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Evaluation the Influence of Bitter Wood (*Quassia amara*) and Nettle (*Urtica dioica, L.*) Roots on Biological Alterations in Diabetic Rats

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ABSTRACT:

The present research sought to determine how nettle, bitter wood roots, and their powdered combinations affected rats with diabetes, induced by using alloxan. A total of forty-eight white randoms ranging around 140 and 150 g had been split into two groups of six each, every at random. Group (I): Served as the randomized group of control, and Group (II): One intra-cage injection of the diabetes-inducing drug alloxan (150 mg/kg b.wt.) was given. The rats with diabetes in Group II had been then split into seven subgroups at random: Group2, the group serving as the positive control, that just given the regular diet; group3-8, which received the standard diet plus 4% bitter wood roots, nettle roots powder, or both, for a duration of 4 weeks. Samples were examined for biochemical markers like glucose ranges, liver enzymes, renal function, and lipid fractions; 28 days after the experiment ended. The results of the collected data confirmed that, in evaluation to the control positive group, the examined plants (P≤0.05) dropped serum sugar, LDL-c, and raised HDL-c. Additionally, the studied plants enhanced kidney and liver functions. According to the findings, nettle and bitter wood powder consist of a variety of active phytochemical compounds that might also minimize the adverse effects and suppress diabetic rats.

Keywords: Rats, nettle, bitter wood, serum sugar, biochemical analysis

1- INTRODUCTION

The long-term metabolic illness regarded as diabetes mellitus, which is demonstrated by using the body's lack of ability to create or use insulin, has an influence on a person's social, physical, and mental health (1). In the body, the pancreas generates insulin, which aids in transferring glucose from the circulation to the cell tissues, the place it is similarly metabolized and used as fuel for healthy metabolic processes. (2). Hyperglycemia has an indicator a feature for many illnesses which cause diabetes. The kinds of diabetes 1 and 2 are T1DM and T2DM, respectively (3). By 2030, the World

Health Organization predicted that there would be about 366 million human beings global with diabetic complications, with men and women aged round 45 and 64 years experiencing the largest growth. Thus, it is essential to decrease these rates (4).

Stinging nettle, (Urtica dioica, L.), is one of the most considerable families in the Urticaceae family and has 30 species. Asthma has been treated with the use of the nettle root and the leaves of the nettle were used as laxative, diuretic, and diabetics (5). Nettle leaf supply protein, minerals, vitamins, fiber, and phytochemicals like phenolic compounds, as nicely as variety to the choices, making them vital sources of nutrients. (6). Most of the animal research has confirmed the advantages of nettles in the remedy of hyperglycemia. Nettle has been discovered via human investigations to serve as an efficient activator of insulin release from beta-cells and has a therapeutic effect on beta-cells in diabetic rats. (7). A nettle mix (leaves and roots) has antidiabetics effect, which could decrease blood glucose level in Croatia experimental (8).

A plant from the Simaroubaceae family, bitter wood (Quassia amara) grows 2–6 meters high. It has numerous typical names due to the fact of its extensive regional range, including Bitter wood, and Quina de Caiena (9). Because of its anti-malarial, analgesic, and anti-edema, antifungal and antibacterial, anti-ulcerogenic, and male fertility influences, the medicinal use of bitter wood has been investigated as an adjuvant or most important product for the management of a variety of illnesses (10 and 11). The system of bitter wood's effects in normoglycemic mice and streptozotocin-induced hyperglycemic rats as an antihyperglycemic drug used to be attributable to quassinoids secondary metabolites, which may additionally feature as an insulin secretory material on living beta-cells of the Langerhans islets (12). In rats that had been given alloxan to induce diabetes, the oral administration of an aqueous solution containing bitter wood powder had an anti-hyperglycemic effect. It is concepting that diabetics who make use of bitter wood as a treatment option may also be capable of regulating sugar levels (13).

This study investigated a possible adjuvant therapy for diabetic mullites through evaluating the hypoglycemia results of nettle and bitter wood roots in regular and alloxan-induced hyperglycemic rats.

2. Materials and Methods

Materials

Bitter wood and nettle roots

The nettle and bitter wood roots purchased from herbalist in Cairo City, Cairo Governorate in May 2022.

Animals

Forty-eight male Albino rats ranging approximately (140-150 g) were supplied by the Vaccine and Immunity

Organization, Ministry of Health, Helwan Farm, Cairo, Egypt.

The chemical and kits

Alloxan, also known as 5, 5-dihydroxyl pyrimidine-2, 4, 6-trione, is a naturally occurring material, a cytotoxic glucose analogue, a derivative of urea, and a carcinogen. The kits for glucose, lipid fraction, liver and renal biomarkers used in this investigation purchased from Al-Gomhoria Company for Trading Drug, Chemical and Medical Instruments, Cairo, Egypt.

METHODS:

The preparation of nettle and bitter wood powder

The German-made Broun high-speed blender was used to grind the nettle and bitter wood roots into a powder, which was once then packaged in black glass bottles and saved at -18 °C in a deep freezer waiting for further processing, in accordance with (14).

Basal diet

The basal diet that was created using the formula provided by (15) is as follows: Protein 10%, cellulose 5%, minerals, 10% corn oil and vitamin blend, 1%, and maize starch 69.5%. Also, (16) advised vitamin mixes composition that was utilized, while (17) advised the salt mix component that was used.

Inducing damage for pancreatic beta cells in rats

According to (18) an injection of alloxan (150 mg per kilogram of body weight) caused chronic damage to pancreatic beta cells in normal healthy rats. One week after receiving alloxan injections, fasting blood samples had been taken from rats with diabetes to check their fasting serum glucose levels, which have been 200 mg/dl (19).

Experimental animals

The Research Ethics Committee of the Faculty of Home Economics, Menoufia University accepted research No. #20-SREC-03-2022.

In this experiment, 48 adult male white albino rats, "Sprague Dawley" strain, 10 weeks old, weighing 140-150g, were used. For adaptation, all rats were fed a basal diet (casein diet) for 7 days. After this adaptation period, rats were divided into 8 groups, 6 rats per each as follows: Group (1): Rats have been given a basal diet, serving as a control group. Group (2): Hyperglycemic rats have been given a basal diet, serving as control positive group. Group (3): Hyperglycemic rats have been given a basal diet and treated with 2% nettle roots of the diet's weight. Group (4): Hyperglycemic rats have been given a basal diet and treated with 4% nettle roots of the diet's weight. Group (5): Hyperglycemic rats have been given a basal diet and treated with 2% bitter wood roots of the diet's weight. Group (6): Hyperglycemic rats have been given a basal diet and treated with 4% bitter wood roots of the diet's weight. Group (7): Hyperglycemic rats have been given a basal diet and mixture 1:1 of nettle and bitter wood roots 2% of the diet's weight. Group (8): Hyperglycemic rats have been

given a basal diet and mixture 1:1 of nettle and bitter wood roots 4% of the diet's weight.

Collection of blood and organs

Rats were slaughtered at the finish of the experiment following a 12-hour fast. Dry, sterile centrifuge tubes have been used to gather blood samples from a portal vein. To get the serum, the samples have been centrifuged at 3000 rpm for 10 minutes. The serum was once saved at -20°C for analysis according to the method of (20).

In addition to being removed simultaneously, the pancreas used to be additionally cleansed with saline solution, dried with filter paper, weighted, and stored in 10% formalin liquid for histological examination. (21).

Biochemical analysis

Serum glucose was estimated using procedure (22). Triglycerides were carried out using the techniques mentioned in (23). Total cholesterol was calculated using the (24) technique. The levels of HDL-C levels were calculated with the technique of (25). The following equation was used to determine both VLDL-c and LDL-c as follows: VLDL-c = (Triglycerides/5).

LDL-C = (T. C. - HDL-C) – VLDL-C (26).

Alkaline phosphatase (ALP) concentration was estimated by using the method of (27), alanine amino transferase (ALT) levels were estimated by using the method of (28), and aspartate amino transferase (AST) levels were estimated by using the method of (29). While serum creatinine, urea, and uric acid were calculated by using the method of (30, 31 and, 32).

Statistical analysis

A significant primary factor used to be located, the records have been examined the use of a thoroughly randomized factorial design, and the ability have been separated the use of known as the Student-Newman-Keuls test. The Costat Program has decided that difference between treatments that are ($P \leq 0.05$) significant. To consider the biological outcomes, one-way ANOVA was once at first used. (33).

3- Results and Discussion

The information in Table 1 explains the bitter wood, nettle roots, and their combination influence the sugar ranges of hyperglycemic rats. The received data confirmed a substantial difference in the sugar degrees between two control groups, with the negative control group recording the lowest value. The corresponding averages have been 311.15 and 104.23 mg/dl.

For the groups that had been given 2% bitter wood powder confirmed the best value of glucose levels, whilst the G8 combination 4% group showed the least value with substantial difference. The corresponding averages have been 162.42 and 115 mg/dl. These results corroborated that of (34), discovered which it rats given 8% of the bitter wood extract exhibited the best reduction, probably because of the active substances covered in the plant. The

utilization of saponins has stated to decrease gluconeogenesis, stimulate glycogen synthesis, and repair insulin characteristics in order to decrease blood sugar levels. Vitamins additionally provide protection from degenerative changes.

These outcomes concur with those of (35), who confirmed that the phenolic bitter leaf extract inhibits -amylase and -glucosidase enzyme activity in vitro in a manner that relies upon on the dose (4-16 g/ml), which aids in slowing the degradation of polysaccharides to sugar and so lowers the quantity of sugar taken within the organs.

Furthermore, serum glucose ranges had been dramatically reduced by way of stinging nettle leaf extract. Nettle leaf extract has been proven to exhibit anti-PPAR gamma, anti-alpha glucosidase, and insulin secretagogue characteristics related with diabetes and may want to assist with glycemic management (36).

Table (1) Influence of nettle roots and bitter wood powder and their mixtures on glucose range of hyperglycemic rats

Parameters / Groups	Glucose (mg/dl)
G1 C (-)	311.15a±5.18
G2 C (+)	109.50h±3.53
G3 (2% Nettle powder)	145.50c±2.52
G4 (4% Nettle powder)	133.00e ± 5.0
G5 (2% Bitter wood powder)	162.42b±4.96
G6 (4% Bitter wood powder)	141.28d±3.31
G7 Mixture 2%	123.61f±5.56
G8 Mixture 4%	115.00g±5.0
LSD (P≤0.05)	2.0

Each value represents the mean ± SD of six replicates. Means in the same column with different letter are significantly different (P<0.05).

The data provided in Table (2) illustrates how bitter wood powder and nettle roots affected the ALP, AST, and ALT ranges in the livers of diabetic rats. The data accrued confirmed that the group with a control positive had the biggest value of ALT ranges, whilst group with negative control had the least value, with major variations. The corresponding suggested amounts were 180.50 and 97.50, U/L. With major variations, the 4% combination group recorded the lowest value of ALT ranges for the treatment groups, whereas the 2% bitter wood powder group recorded the maximum value, which were 163.00 and 120.50 U/L on average.

In the instance of serum AST, it was once established that the group with control positive had the higher value of AST enzyme ranges, whereas the group with control negative had the least value, with considerable variations. The common averages are respectively 54 and 20.50

U/L. The 2% Bitter wood powder group had the biggest value of AST ranges for the treated groups, whereas the 4% a combination group had the least value, with considerable variations, that were 48.50 and 26.14 U/L on average, respectively. Additionally, the data showed that the group with control positive had the most elevated ALP enzyme, whereas the negative control group had the least amount, with statistically significant variations, the corresponding mean values were 26.10 and 12.50 U/L. The 2% bitter wood powder recorded the greatest amount of ALP concentrations for the treatment groups, whereas the 4% mixed group recorded a smaller value with statistically significant variations, the corresponding average that 22.83 and 14.50 U/L. These findings corroborated the observations of (37) who claimed that the nettle leaves at 400 mg/kg, a extract exhibits the strongest liver-protective effects, which lowers liver enzyme levels. such as GOT, and GPT.

Yener et al., (38) observed that nettle extract notably reduced MDA, enhanced the ranges and activities of AST, and ALT were reduced by oxidative enzymes activities and prevented the creation of ROS or scavenges to considerably enhance hydropic degeneration, necrosis, fats degeneration periportal inflammation, bile canal development, and. Furthermore, hepatic congestion is reduced by means of bitter wood.

Additionally, it is an ordinary South American therapy for disorders of the liver. Ground chips of the bitter wood are supplied for sale and are used to make tinctures and tonics (39).

Table (2) Influence of nettle roots and bitter wood powder as well as their mixtures on liver enzymes of diabetic rats

Parameters / Groups	ALT U/L	AST U/L	ALP U/L
G1 C (-)	97.50g±2.52	20.50g±5.52	12.50d±5.55
G2 C (+)	180.50a±5.52	54.00a±5.00	26.10a±6.60
G3 (2% Nettle powder)	140.50d±4.52	38.53d±4.57	20.50b±4.54
G4 (4% Nettle powder)	135.00e±4.0	31.20e±2.40	17.15c±3,18
G5 (2% Bitter wood powder)	163.00b±5.0	48.50b±5.50	22.83b±6.89
G6 (4% Bitter wood powder)	156.50c±3.0	41.30c±4.70	20.64b±5.59
G7 Mixture 2%	139.00d±4.0	30.25e±3.28	16.52c±4.56
G8 Mixture 4%	120.50f±5.52	26.14f±5.19	14.50cd±6.52
LSD (P≤0.05)	2.0	2,0	2.2

ALT=Alanine aminotransferase. AST= Aspartate aminotransferase. ALP=Alkaline phosphatase. Each value represents the mean ± SD of six replicates. Means in the same column with different letter are significantly different (P<0.05).

The influences of bitter wood powder and nettle roots on ranges of total cholesterol (TC) and triglyceride (TG) in hyperglycemic rats were demonstrated through the data in Table 3. The obtained outcomes confirmed that, with

considerable differences, the group with control positive had the biggest value of cholesterol ranges whilst the group with control negative had the least. Relative suggested average has been 157.00 and 86.50 mg/dl. For the groups receiving treatment, 2% bitter wood powder recorded the greatest value of serum cholesterol levels, whilst 4% combined group observed the least with statistically considerable variations. The relative suggest values had been 137.00 and 94.50 mg/dl.

In relation to triglycerides, it was once evident that the group with control positive appeared the biggest range, but group with control negative had the smallest value, with statistically considerable variations. The relative averages had been 127.00 and 68.50 mg/dl. The 2% bitter wood powder recorded the greatest value of blood triglyceride ranges for treated groups, whereas the 4% combined group recorded a smaller value with statistically considerable variations. The relative averages had been 116.50 and 83 mg/dl. These results corroborated that of (40), maintained that rats with hypercholesterolemia and diabetes significantly reduced their levels of TC and LDL-C after receiving organic extract of nettle leaf at different doses which were between one hundred and three hundred mg per kilogram.

Additionally, dyslipidemia that is TC, LDL-C, HDL-C, and triglycerides linked for streptozotocin-induced diabetes, utilized to be effectively restored through nettle extract and glibanclamide (41).

Furthermore, in contrast to the group of control, diabetic rats treated unique plants had lower ranges of lipid fractions that is TC, and TG (42).

Table (3) Influence of nettle and bitter wood powder as well as their mixtures on serum triglycerides, and total cholesterol of hyperglycemic rats

Parameters / Groups	Total cholesterol mg/dl	Triglycerides mg/dl
G1 C (-)	86.50a±4.80	68.50a± 3.21
G2 C (+)	157.00a±3.50	127.00a±2.50
G3 (2% Nettle powder)	126.50c±4.50	107.00c±5.20
G4 (4% Nettle powder)	105.00±3.50	97.50d±2.50
G5 (2% Bitter wood powder)	137.00b±4.00	116.50b±4.50
G6 (4% Bitter wood powder)	118.50d±3.30	108.50c±4.50
G7 Mixture 2%	106.00e±3.40	92.50e±3.80
G8 Mixture 4%	94.50f±4.60	83.00f±4.50
LSD (P≤0.05)	1.06	1.70

TC = Total cholesterol. TG= Triglycerides Each value represents the mean ± SD of six replicates. Means in the same column with different letter are significantly different (P<0.05).

The data provided in Table (4) demonstrates how bitter wood powder and nettle roots influence the ranges of the lipids fraction that is HDL-c, LDL-c,

and VLDL-c in the rats suffering from diabetes. It is evident that the group with control negative had the maximum ranges of HDL-c whilst the group with control positive had smallest levels, at variations that had been statistically considerable, the average reading was 48.10 and 31.50 mg/dl, respectively. As contrasted with that, the 4% combination group had the maximum ranges of HDL-c amongst the treatment groups, whilst the 2% bitter wood powder group had smallest ranges with statistically considerable variations. The corresponding mean values had been 45.10 and 35.60 mg/dl.

Additionally, the findings confirmed that the group with control positive had the maximum LDL-c values, whereas the group with control negative had the maximum value, with statistically considerable variations. The relative average had been 100.10 and 24.70 mg/dl. For the groups receiving treatment, 2% bitter wood powder had the maximum value of serum LDL-c levels, whilst 4% combination had the least value at statistically considerable variations. The corresponding averages have been 78.10 and 32.80 mg/dl.

With respect to VLDL-c, the group with control positive had the maximum value while group with control negative had the least value; these differences were significant. There were two different mean values: 25.40 and 13.70 mg/dl. For the groups receiving treatment, 2% bitter wood powder had the maximum value of VLDL-c levels, but 4% mixture had the least value with statistically significant variations, the average reading was 23.30 and 16.60 mg/dl, respectively. These findings corroborated what was once observed by way of (43) that nettle leaf powder reduced blood cholesterol and lipoprotein levels. Lower ranges of low-density lipoprotein and apo-protein B were discovered to have a considerable influence on the lipid fraction, together with TC, cholesterol fractions, and LDL-c/HDL-c proportions.

Quassia amara extract and glibenclamide, effectively normalized dyslipidemia associated with streptozotocin-induced diabetes. The findings of the present study indicate that Quassia amara extract may be potentially valuable in the treatment of diabetes and associated dyslipidemia (41).

In comparison of each of the control groups and combination plant treatment, serum ranges of lipid fraction all significantly decreased. For HDL, the reverse is observed once (44).

The information displayed in Table 5 illustrates the influence of bitter wood powder and nettle roots on the ranges of renal biomarkers in hyperglycemic rats. It is evident that the group with control positive had the most elevated urea ranges, whereas the group with control negative had the least amount, at variations that have been statistically considerable. The relative mean values have been 69 and 36.50 mg/dl. The 2%

group of bitter wood powder had the most elevated urea ranges amongst hyperglycemic groups, whilst the 4% mixture group had the least amount with variations that have statistically considerable. The relative mean values have been 58 and 39.50 mg per deciliter.

Table (4): Effect of nettle roots and bitter wood powder and their mixtures on lipid profile of diabetic rats

Parameters / Groups	HDL-C mg/dl	LDL-c mg/dl	VLDL-c mg/dl
G1 C (-)	48.10a±4,14	24.70d±5,75	13.70e±5,9
G2 C (+)	31.50f±5,55	100.10a±4,14	25.40a±4,44
G3 (2% Nettle powder)	38.40cde±6,46	66.70b±3,73	21.40c±3,43
G4 (4% Nettle powder)	40.50cd±5,55	45.10d±21,6	19.40c±5,45
G5 (2% Bitter wood powder)	35.60e±7,67	78.10b±3,13	23.30b±3,33
G6 (4% Bitter wood powder)	37.50de±2,52	59.80bc±5,13	21.20c±4,24
G7 Mixture 2%	41.70c±6,8	45.80cd±4,12	18.50d±4,54
G8 Mixture 4%	45.10b±7,17	32.80±d5,13	16.60d±3,63
LSD (P≤0.05)	2.901	1.570	1.641

LDL-C=Low-density lipoprotein. VLDL-C. Very low-density lipoprotein. HDL-C= High-density lipoprotein. Each value represents the mean ± SD of six replicates. Means in the same column with different letter are significantly different (P<0.05).

The information additionally observed that, with statistically significant variations, the effective group with control positive had the greatest amount of uric acid ranges, and the group with control negative had the least amount, that were 3.80 and 1.85 mg/dl on average, respectively. On the different hand, 2% bitter wood powder had the maximum percentage of blood uric acid ranges in the treated groups, whilst 4% combination had the smallest amount with statistically significant variations, which were 3.30 and 1.95 mg/dl on average, respectively. The finding also showed that between the 4%mixture group and group with control negative, there have been non-significant variations.

In the instance of creatinine, it was once possible to conclude that the group with control positive had the greatest amount observed, whereas group with control negative had the smallest reading with significant (P0.05) variations. The relative mean values have been 1.16 and 0.86 mg/dl. In contrast, the 4% combination group recorded the smallest value of serum creatinine ranges for hyperglycemic groups, whereas 2% bitter wood powder group recorded the most elevated value with significant variations. 1.08 and 0.89 mg/dl on average, respectively. Positive control, 4% combination, and 2% bitter wood powder did not vary significantly. Our findings have been constant with those of (45) who discovered that kidney function had been enhanced in rats given nettle at ratio of (250 and 500 mg/kg), respectively, for 28 days. Additionally, due to the fact nettle extracts consist of antioxidants, they have

an influence on kidney stone modeling brought on by sodium oxalate by reducing tissue deterioration and the number of stones.

In addition, every group of rats that were kidney-damaging given diets containing nettle leaves and seeds exhibited a considerable drop in the average readings. of kidney function biomarkers concentrations as compared to group with C (+) (46).

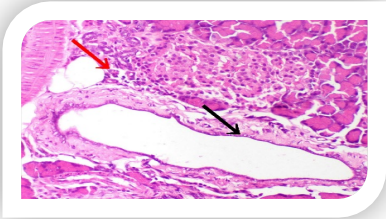
Table (5): Influence of nettle roots and bitter wood powder and their mixtures on renal functions of hyperglycemic rats

Parameters / Groups	Urea mg/dl	Uric acid mg/dl	Creatinine mg/dl
G1 C (-)	36.50g±2.54	1.85b±1.10	0.86a±0.50
G2 C (+)	69.00a±2.00	3.80a±2.00	1.16a±0.75
G3 (2% Nettle powder)	52.53c±2.56	2.55ab±1.00	1.03a±0.50
G4 (4% Nettle powder)	44.30e±3.33	2.27b±1.30	1.00a±0.75
G5 (2% Bitter wood powder)	58.00b±2.00	3.30ab±2.30	1.08a±0.10
G6 (4% Bitter wood powder)	50.51d±3.54	3.00ab±1.40	1.05a±0.50
G7 Mixture 2%	43.80e±2.13	2.16b±1.14	0.92a±0.20
G8 Mixture 4%	39.50f±2.54	1.95b±0.50	0.89a±0.30
LSD (P≤0.05)	1.9	1.0	0.4

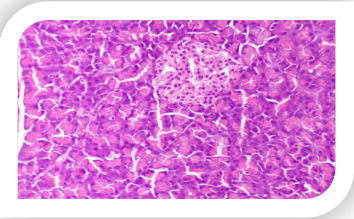
Each value represents the mean ± SD of six replicates. Means in the same column with different letter are significantly different (P<0.05).

When examined under a microscope, pancreases of the rats in group 1 showed typical pancreatic acini and Langerhans islets (picture 1). Other than that, the pancreas in group 2 rats displayed inflammatory cell infiltration, cystic dilatation of the pancreatic duct, necrosis of islet of Langerhans' cells, and vacuolation of acinar epithelium (picture 2). Rats from group 3 displayed vacuolation of some acinar epithelium and necrosis of certain islets of Langerhans cells in their pancreas (picture 3). Also, some parts of pancreases in group rats 4 appeared to have normal pancreatic parenchyma, while other sections only showed necrosis of a few islets of Langerhans cells (picture 4). In contrast, certain sections from group 5 showed minimal histopathological abnormalities, while other sections showed vacuolation of some acinar epithelial cells and congestion of pancreas vessels (picture 5). But in group 6's slices, cells from the islets of Langerhans were vacuolated (picture 6). In addition, rats in group 7's pancreas showed no histological modifications other than a little congestion of pancreatic blood vessels in some regions (picture 7). Additionally, pancreases in group 8 rats showed ideal pancreatic parenchyma and no histological changes (picture 8). These results agree with (47) who showed there was a significant decrease in the aortic arch thickness of

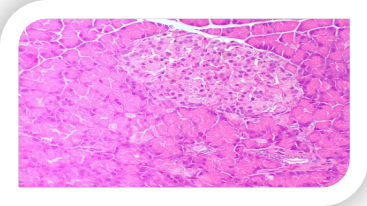
rats in groups treated with UD In histopathological evaluations of the aortic arch, which Conclusion Ethanolic extract of UD prevents establishment of atherosclerotic lesions in rat aorta, which is associated with positive effects on serum lipid profile without significantly affecting antioxidant status.



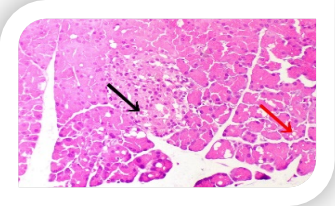
Picture (2): Photomicrograph of pancreas of rat from group 2 showing cystic dilatation of pancreatic duct (black arrow) and inflammatory cells infiltration (red arrow).



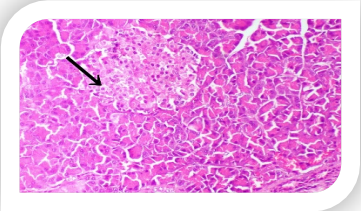
Picture (1): Photomicrograph of pancreas of rat from group 1 (control) showing normal pancreatic acini and normal islets of Langerhans's.



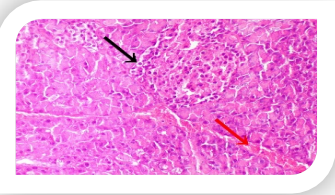
Picture (4): Photomicrograph of pancreas of rat from group 4 showing apparent normal pancreatic parenchyma.



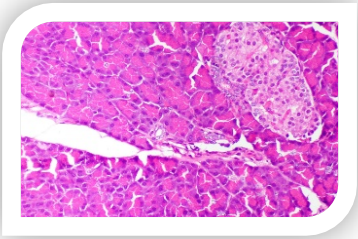
Picture (3): Photomicrograph of pancreas of rat from group 3 showing necrosis of some cells of islets of Langerhan's (black arrow) and vacuolation of some acinar epithelium (red arrow).



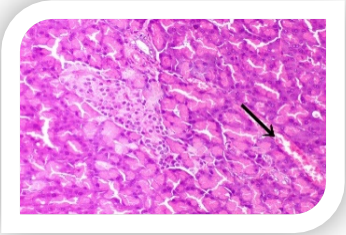
Picture (6): Photomicrograph of pancreas of rat from group 6 showing vacuolation of cells of islets of Langerhans's.



Picture (5): Photomicrograph of pancreas of rat from group 5 showing vacuolation some cells of acinar epithelium (black arrow) and congestion of pancreatic blood vessel (red arrow).



Picture (8): Photomicrograph of pancreas of rat from group 8 showing no histopathological changes (H & E X 400).



Picture (7): Photomicrograph of pancreas of rat from group 7 showing slight congestion of pancreatic blood vessel (arrow) (H & E X 400).

4. Conclusion

Nettle, bitter wood or their mixture significantly enhanced serum glucose level (P≤0.05), improved HDL-c, and decreased levels of liver, and kidney functions, thus, we might use a mixture of nettle, bitter wood powder in our daily drinks.

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التغذية وعلوم الأطعمة

تقييم تأثير جذور الخشب المر والقراص على التغيرات البيولوجية في الفئران المصابة بالسكري

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الاستشهاد الي:

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الملخص العربى:

كان الهدف من الدراسة الحالية هو دراسة تأثير نبات القراص وجذور الخشب المر ومسحوق مخلوطهم على مرض السكري فى الفئران. تم استخدام ثمانية وأربعين فأرًا ألبينو ذكرًا تتراوح أوزانهم بين ١٤٠ ــ ١٥٠ جرامًا إلى مجموعتين تتكون كل منهما من ستة فئران بشكل عشوائي. كانت المجموعة الأولى بمثابة المجموعة الضابطة السالبة، وتلقت المجموعة الثانية جرعة واحدة من مادة الألوكسان المسبب لمرض السكري (١٥٠ ملجم/كجم من وزن الجسم). تم بعد ذلك تقسيم الفئران المصابة بالسكري فى المجموعة الثانية إلى سبع مجموعات فرعية بشكل عشوائي: المجموعة الثانية، المجموعة الضابطة الموجبة، التى تلقت النظام الغذائى القياسي فقط؛ من المجموعة الثالثة الى المجموعة الثامنة، الذين تلقوا النظام الغذائى القياسي بالإضافة إلى٢، ٤٪ من مسحوق جذور الخشب المر والقراص، أو مخلوطهما، لمدة ٤ أسابيع. تم فحص العينات عن طريق قياس المؤشرات البيوكيميائية مثل مستوى الجلوكوز، وإنزيمات الكبد، ووظائف الكلى، وصورة دهون الدم؛ بعد انتهاء التجربة والتى استمرت لمدة ٢٨يومًا. أشارت نتائج البيانات التى تم الحصول عليها إلى أن النباتات المختبرة أدت إلى انخفاض معنوي (P≤0.05)في مستويات كلا من نسبة الجلوكوز في الدم والبروتين الدهني منخفض الكثافة والبروتين الدهنى منخفض الكثافة جدا في الدم وزيادة البروتين الدهنى مرتفع الكثافة مقارنة بالمجموعة الضابطة الموجبة. بالإضافة إلى ذلك، فإن النباتات المدروسة تعمل على تحسين وظائف الكلى والكبد. وفقًا للنتائج، مسحوق جذور نبات القراص والخشب المر يحتوي على مجموعة متنوعة من المركبات الكيميائية النشطة التى قد تقلل أيضًا من الآثار الضارة وتحسن من مستوى السكر في الفئران التي تعاني من ارتفاع السكر في الدم.

الكلمات الكاشفة: الفئران، القراص، الخشب المر، سكر الدم، التحاليل البيوكيميائية