Journal of Home Economics
Volume 29, Number (2), 2019
http://homeEcon.menofia.edu.eg

Journal of Home Economics

ISSN 1110-2578

Study The Effect Of Garden Cress And Rosemary On Experimental Animals Infected Hyperglycemic

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ABSTRACT

This study was conducted to acquaintance the effectiveness of garden cress seeds and rosemary on experimental rats suffered from diabetes mellitus.48 adult male albino rats weighting between 150± 5 gram, rats were housed in cages arrows maintained at 25±2c and kept under normal healthy condition. All rats will be fed on a standard diet for a week to acclimatization, and then dividedin to 8groups,each with 6 rats as follows :Group (1):(Nigative control)group 6 normal rats fed on basal diet, and the second group (2)(n=42): positive control infected rats alloxan (dose 150mg per kg).Then rats were divided in to seven groups (each group consisted of 6 rats and fed on basal diet)as following : Group (2)was left as positive control(+)group.Group (3):was fedon basal diet+3%of garden cress, Group (4):was fed on basal diet +6%of garden cress ,Group (5)was fed on basal diet+3%of rosemary, Group (6):was fed on basal diet+6% of rosemary, Group (7):was fed on basal diet+3% mixture of garden cress and rosemary, Group (8):was fed on basal diet+6% mixture of garden cress and rosemary. All above mentioned experimental groups were maintained on their corresponding diet for two months at the end of experimental rats were sacrificed and blood samples collected then centrifuged for Biochemicalanalysis:blood glucose, kidney function indicators, some serum liver enzymes activity and lipid profile were estimated. (BWG),Feed efficiency ratio (FER)and relative orange weight were recorded. Histopathological change for liver and kidney were estimated. Also the proximate chemical composition for materials.

Conclusion :garden cress seeds and rosemary have therapeutic effect on diabetic rats.

Kay words :diabetes mellitus, gardencress seeds, Anti-diabetic and Biochemical analysis, rosemary.

Introduction

Type 2 diabetes mellitus (T2DM) is a disease resulting from impairments in insulin action and insulin secretion **(Tripathy and Chavez,2010)**Diminished insulin action and insulin secretion lead to deregulation of glucose and fat metabolism in various tissues including skeletal muscle, adipose tissue and liver and failure to maintain normal blood glucose levels. This prolonged pathological state characterized by hyperglycemia and hyper lipidemia leads to complications such as retinopathy; neuropathy; nephropathy ; and microvascular, macrovascular and cardiovascular problems. According to theWorld Health Organization and the International Diabetes Federation (IDF) estimates, T2DM is rapidlygrowing and will be affecting more than 439 million adults by 2030 **(Shaw *et al.*,2010)**At present, there is no cure for diabetes mellitus as is true for many of the major chronic diseases inflicting the world's population at large. Current therapeutic strategies for diabetes mellitus are aimed at management and alleviation ofthe underlying pathological processes and include lifestyle modifications such as healthy diet, weight management and regular physical activity coupled with medication/drug interventions (**Tran *et al*.,2015).**

Type 2 Diabetes Mellitus is a heterogeneous, multi factorial, polygenic disease characterized by a defect in insulin's secretion (the beta cell secretory defect) and action (insulin resistance)" **(Hayden,2002).**

Bryan *et al..*,(2009). reported that garden cress is rich in proteins, vitamins, minerals, especially calcium and iron. GC seeds contain 24 % fat in which 34.5 % of total fatty acids α-linolenic acid .

The seeds are rich phenolic compounds and have high antioxidant activity compared to other cress varieties. It contains many phytochemicals with potential nutraceutical activity like glucosinolates, flavonoids, coumarins, sulphur glycosides, triterpenes, sterols and various imidazole alkaloids**(Maier *etal*., 1998).**

Gokavi et *al.*,(2004) reported thatGcseeds shows many medicinal properties such as anti diabetic, hypocholesterolemic, antihypertensive, anti diarrheal, antispasmodic and laxative activities. It also has fracture healing hepatoprotective, diuretic, antinflammatory, nephroprtectivenephrocurative,galactogogue,antipyretic and analgesic potential. Health drink and food products incorporated with Gc seed or

its fractions were sensorily acceptable. Gc seed can be used as a promising multipurpose medicinal source.

Chauhan*et al.* (2012) reported the hypoglycemic and hypo lipidemic effects of Gc seed powder in alloxan induced diabetic male Wistar rats. Diabetic and hyper lipidemic rats administered with Gc seed (3g/kg body weight) showed a significant decrease ($p \leq 0.05$) in fasting blood glucose levels, glycosylated haemoglobin, lipid profile, total cholesterol, triglycerides and lipoprotein fractions (LDL and VLDL) with a significant increase inHDL levels.

Rosemary contains anumberof phytochemicals,including rosmarinic acid, camphor, caffeic acid, ursolic acid, betulinic acid, carnosic acid and carnosol. In traditional medicine, extracts and essential oil from flowers and leaves are used in the belief they may be useful to treat a variety of disorders.(**Vallverdu-Queralt,2014**)·Rosemary essential oil contains 10-20% camphor, though the chemical composition can vary greatly between different samples according to in vitro studies(**RaskovicandAleksandar,2014).**

Khalil*et al.,(*2012)reported that rosemary extract and the rosemary extract polyphenols carnosic acid and rosmarinic acid have been shown to have insulin-like effects in insulin target cells in vitro and to exert significant anti-diabetic effects in different animal models of T2DM in vivo. Rosemary extract and rosemary extract polyphenols exhibit protective properties against hyperlipidemia and hyperglycemia in genetic, chemically-induced and dietary animal models of obesity and T2DM.

Rosemary has antioxidant and anti inflammatory activity in biological systems. Functional dairy products supplemented with rosemary could play a role in reducing the risk of some common diseases since its contents of antioxidant components can prevent chemical damage to the cells' components by oxidation and can interfere with the oxidation process by reacting with the free radicals, chelating free catalytic metals and also by acting as free radical scavengers (**Fernandez-Lopez *et al*.,2005)**.

Many studies have revealed that antioxidant activity of rosemary extract is mainly due to the presence of, rosmarinic acid (RA) and carnosic acid (CA), which are both responsible for the anti inflammatory

and antioxi-dant properties(**Takaki*et al*.,2008)&(Perez-Fons*et al*.,2010).**

Carnosol converted into rosmanol via oxidation in food processing . Carnosol has known as an anti-inflammatory compound in rosemary extract. Rosmanol is transformed from carnosol. Carnosic acid and carnosol are powerful compounds in rosemary extracts. These compounds have anti-inflammatory and anti-cancer activities. Anti-inflammatory agent and that it prevent carcinogens from binding to DNA, and stimulates liver detoxification of carcinogens. Study has demonstrated that rosmarinic acid of a rosemary extract inhibited the allergic airway inflammation induced by house dust mites in vivo and another study of perilla has shown that the volatile constituents also prevented allergic airway inflammation induced by house dust mites. The preventive effect is associated with inhibition of the enhanced local expression of interleukin-13(**Inoue *et al.*,2005)**.

Material And Methods

Materials

Garden cress seeds ((Lepidiumsativum), Rosemary (Rosmarinusofficinalis) were purchased from local markets at Shibin EL-Kom City, EL-Monufia Governorate, Egypt.,Alloxan used for induction for diabetic in rats,purchased from SIGMA chemical co.,USA.

A total of 48 adult normal male albino rats (Sprague Dawley Strain) weighing 150 ±5 g were obtained from Experimental animal farm.,cairo,Egypt.

Methods:

Preparation powder:

Garden cress seeds and rosemary obtaind from local market at Shibin El-KomCity,EL-Minufiya Governorate,andcrushed in to fine powder by an electrical grinder.

Animals and Experimental Design:

The work was carried out at the Faculty of Home Economic, Menofia University, Egypt. 48 male albino rats were fed a standard dietaccording to **AIN, (1993)**for aweekas an adaptation period as normal control group while diabetes was induced in normal albino rats by single intrapeuitonel administration of alloxan150 mg/kg according to the method described by **(Desai and Bhide, 1985).**

The animals (48 rats) were distributed into 8 groups (n=6)

according to the following scheme: Normal control (6 rats) fed basal diet.

While diabetic rats (42) were classified into diabetic control,3 &6% garden cress powder, 3&6% rosemary powder and 3&6% the mixtureof garden cress and rosemary.

Food intake was calculated daily and rats were weighted weekly. Feeding and growth performance were carried out by determination of food intake, body weight gain and food efficiency ratio (FER) according to **Chapman *et al.*, (1959)** using the following formula:

$$\textbf{FER} = \frac{\text{Body weight gain (g)}}{\text{Food intake (g)}}$$

$$\text{Body weight gain (BWG\%)} = \frac{\text{Final weight} - \text{initial weight}}{\text{Initial weight}} \times 100$$

Blood samples were collected after (12 hours)fastingat the end of the experiment(2months)using the(retro- orbital method) , by means of amicrocapillary glass tubes, blood samples were collected into a dry clean centrifugal tube and left to clot at room temperature (37°C) , then blood tubes centrifuged for 10 minutes at 3000 rpm to separate the serum, Serum was carefully aspirated, transferred into clean covet fit plastic tubes, and stored frozen at (-20°C) until analysis.

Chemical Analysis:

Moisture, protein, fat, fiber and ash contents of garden cress and rsemary were determined according to methods described by the ***A.O.A.C.* (2010).**

Biochemical Analysis:

Serum glucosewas determined using modified kinetic method according to **Asatoor and King, (1954)**.

Serum Total cholesterol was determination according to **Allain, (1974)** using the modified kinetic method.

Triglyceride (TG) and high-density lipoprotein cholesterol (HDLc) were determined by using enzymatic colorimetric methods of **Fassati and Prencipe, 1982, Schmidt-sommerfeld,(1981),and Allain, (1974) .**respectively. The determination of low-density lipoprotein cholesterol (LDLc) and very low-density lipoprotein cholesterol (VLDLc) were carried out according to the method of **Lee and Nieman,(1996)**as follows:

VLDLc = TG/5 and LDL_C= Total Cholesterol –(HDLc+VLDLc).

Serum aspartate and alanine amino transferases (AST, ALT) were measured according to the methods described by**Kachmar and Moss,(1976) and Bergmeyer and Harder, (1986)** respectively.Determination of serum creatinine and urea **Bartles*et al*., (1972) and Barham and Trinder, (1972)** respectively.

Statistical Analysis:

Statistical analysis was performed by using computer program, Statistical Package for Social Science and compared with each other using the suitable tests **(SAS,2000).**

Results And Discussion

Data in **Table (1)** showed the chemical compositionof garden cress and rosemary(g/100g). The results indicated that garden cress and rosemary content35.68&20.7Carbohydrate, 6.52Moisture, 20.37&5.8 Fat,24.45&3.3Protein, 4.86Ash and 8.12&14.1 fiber respectively

Table (1): Chemical composition ofgarden cress and rosemary.

Parameter	Garden cress	Rosemary
Moisture	6.52	
Carbohydrate (g/100 g)	35.68	20.7
Fat (g/100g)	20.37	5.8
Protein (g/100 g)	24.45	3.3
Ash (g/100 g)	4.86	
fiber (g/100 g)	8.12	14.1

Effect of garden cress seeds and rosemary on body weight gain, feed intake and feed efficiency ratio of diabetic rats:

Effect of garden cress seeds and rosemaryon feed intake, body weight gain and feed efficiency ratio of diabetic rats showed in table (2).

The data in **table (2)**indicated the mean value of food intake, body weight gain and FER for normal and diabetic rats, it is clear that the food intake value was high significanty ($p \leq 0.01$) increase in group 6%garden cress and 6 % mixture comparedwith positive group. While 3%mixture record significant ($p \leq 0.05$) compared with positive group. On the other hand, body weight gain record significant ($p \leq 0.05$)group which supplement diet with 3%garden cress, 6 % rosemary and 3 % mixture. While group fed on 6 % garden cress and 6 % mixture recorded high significantat($p \leq 0.01$).

Feed efficiency ratio was no significant in groups supplement

diet 3% garden cress, 3 % rosemary and 3% mixture compared with positive group. While FER record significant ($p \leq 0.05$) in groups which supplement diet with 6 % garden cress and 6 % rosemary. Whereas group fed on 6 % mixture record high significant at($p \leq 0.01$). **Hamedan (2010)** studied thatrat groups with oral administration of garden cress seed extract and powder showed a significant lower value of weight gain, feed efficiency ratio. **Ibarra *et al.*, (2011)** showed that rosemary extract prevented weight gain by limiting lipid absorption in the intestine. This was made possible through the inhibition of pancreatic lipase activity.

Table (2): Effect of garden cress seeds and rosemary on feed intake ,body weight gain and feed efficacy ratio of diabetic rats.

Parameters / Groups	FI (g) Mean± SD	BWG (%) Mean ± SD	FER Mean ± SD
-ve	15.44±2.16**	17.08±1.72***	0.075±0.001**
+ve	11.56±1.52	4.51± 1.11	0.023±0.008
Garden cress 3%	13.14±1.65	8.01±1.15*	0.046±0.003
Garden cress 6%	14.85±2.72**	10.92±1.13*	0.056±0.003*
Rosemary 3%	12.67±1.43	6.91±1.27	0.034±0.004
Rosemary 6%	13.79± 1.11	8.81± 1.52*	0.054±0.003*
Mixture 3%	14.04±1.39*	7.98± 1.18*	0.046±0.002
Mixture 6%	14.63±1.55**	11.68± 1.48**	0.060±0.004**

*P≤0.05,**P≤0.01***P≤0.001

Effect of garden cress and rosemary on organs weight of diabetic rats:

Effect ofgarden cress seeds and rosemary on organs weight of diabetic rats showed in table(3)

The data shown in **table (3)** the organs weight of liver, lung, heart, kidney and spleen for normal and diabetic rats. there were significant difference in organs wight between positive control group and other groups. Groups fed on 3 % garden cress and 3 % rosemary showen no significant in liver, lung, heart, kidney and spleen. Groups which supplemented diet with 6 % garden cress significant at ($p \leq 0.05$) in liver, heart, lung and kidney, but significant at ($p \leq 0.01$) in spleen. In the other side group fed on 6 % rosemary showed no significant in liver and heart but give significant at ($p \leq 0.05$) in lung, spleen and kidney . Groups fed on 3 % mixture was significantly ($p \leq 0.05$) in liver, lung, spleen and kidney but record no significant in heart. While group fed on 6 % mixture recorded high significant at ($p \leq 0.01$) in liver, lung and

spleen compared with positive control.

Table (3): Effect of garden cress and rosemary on organs weight(g) of diabetic rats.

Parameters	Liver	Heart	lung	Spleen	Kidney
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD
-ve	4.59 ±1.06**	0.56±0.12**	0.98±0.37**	0.47±0.71***	0.88±0.18**
+ve	8.11±1.43	1.03±0.55	1.57±1.13	0.91±0.16	1.57±0.11
Garden cress3%	6.89±1.26	0.92±0.77	1.25±0.25	0.76±0.94	1.41±0.13
Garden cress6%	6.16±1.35*	0.81±0.87*	1.11±0.44*	0.65±0.65**	1.32±0.19*
Rosemary 3 %	7.37±1.61	1.02±0.83	1.29±1.51	0.81±0.11	1.46±0.44
Rosemary 6%	6.83±1.37	0.88±0.74	1.15±0.27*	0.71±0.33*	1.35±0.35*
Mixture 3%	5.88±1.11*	0.86±0.19	1.17±0.19*	0.72±0.53*	1.34±0.33*
Mixture 6%	5.45±1.31**	0.73±0.22*	1.08±0.83**	0.61±0.13**	1.21±0.45*

***P≤0.05, **P≤0.01 ***P≤0.001**

Effect of garden cress and rosemary on Blood Glucose and Insulinof diabetic rats:

Effect of garden cress seeds and rosemaryon glucose and Insulin of diabetic rats showed in table(4)

The data shown in **table (4)**demonstrated that, the blood sugar glucose is high in positive control and low in the negative control(-). Groups which supplement with 3%rosemary showed no significant in blood glucose and insulin compared with positive group. Serum glucose was significantly ($p\leq0.05$) in groups which supplemented diet with 3% garden cress ,6% garden cress,6% rosemary and 3% mixture compared with positive group. While group fed on 6% mixture recorded the highest significant ($p\leq0.01$) decrease in blood glucose. Whereas insulin in groups fed on 3% garden cress and 6%rosemary significant ($p\leq0.05$) compared with positive control, while groups which supplement diet with 6%garden cress and 3%,6%mixture recorded high significantly ($p\leq0.01$) in insulin compared with positive group. results were reported by **Eddouks*et al.*, (2005)** who conducted study on hypoglycemic activity of garden cress seed aqueous extract in normal and diabetic rats and reported statistically significant decrease in blood glucose level. Hypoglycemic activity of garden cress seeds was independent of insulin secretion because there was no change in basal plasma insulin concentrations after treatment,

either in normal or diabetic rats.**Koga *et al.,(*2006)** in another study, administration of rosemary (20 mg/kg/day) in Streptozotocinrats significantly decreased plasma glucose levels due to inhibition of intestinalglucosidase enzyme activity . **Header *et al.,(*2015**) reported thatoral administration of rosemary (200 mg/kg/day) with or without moderate intensity exercise training for eight weeks resulted in reduction of glucose and increased serum insulin levels inStreptozotocin-induced diabetic rats .

Table (4): Effect of garden cress and rosemary on Blood Glucose and Insulin(mg/dl)of diabetic rats.

Groups	Glucose	Insulin
	Mean ± SD	**Mean ± SD**
-ve	102.01±2.26***	11.95±1.12**
+ve	205.85± 3.14	6.08±1.32
Garden cress 3%	155.25±3.51*	8.72±1.62*
Garden cress 6%	136.32±3.47*	9.66±1.16**
Rosemary 3%	168.6±4.82	7.23±2.43
Rosemary 6%	145.01± 2.15 *	8.65±1.22*
Mixture 3%	153.16± 3.86 *	8.95±1.38 **
Mixture 6%	127.73± 2.09 **	9.81±1.75**

***P≤0.05 **P≤0.01 ***P≤0.001**

Effect of garden cress and rosemary on AST, ALT,urea,uric acid and creatinineof diabetic rats :

Effect of garden cress and rosemary on AST, ALT,urea,uric acid and creatinineof diabetic rats showed in table(5).

Data in **table (5)**illustrate the mean value of AST , ALT for normal and diabetic rats, levels of Aspartate amino transferase (Ast) in groups which supplement diet with 3%garden cress, 3% rosemary and 3%mixture had no significant compared with positive group. While 6%garden cress and 6%rosemary record significant (p≤0.05),the highest significant was at (p≤0.01)in 6%mixture.

The value of Alanine amino transferase (Alt) was no significant in groups fed on 3 % garden cress ,3 % rosemary and 3%mixture,but(Alt)was significant (p≤0.05)in groups which supplemented diet of 6% garden cress, 6 % rosemary and 3%mixture. While highly significant

was at ($p \leq 0.01$) in group which supplement diet with 6 % mixture compared with positive group.

Kensara *et al.,*(2010) showed that rosemary treatment demonstratedto reduce alloxan-induced hepatocyte vacuolar degeneration, necrosis, small hemorrhages anddilatation of hepatic sinusoids indicating hepatoprotective effects. **Nusier *et al.*,(2007)** alanine aminotransferase (ALT) and aspartate aminotransferase (AST),enzymes released due to liver damage, were also decreased. **Abuelgasim *et al.*, (2008)** suggested, garden cress seeds possess hepatoprotective activity and also has nephrocurative and nephrprotective activity. Levels of urea ,uric acid and creatinine in groups fed on 3%of garden cress and3% rosemary recorded no significant in urea,uric acid and creatinine compared with positive control. On the other side group fed on 6% rosemary record significant at ($p \leq 0.05$)in urea,but had no significant in uric acid and creatinine. Whereas groups fed on 6%garden cress, 3%mixture significant at ($p \leq 0.05$) compared with positive control. While urea and creatinine record significant ($p \leq 0.05$)in group which fed on 6%mixture ,but uric acid record high significantly ($p \leq 0.01$) in the same group **.Hamedan (2010)** reported thatrat groups with oral administration of garden cress seeds extract and powder showed significant lower values for serum creatinine, urea, liver cholesterol and total lipids. Similarly, **Shinde *et al.*, (2010)** reported administration of garden cress (Lepidiumsativum) extract significantly decreaseof serum creatinine (0.98 mg/dl to 0.78mg/dl) and urea levels (49.86 mg/dl to 39.46 mg/dl).Assessment of renal biomarkers including serum creatinine,uric acid and urea levels showed that rosemary had renoprotective effects **Header *et al.,*(2015**). Historically, rosemary has been used medicinally to treat renal colic and dysmenorrhea, stimulate hair growth and relieve symptoms caused by respiratory disorders **Sedighi *et al.*,(2015).**

Table (5): Effect of garden cress and rosemary on AST,ALT,urea,uric acid and creatinineofdiabetic rats.

Parameters / Groups	AST (U/L)	ALT (U/L)	Urea (mg/dl)	Uric acid (mg/dl)	Creatinine (mg/dl)
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
-ve	30.46±1.71**	35.14±1.64**	37.18±2.56**	1.58±0.17***	0.74±0.09**
+ve	51.12±1.16	54.29±2.79	53.21±3.22	2.94±0.45	1.32±0.36
Garden cress3 %	41.34±3.17	44.29±2.51	47.84±2.43	2.59±0.19	0.97±0.33
Garden cress 6%	37.57±1.92*	40.94±2.14*	43.54±2.18*	2.02±0.13*	0.87±0.21*
Rosemary 3%	45.54±2.25	47.08±2.63	49.46±3.05	2.69±0.27	1.08±0.11
Rosemary 6 %	39.29±1.63*	41.69±2.72*	44.84±3.25*	2.43±0.25	0.95±0.72
Mixture 3 %	40.33±1.33	42.53±1.38*	44.77±2.88*	2.11±0.21*	0.89±0.11*
Mixture 6 %	34.39±1.88**	39.12±1.29**	42.31±1.11*	1.76±0.11**	0.81±0.18*

***P≤0.05, **P≤0.01, ***P≤0.001**

Effect of garden cress and rosemary on lipid profile of diabetic rats:

Effect of garden cress and rosemary on lipid profile of diabetic rats showed in table(6).

Data in **Table (6)** that the effect of garden cress and rosemary on lipid profile for normal and diabetic groups . Serum total cholesterol (T. Ch) value,was significant higher in positive group. Groups which supplement diet with 6 % mixture record high significantly (p≤0.01) decrease of (T.CH),while record significant (p≤0.05) decrease in 6% garden cress, 6 %rosemary and 3% mixture compared with positive control.

Triglycerides value was significant higher in positive group compared with negative, groups fed on diet which supplemented with 6 % garden cress and 6 % mixture record high significantly at (p≤0.01) decrease in T.G ,while significant (p≤0.05) in groups 6 % rosemary and 3 % mixture compared with positive control.

Groups fed on 6 % mixture shown high significantly(p≤0.01) in HDL compared with positive control, while rats supplement with 6 % garden cress, 6 % rosemary and 3 % mixture record significantly (p≤0.05) in high density lipoprotein (HDL).

Groups fed on 6 % garden cress and 6 % mixture shown the highest significant (p≤0.01) reduction in VLDL compared with positive control, while 6 % rosemary and 3 % mixture significant at (p≤0.05) in VLDL. Groups which supplement diet with 6 % rosemary and 3 % mixture record significant (p≤0.05) in LDL compared with positive control, while groups recorded high significantly (p≤0.01) is 6 %

garden cress and 6 % mixture. **Amawi and Aljamal (2012), Chauhan *et al.*, (2012)** also reported similar results, observed significant decrease ($p \leq 0.05$) in lipid profile , total cholesterol, triglycerides and lipoprotein fractions (LDL-c and VLDL-c) with a significant increase in HDL-c levels after treatment with Lepidiumsativum extract (30 mg/kg body weight) for a period of four weeks.

In addition, rosemary significantly reduced plasmatic fasting plasma glucose(FPG), TG, TC and low density lipoprotein (LDL) while increasing high density lipoprotein (HDL) and erythrocytes levels **Al-Jamal, (2011).**Similarly, daily administration of aqueous rosemary (100 mg/kg) to high-cholesterol fed mice for36 days resulted in significant decline in plasma TG, TC, LDL levels, while HDL levels were increased compared to control mice **Al Sheyab *et al.*,(2011).** Thepresent result of diabetic rats treated with dried rosemary powder caused significant decrease in the plasma levels of cholesterol, LDL-C, VLDL-C, TG and an increase in HDL-C. This may be an indication of progressive metabolic control of dried rosemary leaf powder on mechanisms involved in the elimination of the lipids from the body. The decrease may be due to antioxidant effect of caffeic acid and its derivatives such as rosmarinic acid, which are among phytochemical constituents of rosemary leaves **(Al-Sereiti *et al.*, 1999**).

Table (6): Effect of garden cress and rosemary on lipid profile of diabetic rats.

Parameters / Groups	T.Cholesterol (mg\dl) Mean ± SD	Triglycerid (mg\dl) Mean ± SD	HDL (mg\dl) Mean ± SD	LDL (mg\dl) Mean ± SD	VLDL (mg\dl) Mean ± SD
-ve	94.38±1.4***	64.93±1.15***	48.34±2.1.72**	33.06±0.51***	12.98±0.23**
+ve	164.13 ±3.54	96.98±2.08	27.63±1.58	127.11±1.55	19.39±0.41
Garden cress 3%	138.9±2.87	85.15±2.89	34.86±1.33	86.99±0.97	17.03±0.57
Garden cress6%	122.14±2.12*	74.6±1.62**	39.42±1.91*	67.81±0.11**	14.92±0.32**
Rosemary 3%	141.79±2.13	87.1±3.35	30.95±2.12	93.42±0.66	17.42±0.67
Rosemary6%	130.86±2.32*	79.48±2.42*	37.71±1.63*	77.26±3.16*	15.89±0.48 *
Mixtue3%	133.27±2.55*	80.37±1.18*	36.97±1.46*	80.23±0.86*	16.07±0.23*
Mixtue 6%	119.72±1.24**	71.66±1.74**	41.47±1.97**	63.42±1.04**	14.33±0.34**

***P≤0.05, **P≤0.01, ***P≤0.001**

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Journal of Home Economics, Volume 29, Number (2,4), 2019

دراسة تأثير حب الرشاد والروزماري علي حيوانات التجارب المصابة بأرتفاع سكر الدم

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باحثة دراسات عليا ماجستير التغذية وعلوم الاطعمة

الملخص العربى:

استهدف هذا البحث دراسة تأثير كل من حب الرشاد والروزماري وخليطهما علي مستوي جلوكوز الدم في الفئران المصابة بأرتفاع سكر الدم نتيجة لحقنها بالالوكسان بنسبة 150ملجم/كيلو جرام من وزن الجسم .حيث تم استخدام 48 من فئران التجارب تتراوح اوزانهم بين150±5 جم واستمرت التجربة لمدة شهرين وقد تم اضافة بذور حب الرشاد والروزماري المطحون وخليط منهما بنسبة 3%،6% الي الغذاء الأساسي وسجل وزن الجسم والغذاء المتناول أسبوعيا وفي نهاية التجربة تم حساب معدل الزيادة في وزن الجسم ومعدل كفاءة الغذاء وأظهرت النتائج المتحصل عليها أن مستوي الجلوكوز في المجموعة الضابطة السالبة أقل معنويا من جميع المجموعات ومعدل تناقص قيم السكر في الدم يزداد بزيادة نسبة حب الرشاد والروزماري المطحون المضاف للغذاء، أعلي انخفاض لانزيمات الكبدALT,AST في المجموعة التي تم تغذيتها علي 6 % خليط من حب الرشاد والروزماري المطحون. أفضل قيمة لليوريا سجلت مع المجموعة التي تم تغذيتها علي6%خليط من حب الرشاد والروزماري، بالنسبة للكرياتينين فقد كان هناك فرق معنوي في المجموعة المدعمة ب6%حب الرشاد، 3%خليط من حب الرشاد والروزماري، وكانت أفضل قيمة للكرياتينين سجلت مع المجموعة التي تم تغذيتها علي 6%خليط من حب الرشاد والروزماري مقارنة بالمجموعة الضابطة الموجبة. أما بالنسبة ل(HDL) فقد سجلت كل المجاميع أعلي من المجموعة الضابطة الموجبة، ومن ناحية أخري سجلLDLمستويات أقل وخاصة في المجموعة التي تم تغذيتها علي 6%خليط من حب الرشاد والروزماري، أفضل واقل قيمة للدهون الثلاثية والكوليستيرول الكلي سجلت مع المجموعة التي تم تغذيتها علي6%خليط من حب الرشاد والروزماري مقارنة بالمجموعة الضابطة الموجبة.

الكلمات الكاشفة :سكر الدم، حب الرشاد، الروزماري، فئران التجارب