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Study Effect of Bay (*Laurus Nobilis, L.*) Leaves Extracts on Diabetic Rats

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ABSTRACT:

The current study aims to introduce the impact of bay leaves aqueous and ethanolic extracts at two concentrations (100 and 200mg/kg B.W.) on glucose levels in diabetic rats. Thirty male albino rats, Spring Dawley strain, 2-week age, weighing 150±10 g, were once divided into six groups (five rats in each group). The first group was once kept as a control (-ve) group, whilst the other five groups had been injected with alloxan (150 mg/kg/b.w) to result in diabetic rats; the second group, diabetic rats, served as positive diabetics fed on basal diet only. The third and fourth groups were treated with 100 and 200 mg/kg B.W. of bay leaves aqueous extract, whilst the fifth and sixth groups were treated with 100 and 200 mg/kg B.W. of bay leaves ethanolic extract. After 28 days, the following exams had been evaluated, fasting blood glucose, alanine aminotransferase, lipid profile (triglyceride (TG), total cholesterol (TC), high-density lipoprotein-cholesterol (HDL-c), and low-density lipoprotein-cholesterol (LDL-c)), oxidative enzymes like Superoxide dismutase (SOD), catalase enzyme (CAT), and malondialdehyde (MDA), kidney (creatinine, uric acid, and urea), and liver enzymes like alkaline phosphatase (ALP), aspartate aminotransferase (AST), and alanine aminotransferase (ALT), had been evaluated through biochemical tests. The results revealed that bay leaf extract reduced glucose levels, improved functions of the kidney and liver biomarkers, and enhanced lipid profile and oxidative enzymes in contrast to the positive control group. In conclusion, it is advised to use bay leaves extract for patients with diabetes, as it can potentially enhance blood sugar control.

Keywords: Bay Leaves, Extracts, Rats, Diabetic Mulitas

1. INTRODUCTION

One of the most usual long-term illnesses is diabetes, which influences greater than 537 million individuals worldwide at present and will affect over 643 million people via way of 2030, in accordance to estimates (1). It is a long-term illness marked by means of excessive blood sugar ranges brought on by the useful resource of each limited and inefficient

insulin utilization with the aid of the body (2). Ketoacidosis or nonketotic hyperosmolar syndrome is delivered about through excessive diabetes (3). In addition, weight loss, impaired eyesight, polyuria, and polydipsia are characteristics of diabetes (4). It can be divided into two categories: kind two diabetes (caused through way of a progressive loss of b-cell insulin secretion generally on the history of insulin resistance) (5) and kind 1 diabetes (caused by means of capacity of immune system attacks on the pancreatic cells that produce insulin, resulting in a lack of insulin production) (6).

Medicinal plants are rapidly becoming greater extensively common due to their possible as bioactive factors that can be used as treatments. In addition to lowering blood sugar levels, new hypoglycemic medicinal drugs made from plants have been validated and tested to decrease oxidative stress, liver fats accumulation, kidney failure, and special secondary effects of diabetes (7). Bay leaves (laurus nobilis, l.), a member of the Lauraceae family, is often utilized as a seasoning for foods in Western countries. It has been established that the polyphenols included in bay leaves enhance antioxidant status, absorption of glucose, and sensitivity to insulin (8). In addition to its hypoglycemic benefits, bay leaf can help sufferers with kind two diabetes control their blood glucose levels via enhancing liver and kidney function, capillary function, lipid metabolism, and antioxidant status (9). For victims with kind two diabetes, bay leaves reduced serum glucose, lipid fraction and accelerated HDL cholesterol levels (10). Therefore, the purpose of this study is to assess the various concentrations of bay leaves aqueous and ethanolic extracts and determine how they influence diabetic rats.

2. Material and Methods

2.1. Materials

2.1.1.Plants and chemicals

The dried plant bay leaves (laurus nobilis, l.) had been sold at the herbal store in the Menoufia government, Shebin El-Kom, local markets. The alloxan was purchased from El-Gomhoria Company for Trading Drugs, Chemical and Medical Instruments, Cairo, Egypt. Chemical kits used for determination (TG, TC, HDL-c, SGPT, SGOT, uric acid, and creatinine) were purchased from the Al-Gomhoria Company for Trading Drugs and Medical Instruments, Cairo, Egypt.

2.1.2.Experimental animals

We bought thirty albino rats, all male, adults, weighing 150 ± 10 g, from the Medical Insects Research Institute in Dokki, Cairo, Egypt.

2.2.Methods

2.2.1. Preparation of aqueous bay leaves extract

The leaves of bay were collected and dried in an airy room for about 3 days of drying, away from direct sunlight to avoid possible damage to their phyto-

constituents and ground into powder. 10g of the leaves powder was soaked in 90 ml of distilled water, shaken for 10 minutes and then allowed to stay at room temperature for 72 hours. The mixture was then filtered using a filtered paper and the filtrate evaporated to dryness on water bath at 60°C. The aqueous extract was kept in air tight bottle in a refrigerator at 4°C until use and served as the stock crude extract (11).

2.2.2. Preparation of bay leaves ethanol extract

The leaves of bay were collected and dried in an airy room for about 3 days of drying, away from direct sunlight to avoid possible damage to their phyto-constituents and ground into powder. 10g of the leaves powder was soaked in 90 ml of ethanol alcohol (80%), shaken for 10 minutes and then allowed to stay at room temperature for 72 hours. The mixture was then filtered using a filtered paper and the filtrate evaporated to dryness on water bath at 60°C. The ethanolic extract was kept in air tight bottle in a refrigerator at 4°C until use and served as the stock crude extract (12).

2.2.3.Experimental design

The Science Research Ethics Committee of the Institutional Animal Care and Use Committee (IACUC)Menoufia University accepted the research protocol MUFHE/S/NFS/13/24. A thirty healthy male albino 10-week-old Sprague-Dawley rats weighing 150±10 g was once obtained from from the Medical Insects Research Institute in Dokki, Cairo, Egypt. The rats have been stored in carefully controlled regular laboratory conditions with a temperature range of 20 to 23 °C. During the week-long adaptation phase, they had been fed a standard diet. For a week, all rats had been fed the basal diet that was once prepared in accordance with (13). Following this section of adaptation, the rats have been split up into six groups, with 5 rats in every group. The different rat groups have been given a single intraperitoneal Alloxan injection (150 mg/kg body weight) to come to be diabetic rats in accordance with the technique outlined by (14).then caused chronic damage to pancreatic beta cells in normal healthy rats. Fasting blood samples were taken one week after alloxan injections to measure fasting serum glucose 200mg/dl in diabetes rats (15).

The first group kept as a control (-ve) group, while the other five group injected with Alloxan (150mg/kg body weight) divided into 5 sub-groups to become diabetic rats; sub group 1 severed as positive control. The third and fourth sub groups were treated with 100 and 200mg/kg/ BWt., of bay leaves aqueous extract orally, whilst fifth and sixth sub groups have been treated with 100 and 200 mg/kg/BWt, of bay leaves ethanolic extract orally. After 28 days, Blood samples will be accumulated in a clean dry centrifuge tube from the hepatic portal vein. Serum was once taken from completed blood by means of centrifuge,

then saved in a plastic vial in a deep freezer till analysis(16).

2.2.4.Biological evaluation

The food efficiency ratio (F.E.R.) and body weight gain (BWG) have been employed to evaluate the various diets biologically (17).

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

$$FER = \frac{Gain\ in\ body\ weight\ (g)}{Feed\ intake\ (g)}$$

2.2.5.Biochemical analysis of serum

Serum blood glucose, total cholesterol, triglyceride (TG) and high density lipoprotein cholesterol (HDL-c) were determined according to (18), (19), (20), respectively. Low density lipoprotein cholesterol (LDLc) and very low density lipoprotein cholesterol (VLDLc) were calculated according to the methods of (21) as follows:

VLDL-c = TG/ 5

LDL-c = Total cholesterol - (HDL-c + VLDL-c)

Serum levels of alkaline phosphatase (ALP), aspartate aminotransferase (AST), and alanine aminotransferase (ALT) were determined according to (22, 23, and 24) respectively. Serum creatinine, urea and uric acid were determined according to (25 and 26 and 27) respectively. While the approach of (28) was once used for measuring serum uric acid the use of a calorimeter.

Liver samples were collected to assess antioxidant enzyme activity after sacrificing the rats. Several oxidative enzymes can be measured, including catalase, superoxide dismutase (SOD), and (MDA) Malondialdehyde were determined according to (29 and 30 and 31) respectively.

2.2.6 Statistical analysis

The data have been analyzed the usage of a completely randomized factorial design, (32) when a large main impact was once detected; the means had been separated with the Student-Newman-Keuls Test. Differences between treatments of ($P \leq 0.05$) have been considered significant the usage of Costat Program. Biological results have been analyzed by way of One Way ANOVA.

3. Results and Discussion

Table (1) shows the effects of different bay leaf extract concentrations on the feed intake (FI), body weight gain (BWG), and feed efficiency ratio (FER) of diabetic rats. The results confirmed that, in assessment to the positive control, the feed consumption FI, BWG, and FER of the negative control recorded an increased significant values. It is clear from the diabetic rats' groups that the ethanolic bay leaves extracts had the highest FI, BWG, and FER especially, at 200 mg/kg, whilst the 100 mg/kg aqueous bay leaves extract had the lowest FI, BWG, and FER. The study on diabetic rats revealed that those treated with the bay leaf alcoholic extract showed the most significant benefits, whereas the aqueous extract was the least effective. According to (33),

diabetic groups experienced initial body weight reduction due to insulin deficiency, which caused protein and fatty acid breakdown. However, after treatment with the alcoholic extract, insulin levels increased and body weight improved in diabetic rats. This indicates that the alcoholic extract is effective in preventing protein degradation and weight loss by promoting insulin secretion. Also, these results were agreement with (34) who reported that the bay extract treated group achieved an amelioration in body weight gain contrast with rat suffering from diabetes.

Table (1): Effect of bay leaves extract on feed intake, body weight gain and feed efficiency ratio of diabetic rats

		FI (g/day/rat)	BWG (%)	FER (%)
Negative control		28.53a±1.42	57.36a±2.65	0.091a±0.04
	Positive control	13.76e±1.45	34.9f±1.92	0.071d±.65
Diabetic	ABLE100mg/kg	14.90e±1.45	40.86e±1.81	0.073cd±.06
groups	ABLE200mg/kg	18.13d±1.15	45.03d±1.65	0.078c±0.17
	EBLE 100mg/kg	22.16c±1.46	48.73c±1.70	0.088b±0.13
	EBLE200mg/kg	25.53b±0.90	52.86b±1.20	0.097a±0.06
LSD		2.36	3.33	0.046

Each value is represented as mean ± standard deviation (n = 5). Mean under the same column bearing different superscript letters are significantly different at P ≤ 0.05. ABLE: Aqueous bay leaves extract. EBLE: Ethanolic bay leaves extract. BWG= Body weight gain. FI= Feed intake. FER= Feed efficiency ratio.

The impact of bay leaf extract on the serum glucose level of diabetic rats was confirmed through the statistics in Table (2). The acquired results confirmed that the positive control's serum glucose level was higher significant difference than the negative control which had been 235.30 and 134.00 mg/dl, respectively.

All treated groups showed deceased significant difference compared to positive control group. It is evident from the diabetic rat groups that ethanol bay leaves extracts had the lowest blood glucose degree especially, at 200 mg/kg and aqueous bay leaves extract had the highest serum glucose stage at 100 mg/kg. The averages have been 143.30 and 205.00 mg/dl, respectively.

According to the findings, rats given the alcoholic extract of bay leaves showed a remarkable improvement in serum glucose levels compared to rats given the aqueous extract. These findings concur with these of (35), who confirmed that, relying on the extraction solvent kind and leaf origin, the phenolic compounds extract of Bay leaves efficiently block the **α**-glucosidase endeavor at tiers ranging from eleven to 93%. This ought to probably decrease postprandial glycemia in diabetics. Additionally, in accordance with (36), the ethanolic extract of Bay enhances insulin sensitivity via upregulating the expression of insulin receptor substrate and significantly reduces intracellular oxidative stress brought on by means of extended

hyperglycemia. Among the phenolic compounds in charge of these biological results is gallic acid. Also, this finding was once constant with that of (37), who found that giving diabetic rats a 5% combination of cardamom seeds and bay leaves all through the food instruction system substantially more advantageous their blood glucose levels.

Table (2): Influence of bay leaves extract on serum glucose level of diabetic rats

		Serum glucose (mg/dl)	% of change
negative control		134.00f±2.00	-43.05%
Diabetic groups	positive control	235.30a±1.52	00
	ABLE100mg/kg	205.00b±4.00	-12.87%
	ABLE200mg/kg	193.60c±2.08	-17.72%
	EBLE100mg/kg	182.00d±2.00	-22.65%
	EBLE 200mg/kg	143.3e±2.51	-39.09%
LSD		4.41	00

Each value is represented as mean ± standard deviation (n = 5). Mean under the same column bearing different superscript letters are significantly different at p ≤ 0.05. BLE: Aqueous Bay leaves extract. EBLE: Ethanolic bay leaves extract.

The results in Table (3) confirmed the influence of bay leave extracts on liver enzymes activities (ALT, AST, and ALP) of diabetic rats. The acquired results show that AST, ALT, and ALP liver enzymes activity of positive control increased significantly compared with negative control. The corresponding mean values were (90.60, 180.6, and 179.9) and (64.90, 77.6, and 133.40), respectively.

Also, the data in Table (3) indicates that the group of diabetic rats had mean values of AST, ALT, and ALP enzymes with the greatest value recorded for aqueous bay leaves at 100 mg/kg and the lowest value mentioned for ethanolic bay leaves at 200 mg/kg. The findings in diabetic rats revealed that the rats given the bay leaf alcoholic extract had the greatest effects, whilst the rats given the aqueous extract had the lowest effects in comparison to the alcoholic extract.

These findings are steady with those said by (38) who explains the effectiveness of bay leaf in decreasing liver enzymes to the relationship between cholesterol and low-density protein or to its possible to inhibit the enzyme Acetyl-CoA Synthetase, which was once an essential factor of fatty acids. The effects posted through (39) corroborate these findings, as they determined that the herbal nutmeg and bay leaf combination stronger liver function considering that bay leaves include more than one active component.

The influences of bay leaf extract on the parameters of oxidative enzymes (MDA, CAT, and SOD) in the liver tissue of diabetic rats had been demonstrated by way of the results obtained from Table (4). It is evident that the enzymatic antioxidants CAT and SOD in the negative control group, which recorded values of 19.70 U/g tissue and 10.20

U/mg tissue respectively, showed significantly higher values than the positive control group (2.93 U/g tissue and 1.90 U/mg tissue, respectively). While vice versa with MAD values are 62.43 and 89.73 nmol/g, respectively.

Table (3): Effect of bay leaves extract on liver activities of diabetic rats

		AST (U/L)	ALT (U/L)	ALP (U/L)
Negative control		64.9f±1.32	77.6e±1.68	133.4f±2.45
Diabetic groups	positive control	90.6a±1.71	180.6a±1.99	179.9a±2.28
	ABLE 100 mg/kg	84.8b±1.70	178.1a±2.21	167.9b±2.07
	ABLE 200 mg/kg	78.9c±1.10	163.6b±2.01	159.8c±1.95
	EBLE 100 mg/kg	74.6d±2.07	147.9c±2.26	153.4d±1.68
	EBLE 200 mg/kg	69.4e±1.45	118.8d±1.73	147.4e±2.61
LSD		2.83	3.55	3.88

Each value is represented as mean ± standard deviation (n = 5). Mean under the same column bearing different superscript letters are significantly different at p ≤ 0.05. ABLE: Aqueous bay leaves extract. EBLE: Ethanolic bay leaves extract. (ALP)= Alkaline phosphatase, (AST)= Aspartate amino transferase. (ALT)= Alanine amino transferase.

It is evident from the diabetic rat groups that the highest CAT was found for ethanolic bay leaves extract 200 mg/kg, whereas the lowest (CAT) and (SOD) have been observed for aqueous bay leaves 100 mg/kg. The lowest MDA measurement for ethanolic bay leaves was 200 mg/kg, on the other hand the most considerable value from aqueous bay leaves extract at 100 mg/kg. According to the findings, rats given the alcoholic extract of bay leaf had the great outcomes, whilst rats given the aqueous extract had the lowest results in comparison. The effects corroborated those of (40), who located that treatment with an ethanolic extract of bay leaves will increase antioxidants through elevating the value of the catalase (CAT) enzyme in diabetic rats and reducing oxidative stress-related damage. This is due to the fact polyphenols in bay leaves are known to have antioxidant properties. According to (41), bay leaves include a range of chemicals, such as flavones and flavonol, which have antioxidant activity and improve the antioxidant enzymes SOD and CAT, which in turn significantly reduce intracellular oxidative stress.

Results indicating the results of bay leaves extract on the TG and TC lipid profiles of diabetic rats are proven in Table (5). It used to be obvious for TG and TC. The obtained statistics verified that, in contrast to the negative control, the positive control recorded that triglycerides and total cholesterol had significant larger values. It is evident from the diabetic rat groups that the treatment with aqueous bay leaves extract at 100 mg/kg had the best TG and TC, measuring 99.20 and 84.26 mg/dl, respectively, whilst the ethanolic bay leaves extract, at 200 mg/kg, had the lowest TG and TC, with a statistically great difference (62.26 and 61.6 mg/dl,

respectively).

Table (4): Effect of bay leaves extract on liver oxidative enzymes tissue of diabetic rats

Groups		CAT (U/g tissue)	SOD (U/mg tissue)	MDA (nmol/g tissue)
Negative control		19.70a+1.73	10.20a+1.99	62.43f+.92
Diabetic groups	Positive control	2.93e+1.30	1.90c+.26	89.73a+1.78
	ABLE 100 mg/kg	6.93d+1.68	3.40c+0.70	84.56b+1.65
	ABLE 200 mg/kg	10.7c+1.60	6.23b+0.83	78.76c+1.45
	EBLE100 mg/kg	14.56b+1.55	7.83b+0.70	75.06d+1.61
	EBLE200 mg/kg	17.03ab+2.45	10.26a+1.20	69.4e+1.04
LSD		3.16	1.94	2.57

Each value is represented as mean ± standard deviation (n = 5). Mean under the same column bearing different superscript letters are significantly different at p ≤ 0.05.ABLE: Aqueous bay leaves extract. EBLE: Ethanolic bay leaves extract. (SOD)= Superoxide dismutase, (CAT)= Catalase enzyme, (MDA)= Malondialdehyde

According to the greatening's, rats given the alcoholic extract of bay leaf had the great outcomes, whilst rats given the aqueous extract had the lowest effects in comparison. These findings corroborate the findings of (42) which confirmed that bay leaf and its separated flavonoids and glycosides reduced TC, TG, LDL-C, and VLDL-C value in contrast to control, suggesting that bay leaf is a beneficial agent in decreasing hyperlipidemia. The findings are corroborated by research via (43) which verified that polyphenols in the alcoholic extract of Laurus nobilis drastically decrease ranges of triglycerides and total cholesterol. This may additionally be due to the fact Laurus nobilis contains flavonoids that help adjust lipid profiles, or it might also have something to do with the feature of laurel leaves in decreasing cholesterol concentrations.

Table (5): Influence of bay leaves extract on total cholesterol and triglycerides of diabetic rats

		T.G (mg/dl)	T.C (mg/dl)
Negative control		47.46f±2.89	60e±2.23
Diabetic groups	positive control	132.26a±2.63	90.1a±2.26
	ABLE 100mg/kg	99.2b±2.40	84.26b±2.81
	ABLE 200mg/kg	86.46c±2.74	72.13c±1.84
	EBLE 100mg/kg	77.6d±2.02	67.9d±1.37
	EBLE 200mg/kg	62.26e±1.55	61.6e±2.62
LSD		4.30	3.99

Each value is represented as mean ± standard deviation (n = 5). Mean under the same column bearing different superscript letters are significantly different at p ≤ 0.05. ABLE: Aqueous bay leaves extract. TC =Total cholesterol. EBLE: Ethanolic bay leaves extract. TG= Triglycerides.

The facts in Table (6) illustrated how bay leaf extracts influence lipid fraction in diabetic rats, including high-density lipoprotein cholesterol (HDL-c), low-density lipoprotein cholesterol (LDL-c), and very low-density lipoprotein cholesterol (VLDL-c). According to these results, the mean HDL-c value of diabetic

rats (+ve)) decreased significantly than rats (-ve) control group. The mean was 32.32 and 12.00 mg/dl, respectively.

The results confirmed that the group of diabetic rats had mean ranges of HDL-c that have been lowest for aqueous bay leaves extract (100 mg/kg) and biggest for ethanolic bay leaves (200 mg/kg). The mean values have been 16.06 and 28.06 mg/dl on average.

Additionally, in contrast to the negative control, the obtained effects for LDL-c and VLDL-c indicated that the positive control's values had been significant greater. More statistics revealed that the aqueous bay leaves extract had the biggest LDL-c and VLDL-c recorded at 100 mg/kg, whilst the ethanolic bay leaves extract (200 mg/kg) had the lowest, the values were (48.36 & 19.84 and 21.08 & 12.45 mg/dl, respectively).

According to the findings, rats given the alcoholic extract of bay leaf had the great outcomes, whilst rats given the aqueous extract had the lowest results in comparison. These findings had been corroborated by way of (44) who found that, in contrast to the control group, the diabetic group's therapy with bay leaf extract considerably improved their high-density lipoprotein cholesterol whilst reducing their low and very low-density lipoprotein cholesterol.

The findings had been corroborated through these suggested by way of (45) who proven that polyphenols in the alcoholic extract of Bay decrease LDL cholesterol and elevate HDL cholesterol in diabetic rats brought about through alloxan by way of oral administration of 200 mg/kg of Bay extract for a month. Furthermore, due to the fact plant leaves elevate HDL-c and decrease LDL-c and VLDL-c, they, and their combination at 10% ought to be deemed powerful nutraceutical therapeutic potential for treating hypercholesterolemia in rats (46).

Table (6): Influence of bay leaves extract on lipid profiles of diabetic rats

Groups		HDL-c mg/dl	LDL-c mg/dl	VLDL-c mg/dl
	Negative control	32.32a±2.65	18.27d±.31	9.49f±.57
	positive control	12.00f±1.51	51.64a±4.06	26.45a±.52
Diabetic	ABLE100mg/kg	16.06e±1.78	48.36a±1.50	19.84b±.48
groups	ABLE 200 mg/kg	19.73d±1.19	35.37b±2.38	17.02c±.91
	EBLE 100 mg/ kg	23.7c± 1.37	28.68c±.40	15.52d± .40
	EBLE 200mg/kg	28.06b±1.62	21.08d±1.59	12.45e±.31
LSD		3.12	3.79	1.012

Each value is represented as mean ± standard deviation (n = 5).

Mean under the same column bearing different superscript letters are significantly different at P ≤ 0.05.

ABLE: Aqueous bay leaves extract. EBLE: Ethanolic bay leaves extract. (HDL-c) = High density lipoprotein-cholesterol, (LDL-c) =Low density lipoprotein-cholesterol), h(VLDL-c) = Very low-density lipoprotein-cholesterol.

The effects of bay leaf extract on renal functions (urea, creatinine, and uric acid) in diabetic rats are displayed in Table (7). In assessment to the negative control group, the positive control group's corrosive ranges (urea, creatinine, and uric acid) recorded the highest significant values. The average readings had been 54.10, 1.60, & 3.53 and 37.60, 0.60, & 1.13 mg/dl, respectively.

The highest ranges of corrosive results on kidney function had been viewed in aqueous bay leaves extract (100 mg/kg), whereas ethanolic bay leaves extract (200 mg/kg) confirmed the lowest levels. The common readings have been 51.36, 1.00, and 2.69 mg/dl and 40.50, 0.76, and 1.43 mg/dl, respectively.

According to the findings, rats given the alcoholic extract of bay leaf had the great results, whilst rats given the aqueous extract had the lowest results in comparison. The results corroborated those of (47), who described the protective results of bay leaf extract on kidney function. The extract consists of several antioxidant compounds that, by using activating the antioxidant enzymes CAT and SOD, decrease oxidative stress, enhance renal function markers, and keep away from renal injury in rats with kind two diabetes. Creatinine and urea value in the mice drastically lowered after receiving the Bay extract treatment. This ought to be defined by way of the extract's antioxidant concentration, which elevated protein synthesis and reduced catabolism (48).

Additionally, (49) found that, after 30 days, remedy with bay leaf extract resulted in a considerable reduction in all kidney function markers, such as creatinine and urea, in diabetic groups when in contrast to control.

Table (7): Influence of bay leaves extract on renal functions of diabetic rats

		Urea (mg/dl)	Creatinine (mg/dl)	Uric acid (mg/dl)
negative control		37.60f+1.72	0.60e+1.67	1.13f+0.21
Diabetic groups	Positive Control	54.10a+2.02	1.60a+2.09	3.53a+0.70
	ABLE 100mg/kg	51.36b+1.02	1.00b+2.19	2.69b+0.67
	ABLE 200mg/kg	48.60c+1.34	0.92b+1.87	2.11c+0.52
	EBLE 100mg/kg	43.30d+1.90	0.85c+1.65	1.65d+2.38
	EBLE200 mg/kg	40.50e+ 1.86	0.76d+1.26	1.43e+1.38
LSD		2.50	0.23	0.51

Each value is represented as mean ± standard deviation (n = 5). Mean under the same column bearing different superscript letters are significantly different at p ≤ 0.05. ABLE: Aqueous bay leaves extract. EBLE: Ethanolic bay leaves extract.

4- Conclusion

In diabetic rats, the aqueous and ethanolic extract of bay leaves better the biomarkers of the liver, kidney, and oxidative enzymes as well as the blood glucose level especially ethanolic bay leaves extract (200 mg/kg).must be a part of our diets due to the fact it has active elements that are suitable for diabetics.

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التغذية وعلوم الاطعمة

دراسة تأثير مستخلص أوراق الغار على الفئران المصابة بالسكرى

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الملخص العربى:

أجريت الدراسة الحالية لمعرفة تأثير مستخلص نبات اوراق الغار على الفئران المصابة بداء السكري. تم استخدام ٣٠ فأر من ذكور الفئران البيضاء من سلالة (سبراجو دوالي)، بعمر ١٠ أسابيع، وتزن ما بين ١٥٠±١٠جرامًا. تم تغذية كل الفئران على الوجبة القياسية لمدة اسبوع واحد، ثم تم تقسيمهم إلى ٦ مجموعات كل مجموعة تحتوي على ٥ فئران. المجموعة الأولى مجموعة ضابطة سالبة، بينما تم حقن كل المجموعات الأخرى بالألوكسان (١٥٠ مجم / كجم من وزن الجسم) للإصابة بمرض السكري. تم الاحتفاظ بمجموعة واحدة منها كمجموعة ضابطة موجبة، بينما تم معالجة المجموعتان الثالثة والرابعة المصابة بمرض السكرى بتركيزات مختلفة (١٠٠ ،٢٠٠ /كجم /وزن الجسم) من المستخلص المائى لأوراق الغار، في حين تم معالجة المجموعتان الخامسة والسادسة المصابة بمرض السكرى بتركيزات مختلفة (١٠٠ ،٢٠٠ /كجم /وزن الجسم) من المستخلص الايثانولى لأوراق الغار. بعد انتهاء التجربة (٢٨ يومًا) تم وزن كل فأر على حده ثم تم ذبح الفئران وتجميع عينات الدم وتقدير مستويات الجلوكوز ووظائف الكبد (الانين ترانس امينيز – اسبارتات ترانس امينيز) والإنزيمات المؤكسدة مثل سوبر أوكسيد ديسموتاز ، وإنزيم الكتاليز ، والمالونديالدهيد ودهون الدم (الكوليسترول الكلي - الجلسريدات الثلاثية - الليبوبروتينات المرتفعة والمنخفضة والمنخفضة الكثافة جدا) ووظائف الكلى (اليوريا الكرياتينين - حمض اليوريك). وتم تقدير وزن الجسم وكمية الغذاء. وكشفت النتائج أن مستخلصات أوراق الغار خفضت مستويات الجلوكوز وتحسنت كل من وظائف الكلى والكبد وكذلك مستويات الدهون والإنزيمات المؤكسدة بالمقارنة مع المجموعة الضابطة الموجبة. في الختام، تعكس جميع التحاليل البيوكيميائية أهمية مستخلص أوراق الغار خاصة مع المستخلص الإيثانولي بتركيز ٢٠٠ ملجم/كجم كعلاج غذائي لعلاج مرض السكري في الفئران.

الكلمات المفتاحية: أوراق الغار، المستخلصات، الفئران، مرض السكر.