhotra (2003)**, while creatinine according to the method described by **Chary and Sharma (2004)**, AST assessed according to the method of **Chawla (2003)**, ALT according to the method of **Srivastava *et al.*,(2002).**

Results and discussion

Lipids profile

Data presented in **table (1)** illustrated the effect of kiwi and its extract on serum total cholesterol& triglycerides (mg/dI) of obese rats.

A) Serum total cholesterol (T.C): It could be noticed that the mean value of control (+) group was higher than control (-) group, being 140.00± 2.30 & 89.96± 2.00 mg/dl respectively which indicated significant difference with percent of decrease -35.74%of control (-) group as compared to control (+) group. All groups indicated significant differences as compared to control (+) group. Significantly group 6 (kiwi extract) recorded the best treatment for decreasing (T.C) level of obese rats.

B) Serum triglycerides (T.G.): It is clear to notice that the mean value of control (+) group was higher than control (-) group, being 118.60±2.40 &50.80±2.10mg/dl respectively which indicated significant difference with percent of decrease -57.16%of control (-) group as compared to control (+) group. All treatments showed significant differences as compared to control (+) group. Groups 6 (kiwi extract) recorded the best treatment for decreasing (T.G.) level of obese rats when compared to control (-) group.

The results of table (1) are in agreement with that obtained by **Shehata and Soltan (2013)** who showed that feeding rats on high fat diet for 6 weeks caused a significant increase in total cholesterol and triglyceride in serum. Also found that the levels of total cholesterol, triglyceride significantly decreased for the groups fed kiwifruit and avocado. **Leontowicz *et al.*, (2013),** reported that diet containing kiwifruit decreased TG and TC. Also, **Duttaroy and Jorgensen (2004)** suggested that consuming two or three kiwifruit per day for 28 days by 30 health subjects reduced only the blood TG. **Rodriguez *et al*., (2015)**found that consumers of at least 1 kiwi /week lowered triglyceride values.

Data given in **table (2)** illustrated the effect of kiwi and its extract on serum high density lipoprotein cholesterol (HDL-c), low density lipoprotein cholesterol (LDL-c), Very low density lipoprotein cholesterol(VLDL-c) and AI ((very low density lipoprotein cholesterol + low density lipoprotein cholesterol)/ high density lipoprotein cholesterol)) ((VLDL-c +LDL-c)/HDL-c))(mg\dl) of obese rats.

A) Serum high density lipoprotein cholesterol (HDL-c): It could be noticed that the mean value of control (+) group was lower than control (-) group, being 24.40± 2.60 & 65.64±1.10 mg/dl, respectively which revealed significant difference with percent of increase +169.01% of control (-) group as compared to control (+) group. All treatments group showed significant differences as compared to control (+) group. Group 3 (kiwi extract) recorded the best treatment for increasing (HDL-c) level of obese rats when compared to control (+) group.

B) Serum low density lipoprotein cholesterol (LDL-c): It could be noticed that the mean value of control (+) group was higher than control (-) group, being 91.80± 3.00 & 14.16± 2.30mg/dI respectively which indicated significant difference with percent of decrease -84.57%of control (-) group as compared to control (+) group. All treated groups indicated significant differences when compared to control (+) group. Significantly group 6 (kiwi extract 200 mg/kg) showed the better treatment for decreasing (LDL-c) level of obese rats when compared to control (+) group.

C) Serum very low density lipoprotein cholesterol (VLDL-c): It could be noticed that the mean value of control (+) group was higher than control (-) group, being 23.72± 0.48& 10.16± 0.42mg/dl, respectively which indicated significant difference with percent of decrease -57.16%of control (-) group as compared to control (+) group. All treatments revealed significant differences when compared to control (+) group. Group 6 (kiwi extract 200 mg/kg) recorded the best treatment for decreasing (VLDL-c) level of obese rats when compared to control (+) group.

D) Serum (very low density lipoprotein cholesterol + low density lipoprotein cholesterol) \high density lipoprotein cholesterol ((VLDL-c + LDL-c)\HDL-c Ratio) : It could be noticed that the mean value of control (+) group was higher than control (-) group, being 4.77± 0.65& 0.36± 0.035 mg/dl respectively which indicated significant difference with percent of decrease -92.45%of control (-) group as compared to control (+) group. All AI treatments indicated significant differences when compared to control (+) group. Groups 3&6 (5%kiwi powder, kiwi extract 200mg/kg) found to be the best groups for decreasing ((VLDL-c+ LDL-c)/HDL-c) level of obese rats when compared to control (-) group. Results of lipid profile seemed to agree

with the trend in findings by **Rodriguez *et al.*, (2015)** reported that consumption of at least one kiwi /week presented higher plasma value of HDL.C and lower plasma concentrations of fibrinogen and improved plasma lipid profile in the context of a normal diet regular exercise. Also, the results by **Shehata and Soltan (2013**) indicated that the level of LDL.C significantly decreased for the groups fed kiwifruit and avocado, and suggested that consumption of kiwifruit and avocado might have some cardiovascular protective properties and beneficial effect on the atherosclerosis CVD risk in hypercholetrolomic rats. In this respect results published by **Leontowicz *et al.*, (2013)** who reported that diet contains kiwifruit decreased LDL.C and the value of the atherogenic index . In addition **Chang and Liu (2009) and Lim (2012)** indicated that after 8 weeks kiwifruit consumption, LDL.C/HDL.C ratio was significantly decreased in hyperlipidemic regular consumption of kiwi-fruit, the HDL.C concentration was significantly increased and the LDL were significantly decreased.

Blood glucose

Data presented in **table (3)** results show the effect of kiwi and its extract on serum glucose of obese rats. It could be observed that the mean value of control (+) group was higher than control (-) group, being 115.00± 4.00 & 80.18± 2.60 mg/dl, respectively which revealed significant difference with percent of decrease -30.27%of control (-) group as compared to control (+) group. All treatments indicated significant differences as compared to control (+) group. Group 6 (kiwi extract 200 mg/kg) recorded the better treatment for decreasing glucose level of obese rats when compared to control (+) group. These results are in agreement with that of **Soren *et al.*, (2016)**, they showed that treatment with *Actinidia delicious* (kiwifruit) extract showed significant decrease in the diabetic control group.

Liver function:

Data given in **table (4)** show the effect of kiwi and its extract on serum liver function (U\L) of obese rats. It could be showed that for glutamic oxaloacetate transaminase, GOT (AST) the mean value of control (+) group was higher than control (-) group, being 153.20± 6.11 & 49.25± 1.01 U/L, respectively which revealed significant difference with percent of decrease -67.85% of control (-) group as compared to control (+) group. All treatments indicated significant differences when

compared to control (+) group. Significantly group 6 (kiwi extract 200mg/kg) recorded the best treatment for decreasing GOT (AST) level of obese rats when compared to control (+) group. The results in the same table (4) also indicated that for the levels of glutamic pyruvate transaminase GPT (ALT), the mean value of control (+) group was higher than control (-) group, being 50.25± 0.73& 18.70± 0.50 U/L, respectively which revealed significant difference with percent of decrease -62.78% of control (-) group as compared to control (+) group. All treatments indicated significant differences when compared to control (+) group. Group 6 (kiwi extract 200mg/kg) recorded the best treatment for decreasing GPT (ALT) level of obese rats when compared to control (+) group. In case of serum glutamic oxaloacetate trans aminase (GOT)/ glutamic pyruvate transaminase (GPT) (AST/ALT)),(table4) the mean value of control (+) group was higher than control (-) group, being 3.043± 0.085 & 2.63± 0.125, respectively which revealed significant difference with percent of decrease -13.57%of control (-) group as compared to control (+) group. All treatments indicated significant differences when compared to control (+) group. Numerically, group 6 (kiwi extract 200mg/kg) recorded the best group for decreasing (AST/ALT) level of obese rats when compared to control (+) group. The results (table4) are in agreement with that of **, Shehata and soltan (2013)** found that the activities of AST and ALT enzymes decreased significantly for the groups fed the kiwifruits and avocado in comparison with the high cholesterol (HC) group. In addition, **Leontowicz., *et al* (2013)** found that aspartate amino transferase (AST) activity in serum was significantly lower for all groups with kiwifruit supplementation, and alanine -amino trans ferase (ALT) was also lower in diet groups supplemented . Also, **Kang *et al*., (2012)** found injection CCL4 that resulted in significantly elevated plasma levels of ALT and AST, but they decreased in kiwi extract pretested group.

Kidneys functions makers

Table (5) show the effect of effect of kiwi and its extract on kidney function (mg\dl) of obese rats.

A) Serum urea nitrogen

It could be observed that the mean were value of control (+) group was higher than control (-) group, being 64.82± 0.55 & 26..30 ±1.00mg/dl respectively which revealed significant difference with

percent of decrease -59.42% of control (-) group as compared to control (+) group. All treatments indicated significant differences when compared to control (+) group. Groups 3&4 indicated non-significant differences between them. Significantly group 6(kiwi extract 200mg/kg) recorded the best group for decreasing urea nitrogen level of obese rats when compared to control (+) group.

B) Serum creatinine

It could be noticed that the mean value of control (+) group was higher than control (-) group, being 1.52 ± 0.01 & 0.60 ± 0.02 mg/dl respectively which revealed significant difference with percent of decrease -60.52% of control (-) group as compared to control (+) group. All treatments indicated significant differences when compared to control (+) group. Groups 6 (kiwi extract 200mg/kg) recorded the best groups for decreasing creatinine level of obese rats when compared to control (-) group. The findings are in agreement with that of **De Castro *et al*., (2014)**, they reported that kidney function tests help to determine if the kidney are performing their task adequately. The findings of this study clarified that obesity rats had renal alterations such as accumulation of fat cells,increases in kidney weight, glomerular sclerosis and inflammatory infiltrates, along with elevated blood-glucose levels .This reinforces the idea that glycosylation of proteins, the increased release of pro-inflammatory cytokines, oxidative stress, and the accumulation of lipid per oxidation products may be the cause of kidney damage. In this respect, creatinine is the major waste product of creatine metabolism by muscle. In the kidney, it is filtered by the glomerulus and actively excreted by the tubules. Moreover, free creatinine may appear in the blood serum **(Stevenes *et al*., 2006)**. These results(table5) were lower than those of **Abd El-Rahman *et al*. (1997),** who reported that serum urea levels was elevated by hypercholostrolemia, but this increment was reduced by feeding on hypocholesterlsmic agediet.

Table (1): Effect of kiwi and its extract on serum total cholesterol (T.C) and triglycerides (mg/dl) (T.G) of obese rats

Parameters / **Groups**	**TC (mg/dl)** **Means±SD**	**T.G (mg/dl)** **Means ±SD**
Group(1) control (-)ve	89.96 ±2[d]	50.8±2.1[f]
%Change of control positive group	-35.74	-57.16
Group(2) control(+)ve	140±2.3[a]	118.6±2.4[a]
%Change of control positive group	0.00	0.00
Group (3) 5%kiwipowder	111.6±1[b]	95.8±1.8[b]
%Change of control positive group	-20.28	-19.22
Group(4) 10%kiwipowder	95.6±0.5[c]	89±1.2[c]
%Change of control positive group	-31.7	-24.95
Group (5) kiwi extract 100mg/kg	92±1.1[d]	79±0.7[d]
%Change of control positive group	-34.28	-33.38
Group (6) kiwi extract 200mg/kg	90.02±0.3[d]	71.5±0.9[e]
%Change of control positive group	-35.7	-39.71
LSD	**2.34**	**3.13**

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

Table (2): Effect of kiwi and its extracts on serum lipid profile (HDL-c, LDL-c, VLDL-c, and AI) of obese rats

Parameters / Groups	HDL-c (mg/dl) means±SD	LDL-c (mg/dl) mean±SD	VLDL-c (mg/dl) mean±SD	AI mean ±SD
Group(1) control (-ve)	65.64 ±1.1[a]	14.16±2.3[e]	10.16±0.42[f]	0.36± 0.035[c]
%Change of control negative group	169.01	-84.54	-57.16	-92.45
Group(2) control(+)ve	24.4±2.6[e]	91.8±3[a]	23.72±0.48[a]	4.77± 0.65[a]
%Change of control positive group	0.00	0.00	0.00	0.00
Group (3) 5% kiwi powder	55.8±1.07[b]	36.64±1.3[b]	19.16±0.36[b]	1.0±0. 036[b]
%Change of control positive group	128.68	-60.08	-19.22	-79.03
Group(4)10%kiwipowder	40.6±1.02[d]	37.2±0.5[b]	17.8±0.24[c]	1.35± 0.02[b]
%Change of control positive group	66.39	-59.47	-24.95	-71.69
Group (5)kiwi extract 100mg/kg	41.5±0.8[d]	34.7±1.1[c]	15.8±0.14[d]	1.16± 0.01[b]
%Change of control positive group	70.08	-64.37	-33.38	-75.68
Group (6) kiwi extract 200mg/kg	49±0.4[c]	26.7±0.7[d]	14.3±0.18[e]	0.836 ±0.01 3[bc]
%Change of control positive group	100.8	-70.91	-39.71	-82.47
LSD	2.24	3.27	0.627	0.354

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

Table (3): Effect of kiwi and its extracts on serum glucose of obese rats

Parameters / Groups	Glucose (mg/dl) mean±SD	%change of control positive group	LSD
Group(1) control (-)ve	80.18 ±2.6[d]	-30.27	**3.60**
Group(2) control(+)ve	115±4.0[a]	0.00	
Group (3) 5%kiwipowder	108±2.4[b]	-6.08	
Group(4)10%kiwipowder	88.2±1.2[c]	-23.30	
Group (5)kiwi extract 100mg/kg	106±0.5[b]	-7.82	
Group (6) kiwi extract 200mg/kg	82±1.3[d]	-28.69	

Values are denoted arithmetic means ±standard deviation of the mean .Means with different letter in the same column differ significantly at ($p \leq 0.05$)

Table (4): Effect of kiwi and its extracts of liver functions (AST, ALT, (AST/ALT) of obese rats

Parameters / Groups	AST (U/L) mean±SD	ALT (U/L) mean±SD	AST/ALT (U/L) mean±SD
Group(1) control (-) ve	49.25±1.01[e]	18.7±0.5[e]	2.63±0.125[b]
%Change of control positive group	-67.85	-62.78	-13.57
Group(2) control(+)ve	153.2±6.11[a]	50.25±0.73[a]	3.043±0.085[a]
%Change of control positive group	0.00	0.00	0.00
Group (3)5%kiwipowder	81.6±1.5[b]	32.6±0.5[b]	2.5±0.01[c]
%Change of control positive group	-46.73	-35.12	-17.84
Group(4)10%kiwipowder	72.6±0.6[c]	30.4±0.3[d]	2.38±0.004[d]
%Change of control positive group	-52.61	-39.50	-21.78
Group (5)kiwi extract 100mg/kg	74±0.9[c]	32.25±0.6[b]	2.29±0.0145[d]
%Change of control positive group	-51.69	-35.82	-24.74
Group (6)kiwi extract 200mg/kg	67.99±0.58[d]	31.33±0.1[c]	2.15±0.02[e]
%Change of control positive group	-55.62	-37.65	-29.34
LSD	**2.22**	**1.848**	**0.145**

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

Table (5): Effect of kiwi and its extracts on serum creatinine and serum urea (mg/dl) of obese rats

Parameters / Groups	Urea (mg/dl) mean±SD	Creatinine (mg/dl) mean±SD
Group (1) control (-) ve	26.3±1[e]	0.6±0.02[d]
%Change of control negative group	-59.42	-60.52
Group(2) control (+) ve	64.82±0.55[a]	1.52±0.01[a]
% Change of control positive group	0.00	0.00
Group (3) 5% kiwi powder	54.2±0.62[b]	0.76±0.03[c]
% Change of control positive group	-16.38	-50
Group (4) 10%kiwi powder	54±0.2[b]	0.75±0.04[c]
% Change of control positive group	-16.69	-50.65
Group (5) kiwi extract 100mg/kg	52.33±0.3[c]	0.93±0.02[b]
% Change of control positive group	-19.26	-38.81
Group (6) kiwi extract 200mg/kg	47.75±0.57[d]	0.73±0.03[c]
% Change of control positive group	-26.33	-51.97
LSD	1.073	0.041

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

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التأثير المحتمل لثمار ومستخلص ثمار الكيوى علي التأثيرات الجانبية في الفئران البدينة

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الملخص العربى

الهدف الرئيسي لهذه الدراسة هو معرفة تأثير ثمار ومستخلص الكيوي على الفئران البدينة .استخدم في هذه الدراسة عدد ستة وثلاثون من ذكور الفئران البيضاء من فصيلة (ا سبراجو دولي) تم تقسيمهم إلى مجموعتين رئيسيتين. المجموعة الرئيسية الأولي تم تغذيتها علي الغذاء الأساسي واستخدمت كمجموعة ضابطة سالبة(مجموعة١) ، في حين تم تغذية المجموعة الرئيسية الثانية علي غذاء مرتفع الدهون لمدة ستة أسابيع . تم تقسيم المجموعة الرئيسية الثانية إلي خمس مجموعات .المجموعة (٢) تم تغذيها على غذاء مرتفع الدهون فقط واستخدمت كمجموعة ضابطة (موجبة) ، المجموعة (٣) تم تغذيتها على غذاء مرتفع الدهون يحتوي علي٥% كيوي، المجموعة (٤) تم تغذيتها على غذاء مرتفع الدهون يحتوي علي ١٠% كيوي و المجموعة (٥) تم تغذيتها على غذاء مرتفع الدهون يحتوي علي مستخلص الكيوي (١٠٠مجم/كجم), المجموعة(٦) تم تغذيتها على غذاء مرتفع الدهون يحتوي علي مستخلص الكيوي(٢٠٠مجم/كجم). في نهاية فترة التجربة (٨اسابيع) تم تصويم الفئران طوال الليل قبل الذبح، تم تجميع الدم من كل فار علي حدا وطرده مركزيا للحصول علي السيرم. أشارت النتائج المتحصل عليها الي ان تغذية فئران التجارب علي غذاء مرتفع الدهون أدي إلي حدوث زيادة معنوية في (جلوكوز الدم، الكولسترول، الدهون الثلاثية ، LDL-C، VLDL - C، اليوريا، الكرياتينين ، وأيضا أنزيمات الكبد ,ALT (AST)، في حين عمل علي انخفاض كولسترول الليبوبوتينات عالية الكثافة). معالجة الفئران التي تم تغذيتها على نظام غذائي عالي الدهون مع مستويات من مسحوق الكيوي، و مستخلصاته أدي إلي حدوث انخفاض معنوي في مستويات دهون الدم (الكولسترول، و الدهون الثلاثية ، LDL-C، VLDL –C) وارتفاع مستوي كولسترول الليبوبوتينات عالية الكثافة .الخلاصة الفئران البدينة التي تم معاملتها(٢٠٠مجم/كجم) من مستخلص فاكهة الكيوي حسنت من دهون الدم وظائف الكبد والكلي بالمقارنة بمسحوق فاكهة الكيوي .

الكلمات الافتتاحية: الفئران البدينة – ثمارالكيوي- مستخلص-غذاء مرتفع الدهن – التحاليل الكيميائية الحيوية.