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Therapeutic Effects Of Anti- Diabetic Agents From Medicinal Plants And Seeds On Hyperglycemic Rats

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Abstract

Recent global statistics showed a high diabetes incidence which affect millions annually. It has become necessary to use supported methods in the treatment to reduce complications that may resulting from diabetes. Medicinal plants and seeds play an important role in the treatment of diabetes. This study aims to improve the health status reducing complications by using some medicinal plants and seeds (Ocimum sanctum leaves, Psidium guajava leaves, Momordica charantia seeds and Acacia Arabica seeds) individually and as mixture, through studying of biological changes and biochemical and histopathological for diabetic male albino rats, results revealed:

The ninth group fed a mixture of Ocimum sanctum leaves, Psidium guajava leaves, Momordica charantia seeds and Acacia Arabica seeds in dose 4g/kg b/w in ratio (1: 1: 1: 1) achieved the highest drop in blood sugar levels and creatinine and AST and ALP in serum blood, compared to the positive control group. while the fourth set, which fed on a mixture of Momordica charantia seeds and Acacia Arabica seeds achieved in dose 4g/kg b/w in ratio (1: 1) , the largest decline in urea level and lipoprotein low-density LDL in serum blood compared to positive control group. The third group, which fed on the seeds of Momordica charantia seeds in dose 4g/kg b/w, the highest drop in the level of triglycerides recorded trilateral very low and lipoprotein density VLDL and ALT compared to the positive control group. the ninth group fed a mixture of Ocimum sanctum leaves, Psidium guajava leaves, Momordica charantia seeds and Acacia Arabica seeds achieved in dose 4g/kg b/w in ratio (1: 1 : 1: 1) , the highest elevation in the level of high

density lipoprotein (HDL) and albumin and globulin compared to the positive control group

Key words: Medicinal plants, seeds, hyperglycemia, blood lipids, diabetes

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Introduction

Diabetes mellitus is a complex metabolic disease associated with impaired insulin secretion, developing insulin resistance as well as β-cell dysfunction that leads to abnormal glucose, protein and lipid metabolism, inflammatory responses and oxidative damages. **(Farzaei MH*et al*., 2015).** There are two major forms of DM termed as type-1 diabetes and type-2 diabetes. Type-1 diabetes is an autoimmune disease resulting in destruction of pancreatic cell leading to severe lack of insulin. Whereas, type-2 diabetes develop due to inefficient insulin utilization referred as insulin resistance or insufficient quantity of insulin production. Insulin signaling pathway is the key pathway involved in regulating blood glucose level. There are several factors reported to alter insulin secretion as well as insulin signaling pathway resulting in etiology and progression of diabetes. **(Awasthi *et al*., 2016).**Since ancient times, plants have been an exemplary source of medicine. Medical plants play an important role in the management of diabetes mellitus. There is growing interest in herbal remedies due to the side effects associated with the oral hypoglycemic agents. Herbal medicines have been the highly esteemed source of medicine throughout human history **(Mukesh and Namita, 2013).** Plants with potential therapeutic values have been used from time immemorial to cure various ailments and infectious diseases. The importance of wild edible plants may be traced to antiquity but systemic studies are recent. **(Nagarani *et al*., 2014)**.

In the present study the therapeutic effects of four plants and seeds (Ocimum sanctum leaves, Psidium guajava leaves, Momordica charantia seeds and Acacia Arabica seeds) individually and in mixture on diabetic rats was investigated

Material and Methods

Materials

Rats

Thirty six white Male albino rats weighing between 150-180 g were purchased from animal house of the National Research Center (Cairo, Egypt).

Plant material

Plant material (seeds of Acacia Arabica, Momordica charantia seeds, Ocimum sanctum Linn leaves and Psidium guajava Linn leaves) was obtained from local market, washed with fresh water, dried in shade at room temperature and then crushed into fine powder by an electrical blender

Chemicals

Alloxan monohydrate and Glucose-oxidase peroxidise kit was purchased from El-gomhoriya pharmaceutical company. Diethyl ether was obtained from sigma-Aldrich chemicals, chemical kits were obtained from biodiagnostion. All used chemicals were analytical grade of the highest laboratory purity casein was obtained from Misr scientific company, Doki,Giza, Egypt starch and oil were obtained from local market .Vitamines and minerals were obtained from El-gomhoriya pharm and chem.ind. Company Cairo,Egypt

Animals and experimental design

Thirty six mal albino rats were housed in cages in arrows maintained at 25 +- 2 c and kept under normal healthy condition .All rats will be fed on a standard diet for a week to acclimatization, and then divided in to 9 groups of four rats each

Group (1): Negative control fed on basal diet for the duration of the experiment, with plain diet

Group (2): Positive control, infected rats Alloxan (dose 150mg per kg) received plain diet

Group (3): treated with Momordica charantia seeds powder in dose of 4g/kg b/w

Group (4): treated with a formula containing (Momordica charantia seeds powder and Acacia Arabica Seeds powder) in a dose of 4g/kg b/w in ratio (1:1)

Group (5): treated with Ocimum sanctum L leaves powder in a dose of 4g/kg b/w

Group (6): treated with a formula containing (Ocimum sanctum L leaves powder and Psidium guajava leaves powder) in a dose of 4g/kg b/w in ratio (1:1)

Group (7): treated with Psidium guajava leaves powder in a dose of 4g/kg b/w

Group (8): treated with Acacia arabica seeds in a dose of 4g/kg b/w

Group (9) : treated with a formula containing (Ocimum sanctum L leaves powder and Psidium guajava leaves powder, powder of Bitter Gourd seeds and acacia arabica seeds powder) in ratio (1:1:1:1)

Groups 2:9 were injected with alloxan (120mg/kg BW) in the beginning of the experiment to induce diabetes **(Bahnak and Gold 1982).** After a period of 2 days .rats with marked hyperglycemia (fasting blood glucose> 150 mg/dl) were selected and used for the experiment **(Buko et al., 1996).**

The Experiment has continued for 60 Days, after the end of the experiment rats will be slaughtered to collect blood samples obtaining blood serum to conduct Biochemical analysis, and separate the liver, spleen, kidney, heart, and lung and weight them then histopathological examination was conducted

Biochemical analysis of serum

Serum glucose was determined according to the method described by **(Astoor and king 1954) .**Aminotransferase (ALT) in serum was determined according **(IFCC, 1980)** method

ALP activities were measured in serum using the modified kinetic method or liquicolor of **MOSS, (1982).**Aspartate aminotransferase (AST), this assay follows the **(IFCC1980)** method. Total cholesterol was determined according to **(Allain, C.C. et al., 1974)** method

Serum triglycerides (T.G) were measured using the modified kinetic method according to the method described by **Fossati and principe, (1982).**High density lipoprotein cholesterol (HDL) was determined according to **(Burtis and Ashwlood, 1999)** method. Low density lipoprotein cholesterol (LDL) was determined according to **Friedwald,et al., 1972)** equation: LDL concentration mg/dl=total cholesterol-(HDL+VLDL).Very low density lipoprotein cholesterol (VLDL) was calculated according to **Friedwald,et al., 1972)** equation: VLDL concentration mg/dl=T.G/5. Serum total protein was determined according to the method described by **Weissman et al., (1950).** Serum

albumin was determined according to **(Varley, 1980).** Serum globulin was determined as g/dl according to **chary and Chawla (2004)**. Creatinine was determined according to **Schirmeister J. (1964).** Urea was determined according to (**Patton, C.J., and Crouch, S.R., 1977).**

Histopathological Examination:

Autopsy sample were taken from liver and kidney from scarified of fixed in 10% formalin solution. All samples were sent to the histopathological examination, in Veterinary Medicine faculty, Cairo University. The obtained tissue sections were collected on glass slides and stained by hematoxylin and eosin for examination by the light microscope **(Bachroft et al., 1996)**

Statistical Analysis:

Data were statistically analyzed using statistical analysis system (spss)

Results

The effect of supplementation with different medicinal plants and seed on serum blood Glucose levels

The effect of supplementation of (Momordica charantia (MC) seeds powder 4g/kg/b.w, Momordica charantia seeds powder and Acacia Arabica(A.A) Seeds powder, Ocimum Sanctum (OS)leaves powder, O.S. leaves powder+Psidium guajava (P.j)leaves powder , (P.j)leaves powder, (A.A)seeds powder and all) on serum glucose levels of experimental rats was recorded in table (1).Data indicated that when rats became diabetic (positive control) showed significant increase of their glucose level with a mean ±152.50 ± 4.751 when compared to the normal rats fed on the basal diet (negative control) with a mean value ± 98.36 ± 4.425 mg/dl .Furthermore diet supplemented with Momordica charantia (MC) seeds 4g/kg/b.w showed decrease significant with a mean value of 131.50 ± 4.624 mg/dl. However rats in group (4) treated with a formula containing (Momordica charantia seeds powder and Acacia Arabica Seeds powder) in a dose of 4g/kg b/w in ratio (1:1) showed a significant decrease in blood glucose level with a mean value of 113.02 ± 7.919 mg/dl. Rats in group (5) which treated with Ocimum sanctum L (OS) leaves powder in a dose of 4g/kg b/w showed a significant decrease in blood glucose levels with a mean value of 126.38 ± 2.941 mg/dl. Rats in group (6) which treated with a formula containing (Ocimum sanctum L leaves powder and Psidium guajava leaves powder) in a dose of 4g/kg b/w in ratio (1:1) showed a significant decrease in

blood glucose levels with a mean value of 126.88 ± 4.487 mg/dl. Rats in group (7) which treated with Psidium guajava leaves powder in a dose of 4g/kg b/w showed a significant decrease in blood glucose level in a mean value of 126.30 ± 2.291 mg/dl. Rats in group (8) which treated with Acacia Arabica seeds powder in a dose of 4g/kg b/w showed a significant decrease in blood glucose level with a mean value of 117.20 ± 1.463 mg/dl. Moreover, rats in group (9) which treated with a formula containing (Ocimum sanctum L leaves powder and Psidium guajava leaves powder, powder of Momordica charantia (MC) seeds and acacia arabica seeds powder) in ratio (1:1:1:1) showed a significant decrease in blood glucose level with a mean value of 104.12 ± 3.681 mg/dl

This results in agreement with **(Rao, A. et al., 2013) which found that** Ethanolic extract of Ocimum sanctum (OS) has significant and sustained oral hypoglycemic activity. **(Hannan, J.M. Et al., 2006)** also found that Ocimum sanctum leaf extracts have stimulatory effects on physiological pathways of insulin secretion which may underlie its reported antidiabetic action. Increasing intra cellular calcium of beta islet cells of pancreas **Kochhar A.and Nagi M. (2011)** observed that Mixed powder of bitter gourd fruit, fenugreek seeds, and jambu seeds in either capsule (raw) or biscuit (cooked) form Lower fasting and postprandial blood and urine levels; reduced intake of oral hypoglycemic drugs; raw powder was more effective.and causes insulin secretion. MC seeds might enhance glucose utilization because they significantly decreased the blood glucose level in glucose loaded rats. It is very important to note that seed extracts showed a more pronounced action in the glucose tolerance test (**Sathish Sekar, D., et al 2005).**The possible mechanism by which MC seeds lead to a decrease in blood glucose may be by a potentiation of the insulin effect by increasing either the pancreatic secretion of insulin or its responsiveness. A number of other plants have been reported to exert hypoglycemic activity through insulin-release stimulatory effect **(Pari and Umamaheswari 2000).(Khanna et al., 1981)** Attributed the hypoglycemic effect of *Momordica charantia* seeds to hypoglycemic peptide (polypeptide-p) was isolated from fruits, seeds and tissues of M. charantia. Similar studies show the marked antidiabetic activity of the P. guajava leaves. For example, P. guajava leaf extracts not only significantly decreased blood glucose levels but also improves the levels of plasma insulin and haemoglobin in streptozotocin-induced

diabetic rats **(Subramanian *et al.*, 2009).**Ethanolic extract of P. guajava may effectively regulate the antioxidant status in STZ induced diabetic rats. It may be the reason for its hypoglycemic property. The concentration of blood glucosefound to attain a near normal level in in rats received ethanolic extract of P. guajava. (**Ramasamy. and Arumugam 2016).** *Psidium guajava* leaf extract had marked hypoglycaemic Antidiabetic activity of ethanolic leaf extract of *Psidium guajava* may be due to the inhibitory activity of alpha-glucosidase. **(Shakeera banu m. et al., 2013)**

Santosh Mazumdar *et al.*, 2015 observed significant antidiabetic and antidiarrhoeal activities of ethanolic extracts of *Psidium guajava* leave in Wister rats

Table (1)

GROUP	Mean ± SD	T. Test
(1) Control -ve	98.36 ± 4.425	16.678***
(2) Control+ve	152.50 ± 4.751	
(3) Momordica charantia (MC) seeds 4g/k/b.w)	131.50 ± 4.624	6.335NS
(4) MC. Seeds+A.A seeds	113.02 ± 7.919	8.549*
(5) Ocimum Sanctum (OS)leaves	126.38 ± 2.941	9.351*
(6) O.S. leaves+P.j.leaves	126.88 ± 4.487	7.843*
(7) P.j.leaves	126.30 ± 2.291	9.935*
(8) Acacia Arabica (A.A)seeds	117.20 ± 1.463	14.202**
(9) All	104.12 ± 3.681	16.098***

Data represented as Mean ±SD
Independent T-test
***P≤0.05, **P≤0.01, ***P≤0.001 and NS Not Significant**

The effect of supplementation with different medicinal plants and seeds on diabetic rats kidney function

The effect of supplementation with different medicinal plants and seeds on serum urea levels was recorded in table (2).Results revealed that serum urea concentration was increased as a result of diabetes induction (positive control) with a mean value of 61.50 ± 2.380 mg/dl compared to the negative control group which fed on basal diet with a mean value of 45.75± 2.500 mg/dl.Rats in group (3)showed non-significant decreased in serum urea level with a mean value of 56.00 ± 3.56 mg/dl .Rats in group (4) showed a significant decrease in serum urea level with a mean value of 48.75 ± 2.22.Rats in group (5) showed a

significant decrease in serum urea level with a mean value of 50.75 ± 5.44mg/dl. Rats in group (6) showed a significant decrease in serum urea level with a mean value of 51.00 ± 2.31mg/dl. Rats in group (7) showed a significant decrease in in serum urea level in a mean value of 55.25 ± 2.06mg/dl. Rats in group (8) showed a significant decrease in serum urea level with a mean value of 50.75 ± 3.096mg/dl. Rats in group (9) showed a significant decrease in serum urea level with a mean value of 55.50 ± 1.92mg/dl

Table (2)

GROUP	Urea		Creatinine	
	Mean ± SD	**T. Test**	**Mean ± SD**	**T. Test**
(1)Control -ve	45.75± 2.5	9.125***	0.63± 0.03	14.059***
(2) Control+ve	61.50 ± 2.55		0.9075 ± 0.06	
(3) Momordica charantia (MC) seeds 4g/k/b.w)	56 ± 3.56	2.569N	0.7875± 0.03	5.58*
(4) MC. Seeds+A.A seeds	48.75 ± 2.22	7.838***	0.6975± 0.02	13.39**
(5)Ocimum Sanctum (OS)leaves	50.75 ± 5.44	3.621*	0.795± 0.05	4.069NS
(6) O.S. leaves+P.j.leaves	51.00 ± 2.31	6.332**	0.7375± 0.04	7.276*
(7) P.j.leaves	55.25 ± 2.06	3.969*	0.715 ± 0.04	7.662**
(8) Acacia Arabica (A.A)seeds	50.75 ± 3.096	5.506**	0.6825± 0.04	9.939***
(9) All	51.50 ± 2.02	6.547**	0.67 ± 0.04	10.556***

Data represented as Mean ±SD
Independent T-test
***P≤0.05, **P≤0.01, ***P≤0.001 and NS Not Significant**

Results revealed that serum Creatinine concentration was increased as a result of diabetes induction (positive control) with a mean value of 0.91 ± 0.03 mg/dl compared to the negative control group which fed on basal diet with a mean value of 0.63± 0.03 mg/dl .Rats in group (3) showed decreased in serum Creatinine levels with a mean value of 0.79 ± 0.03 mg/dl. Rats in group (4) showed a significant decrease in serum Creatinine level with a mean value of 0.698 ± 0.02.Rats in group (5) showed a non-significant decrease in serum creatinine level with a mean value of 0.795 ± 0.05 mg/dl. Rats in group (6) showed a significant decrease in serum creatinine level with a mean value of 0.74 ± 0.04 mg/dl. Rats in group (7) showed a significant decrease in in serum creatinine level in a mean value of 0.72 ± 0.04

mg/dl. Rats in group (8) showed a significant decrease in serum creatinine level with a mean value of 0.68± 0.04 mg/dl. Moreover, rats in group (9) showed a significant decrease in serum creatinine level with a mean value of 0.67 ± 0.04 mg/dl

This results in agreement with (**Ramasamy. and Arumugam 2016)** which found that urea and creatinine levels are found to attain a near normal level in in rats received ethanolic extract of P. guajava

The effect of supplementation with different medicinal plants and seeds on serum Triglyceride,Totalcholesterol,HDL,VLDL and LDL levels

The effect of supplementation with different medicinal plants and seeds on serum Triglyceride,Totalcholesterol,HDL,VLDL and LDL levels showed in table(4).Results revealed that serum triglyceride concentration was significantly increased as a result of diabetes induction (positive control) with a mean value of 82.50 ± 2.89 mg/dl compared to the negative control group which fed on basal diet with a mean value of 63.75 ± 2.5 mg/dl.Rats in group (3) showed a decrease in serum triglyceride level with a mean value of 67.50 ± 6.46 mg/dl. Rats in group (4) showed a significant decrease in serum triglyceride level with a mean value of 68.50 ± 2.38 mg/dl. Rats in group (5) showed a significant decrease in serum triglyceride level with a mean value of 70.25 ± 4.11 mg/dl. Rats in group (6) showed a significant decrease in serum triglyceride level with a mean value of 71.25 ± .79. Rats in group (7) showed non- significant decrease in in serum urea level in a mean value of 76.25 ± 6.29 mg/dl. Rats in group (8) showed non- significant decrease in serum urea level with a mean value of 76 ± 4.55 mg/dl. Rats in group (9) showed a non-significant decrease in serum triglyceride level with a mean value of 78.25 ± 2.06mg/dl

Table (4)

Group	Triglycerides		Total cholesterol		HDL		VLDL	LDL		
	Mean ± SD	T. Test	Mean± SD	T. Test	Mean ± SD	T. Test	Mean ± SD	T. Test	Mean ± S D	T. Test
(1)Control -ve	63.75 ± 2.5	9.820***	114.25 ± 4.35	6.991***	35.25 ± 2.06	-7.09***	12.75 ± .5	9.820***	15.75 ± 2.75	16.902***
(2) Control +ve	82.50 ± 2.89		135.75 ± 4.35		23.75 ± 2.5		16.5 ± .58		42.25 ± 1.5	
(3) Momordica charantia (MC) seeds 4g/k/b.w)	67.50 ± 6.46	4.243***	120.50 ± 2.08	6.325**	26.25 ± 2.5	-1.414NS	13.5 ± 1.29	-4.243**	27.75 ± 5.38	5.195**
(4) MC. Seeds+A.A seeds	68.50 ± 2.38	7.483***	122.25 ± 2.22	5.531*	28.00 ± 2.45	-2.429NS	13.7 ± .48	-7.483***	26.8± 2.83	9.639***
(5)Ocimum Sanctum (OS)leaves	70.25 ± 4.11	4.876**	122.75 ± 3.3	4.760*	28.5 ± 2.38	-2.752*	14.1 ± .82	-4.876**	27.7 ± 3.89	6.974***
(6) O.S. leaves+P.j.leaves	71.25 ± .79	4.025*	127.00 ± 6.78	2.172NS	29.25 ± 3.86	-2.391NS	14.25 ± .96	-4.025*	27.75 ± 6.18	4.557**
(7) P.j.leaves	76.25 ± 6.29	1.806NS	123.25 ± 3.86	4.298*	27.50 ± 2.65	-2.060NS	15.25 ± 1.26	-1.806NS	33.5 ± 3.87	4.214*
(8) Acacia Arabica (A.A)seeds	76.00 ± 5.55	2.414NS	115.50 ± 4.2	6.696***	30.25 ± 1.5	-4.459**	15.2 ± .91	-2.414NS	30.55 ± 3.73	5.827***
(9) All	78.25 ± 4.06	2.396NS	113.25 ± 4.27	7.381***	31.25 ± 4.19	-3.073*	15.65 ± .41	-2.396NS	31.35 ± 4.52	4.577**

Data represented as Mean ±SD
Independent T-test
***P≤0.05, **P≤0.01, ***P≤0.001 and NS Not Significant**

Results revealed that serum total cholesterol concentration was significantly increased as a result of diabetes induction (positive control) with a mean value of 135.75 ± 4.35 mg/dl compared to the negative control group which fed on basal diet with a mean value of mg/dl. Rats in group (3) showed a decrease in serum total cholesterol level showed with a mean value of 120.5 ± 2.08 mg/dl. Rats in group (4) showed a significant decrease in serum total cholesterol level with a mean value of 122.25 ± 2.22 mg/dl. Rats in group (5) showed a significant decrease in serum total cholesterol level with a mean value of 122.75 ± 3.3 mg/dl. Rats in group (6) showed non-significant decrease in serum total cholesterol level with a mean value of 127± 6.78 mg/dl. Rats in group (7) showed a significant decrease in in serum total cholesterol level in a mean value of 123.25 ± 3.86 mg/dl. Rats in group (8) showed a significant decrease in serum total cholesterol level with a mean value of 115.5 ± 4.2 mg/dl. Moreover, rats in group (9) showed a significant

decrease in serum total cholesterol level with a mean value of 113.25 ± 4.27 mg/dl

Data demonstrated that serum HDL levels was significantly decreased as a result of diabetes induction (positive control) with a mean value of 23.75 ± 2.5 mg/dl compared to the negative control group which fed on basal diet with a mean value of 35.25 ± 2.06 mg/dl .Rats in group (3) showed a significant increase serum HDL with a mean value of 26.25 ± 2.5 mg/dl. Rats in group (4) showed a significant increase in serum HDL level with a mean value of 28 ± 2.45mg/dl.Rats in group (5) showed a significant increase in serum HDL level with a mean value of 28.5 ± 2.38 mg/dl. Rats in group (6) showed non-significant increase in serum HDL level with a mean value of 29.25 ± 3.86mg/dl. Rats in group (7) showed non-significant increase in in serum HDL level in a mean value of 27.5 ± 2.65 mg/dl. Rats in group (8) showed a significant increase in serum HDL level with a mean value of 30.25 ± 1.5 mg/dl. Moreover, rats in group (9) showed a significant increase in serum HDL level with a mean value of 31.25 ± 4.19 mg/dl

Results revealed that serum VLDL level was significantly increased as a result of diabetes induction (positive control) with a mean value of 16.5 ± .58 mg/dl compared to the negative control group which fed on basal diet with a mean value of 12.75 ± .5 mg/dl.Rats in group(3) showed a decrease in serum VLDL level with a mean value of 13.5 ± 1.29 mg/dl.Rats in group (4) showed a significant decrease in serum VLDL level with a mean value of 13.7 ± .48 mg/dl. Rats in group (5) showed a significant decrease in serum VLDL level with a mean value of 14.1 ± .82 mg/dl. Rats in group (6) showed a significant decrease in serum VLDL level with a mean value of 14.25 ± .96 mg/dl. Rats in group (7) showed a significant decrease in in serum VLDL level in a mean value of mg/dl. Rats in group (8) showed a significant decrease in serum VLDL level with a mean value of 5.2 ± .91 mg/dl. Moreover, rats in group (9) showed a significant decrease in serum VLDL level with a mean value of 15.65 ± .41 mg/dl

Results revealed that serum LDL levels was significantly increased as a result of diabetes induction (positive control) with a mean value of 42.25 ± 1.5 mg/dl compared to the negative control group which fed on basal diet with a mean value of 15.75 ± 2.75 mg/dl .Rats in group (3) showed a decrease in serum LDL level with a mean value of

27.75 ± 5.38 mg/dl. Rats in group (4) showed a significant decrease in serum LDL level with a mean value of 26.8± 2.83 mg/dl. Rats in group (5) showed a significant decrease in serum LDL level with a mean value of 27.7 ± 3.89 mg/dl. Rats in group (6) showed a significant decrease in serum LDL level with a mean value of 27.75 ± 6.18 mg/dl. Rats in group (7) showed a significant decrease in in serum LDL level in a mean value of 33.5 ± 3.87 mg/dl. Rats in group (8) showed a significant decrease in serum LDL level with a mean value of 30.55 ± 3.73 mg/dl. Moreover, rats in group (9) showed a significant decrease in serum LDL level with a mean value of 31.35 ± 4.52 mg/dl

This results in agreement with **(Khan, M.R.I. et al., 2010)** which found that Intraperitoneal administration of partitionates of ethanol extract of leaves of O. sanctum resulted in a significant reduction of serum lipid levels in rats with hyperlipidemia viz. triglyceride and total cholesterol. **Mahdi, A. A. et al., 2003** found that M.charantia, O.sanctum not only have hypoglycemic activity but they also significantly reduce the plasma lipid peroxide levels in diabetic rats

Psidium guajava leaf extract had marked hypolipidemic effect in alloxan-induced diabetes. This extract, therefore, could be used for lowering, TC, TG, LDL and VLDL levels and reducing thereby the risk of CVD by increasing HDL cholesterol level. Antidiabetic activity of ethanolic leaf extract of *Psidium guajava* may be due to the inhibitory activity of alpha-glucosidase. **(Shakeera banu m. et al., 2013)**

The effect of supplementation with different medicinal plants and seeds on diabetic rats liver function

The effect of supplementation with different medicinal plants and seeds on serum ASTwas recorded in table (5).Results indicated that normal rats receiving basal diet had serum AST levels with a mean value 28± 1.83 U/L, concentration was significantly increased as a result of diabetes induction (positive control) with a mean value of 41.5 ± 3.11 U/L.Rats in group (3) showed a decrease in AST level with a mean value of 31.25 ± 4.03 U/L .Rats in group (4) showed a significant decrease in serum AST level with a mean value of 33.75 ± 3.59 U/L.Rats in group (5) showed a significant decrease in serum AST level with a mean value of 32.25 ± 3.5 U/L. Rats in group (6) showed a significant decrease in serum AST level with a mean value of 32± 3.56 U/L. Rats in group (7) showed non-significant decrease in in serum AST level in a mean value

of 35.75 ± 4.03 U/L. Rats in group (8) showed a significant decrease in serum AST level with a mean value of 32.25± 2.75 U/L. Moreover, rats in group (9) showed a significant decrease in serum AST level with a mean value of 28.75 ± 2.99 U/L

Table (5)

Group	AST		ALT		ALP	
	Mean± SD	T. Test	Mean± SD	T. Test	Mean ± SD	T. Test
(1)Control -ve	28± 1.83	7.488***	23± 2.83	4.714***	88.75± 4.193	-9.437***
(2) Control+ve	41.5± 3.11		33± 3.16		126.25±6.752	
(3)Momordica charantia(MC) seeds 4g/k/b.w)	31.25± 4.03	4.027**	26± 2.16	3.656*	112.25±3.096	3.77*
(4)MC.Seeds+A.A seeds	33.75± 3.59	3.262*	27.25± 2.87	2.692*	117.75±10.31	1.38NS
(5)Ocimum sanctum (OS)leaves	32.25± 3.5	3.952**	28.25± 1.71	2.643*	117.75±10.31	2.11*
(6)O.S.leaves+P.j. leaves	32± 3.56	4.020**	28 ± 2.94	2.315NS	116.75±2.99	2.574*
(7) P.j.leaves	35.75± 4.53	2.259NS	27.75± 3.86	2.104NS	116.25±1.99	2.852*
(8)Acacia Arabica (A.A)seeds	32.25± 2.75	4.454**	27± 3.37	2.598*	108±2.16	5.149**
(9) All	28.75± 2.99	5.915***	29.5± 3.11	1.578NS	101.25±1.893	7.131***

Data represented as Mean ±SD
Independent T-test
***P≤0.05, **P≤0.01, ***P≤0.001 and NS Not Significant**

Results indicated that normal rats receiving basal diet had serum ALT levels with a mean value 23± 2.83 U/L concentration was significantly increased as a result of diabetes induction (positive control) with a mean value of 33± 3.16 U/L. rats in group(3) showed a decrease in serum ALT level with a mean value of 26± 2.16 U/L. Rats in group (4) showed a significant decrease in serum ALT level with a mean value of 27.25 ± 2.87 U/L. Rats in group (5) showed non-significant decrease in serum ALT level with a mean value of 28.25 ± 1.71 U/L. Rats in group (6) showed significant decrease in serum ALT level with a mean value of 28 ± 2.94 U/L. Rats in group (7) showed significant decrease in in serum ALT level in a mean value of 27.75 ± 3.86 U/L. Rats in group (8) showed a significant decrease in serum ALT level with a mean value of 27± 3.37 U/L. Moreover, rats in group (9) showed non-significant decrease in serum ALT level with a mean value of 29.5 ± 3.11U/L

Results indicated that normal rats receiving basal diet had serum ALP levels with a mean value 88.75± 4.193U/L concentration was non-

significantly increased as a result of diabetes induction (positive control) with a mean value of 126.25±6.752 U/L. rats in group(3) showed a decrease in serum ALP level with a mean value of 112.25±3.096 U/L. Rats in group (4) showed non-significant decrease in serum ALP level with a mean value of 117.75±10.31 U/L. Rats in group (5) showed a significant decrease in serum ALP level with a mean value of 117.75±10.31 U/L. Rats in group (6) showed a significant decrease in serum ALP level with a mean value of 116.75±2.99 U/L. Rats in group (7) showed a significant decrease in in serum ALP level in a mean value of 116.25±1.99 U/L. Rats in group (8) showed a significant decrease in serum ALP level with a mean value of 108±2.16 U/L. Moreover, rats in group (9) showed a significant decrease in serum ALP level with a mean value of 101.25±1.893 U/L

This results in agreement with **(Khan, M.R.I. et al., 2010)** which found that administration of different Ocimum sanctum fractions reduced AST and ALT levels significantly

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التأثيرات العلاجيه لبعض النباتات الطبيه والبذورعلى الفئران المصابه بالبول السكرى

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المستخلص

أظهرت الإحصائيات العالمية الحديثة ارتفاعاً مذهلاً في معدل الإصابة بمرض السكر حيث يصاب الملايين سنويا و أصبح من الضرورى استخدام وسائل مساعدة فى علاج وتقليل المضاعفات التى قد تنجم عن الاصابه بمرض السكر وتلعب النباتات والبذورالطبيه دورا هاما فى علاج مرض السكر حيث تهدف هذة الدراسه الى تحسين الحاله الصحيه وتقليل المضاعفات وذلك باستخدام بعض النباتات الطبيه والبذور (اوراق الريحان الهندى (التولسي) ,أوراق الجوافه, بذور القرع المر و بذور السنط العربى) منفردة وعلى هيئة خليط ومن خلال دراسة التغيرات البيولوجيه والبيوكميائيه والهستوباثولوجيه لذكور الفئران البيضاء المصابه بالسكر و ضحت أهم النتائج

أن المجموعة التاسعة التى تغذت على خليط من بذور القرع وبذور السنط العربي واوراق الريحان واوراق الجوافه (بتركيز ٤جم /كجم من وزن الجسم بنسبة (١:١:١:١) حققت أعلى انخفاض فى مستوى السكر والكرياتنين و AST و ALP فى سيرم الدم مقارنة بالمجموعة الضابطة الموجبه . بينما حققت المجموعة الرابعة التى تغذت على خليط من بذور القرع المر وبذور السنط العربي (بنسبة (١:١) بتركيز ٤جم /كجم من وزن الجسم) اعلى انخفاض فى مستوى اليوريا والليبوبروتين منخفض الكثافة LDL فى سيرم الدم مقارنة بالمجموعة الضابطة الموجبه . وقد سجلت المجموعة الثالثه التى تغذت على بذور القرع المر بتركيز٤جم /كجم من وزن الجسم أعلى انخفاض فى مستوى الجليسريدات الثلاثية والليبوبروتين منخفض جدا الكثافة VLDL و ALT مقارنة بالمجموعة الضابطة الموجبة . كما حققت المجموعة التاسعة التى تغذت على خليط من بذور القرع وبذور السنط العربي واوراق الريحان واوراق الجوافه (بنسبة (١:١:١:١) بتركيز ٤جم /كجم من وزن الجسم) أعلى ارتفاع فى مستوى الليبوبروتين عالى الكثافه (HDL) و الألبيومين والجلوبيولين مقارنة بالمجموعة الضابطة الموجبة

الكلمات المفتاحيه: النباتات الطبيه, البذور, ارتفاع مستوى سكر الدم, دهون الدم