The Chemical, Biological And Histopathological Effects Of Ocimum Basilicum Leaves And *Hyphaene Thebaica* On Rats Effected With Diabetes

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ABSTRACT:

Diabetes is a condition in which insulin fails to adequately maintain the homeostasis of lipid and carbohydrate metabolism. Considering the critical role that early diagnosis, treatment, and prevention play in lowering the prevalence of diabetes, numerous solutions to ameliorate diabetic complications have been put forth. Numerous strategies to reduce diabetic complications have been proposed. This study aims to evaluate the chemical, biological and histopathological **e**ffects of *Ocimum Basilicum* leaves(Bail) and *Hyphaene thebaica (Doum)* and their relationship with diabetes in Rats. Sixty-three female albino rats, weighing 160±10g, were divided into nine groups. The first group, 7 rats, was kept as a negative (-ve) control group fed on the basal diet, while the other groups were injected with alloxan to induce diabetes. The second group was still fed on the basal diet and kept as a positive (+ve) control group, and the other seven groups were fed on a basal diet containing 5, 10% (w/w) basil leaves, doum powder, and a mix of them, and the last group was treated with metformin. Rats's treatment with alloxan caused a significant ($p \leq 0.05$) increase in serum glucose concentration compared to the normal control. Supplementation of the rat's diet with different percentages of basil leaves and doum powder or a mix of them leads to a decrease in those values. The same action was recorded for liver enzymes (ALP, AST, and ALT) and lipid fractions (triglycerides, total cholesterol, LDL, VLDL, and AI) in diabetic rats. The best treatment used was a mix of 5% basil leaves and 5% doum powder. All of these effects are principally attributed to the strong hyperglycemic effect of basil leaves and doum powder as a result of their high bioactive compounds. We could consider that basil leaves and doum powder are powerful for the treatment of diabetes complications in rats.

Key Words: Basil leaves, Doum powder, hyperglycemia, serum lipid profile, diabetes.

Introduction:

Diabetes was first described by the ancient Greek physician, who first coined the term Diabetes mellitus (DM) ***Ratheau et al.; (2015***). Diabetes mellitus is a worldwide menace, escalating at a phenomenal rate and afflicting the global population**.** It is widely recognized as an emerging epidemic that has a cumulative impact on almost every

country, age group, and economy across the world ***International Diabetes Federation et al.; (2015***)

Besides drugs, diabetes has been treated with several medicinal plants for a long time, whereby the medicinal plant extracts were found to improve diabetic control and reduce associated side effects better than the synthetic ones ***Aybar et al.; (2001) .***

Shahrajabian *et al.; (2020)* reported that new plants were proposed, and among these plants were the leaves of Ocimum basilicum (Lamiaceae) . Ocimum basilicum (Lamiaceae) is predominantly recognized as a basil plant. It is inhabited in Asian, African, Middle East, American regions.

Figure (1): Basil leaves **Shahrajabian *et al.; (2020)***

Recent research studies identified peptides from basil expressing anti-oxidant, a-glucosidase, and a-amylase inhibitory activity using in-vitro models ***Afifah & Gan, (2016).*** Another study identified that basil (whole plant, powdered leaves, juice, water, and ethanol extracts) had significant improvements in fasting and postprandial blood glucose and improved lipid profiles in diabetic and obese participants. Hemoglobin A1C (HbA1c) and body mass index (BMI) in obese participants were reduced ***Singletary,(2018).***

This study also included the extract of doum *(Hyphaene thebaica).* Its tea is traditionally believed to be good for the treatment of hypertension. ***Kamis et al.; (2003)***. When investigated chemically, they proved to contain alkaloid (s), reducing sugars, and glycosides ***Elhalim , (2020)***.

Figure(2): *Hyphaene thebaica* (doum) ***Kamis et al.; (2003)***

This study evaluates the chemical, biological, and histopathological effects of Ocimum basilicum leaves and Hyphaene thebaica (doum) on diabetic rats.

MATERIAL AND METHODS

1- **Basil leaves preparation:** Basil leaves was prepared as described by **Subapriya *et al*., (2005)**. Fresh mature basil leaves were washed, then ground with distilled water until they formed a fine paste using a hand blender.

2- **Hyphaene Thebaica Preparation:** Hyphaene thebaica rind was removed. Then fresh, mature pulp was soaked in distilled water and ground to a fine paste using a hand blender.

3- **Basal Diet:** The basal diet composition of tested rats was prepared according to American Institute for Nutrition **AIN (1993).** The mineral and vitamin mixture which used was according to **Campbell (1963).**

4- **The experiment design:** The animals were divided into 9 groups (n=7), all rats were fed for 1 week on a basal diet before starting the experiment for acclimatization after the 1-week period. Rats were divided into 2 main groups, with the first group (n=7) fed on the basal diet only as a control negative. All rats in the second main group (n=56) (the experimental group) were infected with diabetes. The rats infected with diabetes were divided into eight subgroups (n=7). Rats were fed a treated diet for 28 days.

- **Rats groups:**

The first main group, the negative control (n=8), consisted of rats fed on the standard diet.

The second main group: diabetic rats (n = 56).

Diabetic rats were divided into 7 subgroups, (8 rats each) according to the following:

Subgroup 1: Positive control rats were fed the standard diet.

Subgroup 2: Rats were fed a standard diet containing 5% basil leaves.

Subgroup 3: Rats were fed a standard diet containing 10% basil leaves.

Subgroup 4: Rats were fed a standard diet containing 5% Hyphaene thebaica.

Subgroup 5: Rats were fed a standard diet containing 10% Hyphaene thebaica.

Subgroup 6: Rats were fed a standard diet containing a mixture of 2.5% basil leaves and 2.5% Hyphaene thebaica

Subgroup 7: Rats were fed a standard diet containing a mixture of 5% basil leaves and 5% Hyphaene thebaica.

Subgroup 8: Rats were fed a standard diet and orally received metformin.

During the experimental period (28 days), the diet consumed was recorded every day, and body weight was recorded every 3 days. The body weight gain (BWG%), feed efficiency ratio (FER), and food intake (FI) were determined according to **Chapman *et al*., (1959)** using the following equations:

BWG% = (Final weight – Initial weight)/ Initial weight ×100

FER = gramme gain in body weight (g/28 day)/ gramme feed intake (g/28 day).

Blood sampling and organs:

At the end of the experiment, the animals were fasted overnight, and then the rats were anaesthetized .Blood samples were collected according to **Schermer, (1967)** for haematological studies. At the same time, the different organs of rats (pancreas, heart, kidney, and heart) were carefully removed and weighted then kept in buffered formalin solution (10%) for histopathological examination according to the method mentioned by **Kaack and Austed, (1998).** Enzymatic determination of blasma glucose was carried out colorimetrically according to the methods of **Trinder, (1969).** Serum triglyceride (TG), total cholesterol (TC), and high-density lipoprotein (HDL) were determined by using the enzymatic colorimetric method as described by **Fossati and Prencipe (1982), Charles et al., (1974), and Assmann (1979)**, respectively. The determination of total lipids in serum was colorimetrically determined according to **Drevon and Schmitt (1964)**. The determination of low-density lipoprotein (LDL) and very low-density lipoprotein (VLDL) were carried out according to the methods of **David et al., (1996)**. The atherogenic index was calculated as the VLDL + LDL cholesterol / HDL ratio according to the formula of **Kikuchi-Hayakawa *et al*., (1998).**

Histopathological investigation:

Small specimens of the organs (pancreas) were taken from each experimental group, fixed in neutral buffered formalin, dehydrated in ascending concentrations of ethanol (70, 80, 90%), cleared in xylene, and embedded in paraffin. Sections of (4-6) μm thickness were prepared and stained with hematoxylin and eosin according to **Bancroft *et al*., (1996).**

Statistical Analyses:

Statistical analyses were performed using a computer program, the statistical package for social science **SPSS software, version 6.4**

(2008), and compared with each other using the suitable tests. Differences between treatments of ($P \leq 0.05$) were considered significant. Biological results were analyzed by one-way ANOVA.

RESULTS AND DISSCUSION

Effect of Basil leaves and doum powder on serum glucose of hyperglycemic rats:

Table (1) show basil leaves and doum powder impact blood glucose levels. The obtained results showed that at the end of the experiment, results show highest glucose levels in positive control group compared to negative control group. with significant differences. The values were (430.60 ± 2.47 and 62.80 ± 0.35 mg/dl), respectively. Hyperglycemic rats in all tested groups show significant decreases in mean values compared to control group. The hyperglycemic rats fed a diet containing basil leaves at 5% showed a decrease in blood glucose (from 463.33 ± 2.07 to 215.67 ± 1.65 mg/dl). Also, hyperglycemic rats fed on a diet containing basil leaves (10%) decreased blood glucose (from 330.58 ± 1.49 to 186.40 ± 0.62 mg/dl). As well as when feeding hyperglycemic rats on diets containing doum powder 5% and 10% showed decreasing blood glucose (from 355.88 ± 0.98 to 216.80 ± 2.90 mg/dl) and (from 265.63 ± 1.74 to 109.20 ± 0.71 mg/dl), respectively. Likewise, feeding hyperglycemic rats on diets containing a mixture of basil leaves and doum powder decreased blood glucose (from 330.40 ± 2.98 to 100.00 ± 1.11 mg/dl) for a mix of 2.5 basil leaves + 2.5% doum powder and (from 303.67 ± 1.46 to 79.17 0.83 mg/dl). When screening the end-of-experiment, the data in this table revealed no significant differences between serum glucose for hyperglycemic rats treated with metformin and serum glucose for hyperglycemic rats fed on a diet containing a mixture of 5% basil leaves and 5% doum powder. The values were (78.33 ± 2.02 and 79.17re 79.17±0.83mg/dl), respectively. These results agree with ***Keit, (2018)*** who suggests that the results of his study revealed that consuming basil (whole plant, powdered leaves, or juice), had a significant improvement in fasting and postprandial performance compared to consuming a non-basil diet. The major nutritional components of basil are (poly)phenolic acids and flavonoids, which can act as reducing agents and help lower the blood glucose level. Similar results were found by **Salah et al., (2011)** who suggested that feeding doum extracts to diabetic rats led to noticeably greater levels of adiponectin, a hormone that increases insulin's hypoglycemic action. **Bayad, 2016,** Also agreeing with these results were those who mentioned that after 1 and 2 months of feeding rats with doum , a significant reduction in blood sugar, cholesterol, triglycerides, and total

lipid levels was seen. The hypoglycemic action of these herbs may be brought on by their content of antioxidants, which improve glucose metabolism, an increase in serum insulin levels brought on by an increase in insulin secretion from the islets of Langerhans cells in the pancreas, or by their release of bound insulin**.**

Table (1):Effect of basil leaves and doum powder on blood glucose of hyperglycemic rats:

Parameter / Animal group	Serum Glucose (mg/dl)					
	After 5 days	After 10 days	After 15 days	After 20 days	After 25 days	At the end of experiment
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
control-	66.4^{h} ± 1.63	68.60^{i} ± 0.71	57.60^{i} ± 1.96	64.20^{h} ± 1.71	60.00^{i} ± 1.54	62.80^{g} ± 0.35
control+	399.17^{b} ± 1.07	467.50^{a} ± 0.62	427.20^{a} ± 0.95	420.88^{a} ± 0.95	423.60^{a} ± 0.89	430.60^{a} ± 2.47
Basil 5%	463.33^{a} ± 2.07	385.83^{b} ± 1.03	290.5^{c} ± 2.07	287.0^{b} ± 1.72	235.50^{c} ± 1.96	215.67^{b} ± 1.65
Basil 10%	330.58^{d} ± 1.49	315.21^{d} ± 1.12	276.2^{d} ± 2.06	269.38^{c} ± 0.83	216.60^{d} ± 0.86	186.40^{c} ± 0.62
Doum 5%	355.88^{c} ± 0.98	364.20^{c} ± 0.61	294.0^{b} ± 1.40	270.80^{c} ± 2.42	240.60^{b} ± 1.13	216.80^{b} ± 2.90
Doum 10%	265.63^{f} ± 1.74	208.42^{f} ± 0.71	217.0^{f} ± 0.97	191.80^{d} ± 1.26	130.60^{e} ± 1.43	109.20^{d} ± 0.71
mix 2.5 +2.5% :(5%)	330.40^{d} ± 2.98	291.46^{e} ± 1.30	227.0^{e} ± 2.14	181.20^{e} ± 0.77	116.00^{f} ± 1.02	100.0^{e} ± 1.11
mix 5 +5%: (10%)	303.67^{e} ± 1.46	172.33^{g} ± 0.84	138.17^{g} ± 0.93	121.50^{f} ± 2.01	90.17^{g} ± 1.40	79.17^{f} ± 0.83
Mitformin	149.67^{g} ± 0.94	102.17^{h} ± 1.27	88.67^{h} ± 1.09	81.17^{g} ± 1.95	81.50^{h} ± 0.92	78.33^{f} ± 2.02
F	46281.97^{*}	182176^{*}	47399.5^{*}	45293.0^{*}	72012.1^{*}	45480.6^{*}
Sig.	$<0.001^{*}$	$<0.001^{*}$	$<0.001^{*}$	$<0.001^{*}$	$<0.001^{*}$	$<0.001^{*}$

Means in the same column with different letters are significantly different.

Effect of basil leaves and doum powder on serum cholesterol and triglycerides in hyperglycemic rats:

Table (2) shows the effects of basil leaves and doum on serum cholesterol and triglycerides in hyperglycemic rats when they are injected with alloxan. Table (2) shows the effects of basil leaves and doum on serum cholesterol and triglycerides in hyperglycemic rats when they are injected with alloxan. The serum total cholesterol (TC) in Table 5 In the positive control group, the values were much higher than the negative control group, and the values were (226.67±0.93and

80.67±1.83 mg/dl) respectively, and there were significant differences between them, but there were some non-significant differences between the groups treated with Basil 5% and Doum 5%; the values were (220.33± 1.08 and 218.00±0.84 mg/dl). But there were some significant differences between the groups treated with (Basil 10% and Doum 10%); the values were (159.33 ± 0.68 and 139.00 ± 1.44 mg/dl), respectively. There were also significant differences between the groups treated with (Mix 2.5% basil leaves + 2.5% doum and Mix 5% basil leaves + 5% doum), the values were (102.00 ±2.03 and 83.33±0.05 mg/dl) respectively. On the other hand, there was no significant difference between the groups (mixed 5% basil leaves + 5% doum and group of rats treated with metformin) compared with the negative control group. The values were (83.33±0.05 ; 82.93 ± 0.67 and 80.67 ± 1.83 mg/dl) respectively.

In the same table, the results showed that the mean value of serum triglycerides (T.G.) in the positive control group was much higher than the negative control group, and the values were (210.33 ± 1.38 and 58.33 ± 0.81mg/dl respectively), and there was significant difference between them, but there were some non-significant differences between the groups treated with (basil 5% and doum 5%). The values were (200.00 ± 0.94 and 198.33 ± 3.03 mg/dl) respectively. But there were significant differences between the groups (basil10 % and doum 10%) the values were (178.67±2.66 and 152.67±0.50) respectively. Also, there were significant differences between the groups (Basil 10% and Doum 10%); the values were (178.67±2.66 and 152.67±0.50) respectively. There were significant differences between the groups treated with Mix 2.5% basil leaves with 2.5% doum powder and mix 5% basil leaves with 5% doum powder, and the values were and the values were (107.67 ± 1.31 and 62.01 ± 4.08 mg/dl) respectively. On the other hand, there was no significant difference between the groups (Mix 5% basil leaves+5% doum) and the group of rats treated with metformin compared with the negative control group. The values were (62.01±4.08, 60.33±0.50 and 58.33±0.81 mg/dl) respectively.

This results agreed with **Gökçea et al., (2021),** who suggested basil had statistically significant reductions in total cholesterol and triglycerides compared with control group participants. **Hetta and Yassin, (2006),** also found that feeding hypercholesterolemic rats with different parts of doum decreased total cholesterol and triglycerides, and mentioned that the doum plant could be of great merit for use as a hypocholesterolemic drug.

Table (2): Effect of basil leaves and doum powder on serum cholesterol and triglyceride of hyperglycemic rats:

Parameter / Animal group	Parameter	
	Total cholesterol (mg/ dl)	Triglyceride (mg/ dl)
	Mean ± SD	Mean ± SD
control-	$80.67^{h} \pm 1.83$	$58.33^{g} \pm 0.81$
control+	$226.67^{a} \pm 0.93$	$210.33^{a} \pm 1.38$
Basil 5%	$220.33^{b} \pm 1.08$	$200.00^{b} \pm 0.94$
Basil 10%	$159.33^{d} \pm 0.68$	$178.67^{c} \pm 2.66$
Doum 5%	$218.00^{c} \pm 0.84$	$198.33^{b} \pm 3.03$
Doum 10%	$139.00^{e} \pm 1.44$	$152.67^{d} \pm 0.50$
mix 2.5 +2.5%: (5%)	$102.00^{f} \pm 2.03$	$107.67^{e} \pm 1.31$
mix 5 +5%: (10%)	$83.33^{g} \pm 0.05$	$62.01^{f} \pm 4.08$
Mitformin	$82.93^{g} \pm 0.67$	$60.33^{fg} \pm 0.50$
F	24212.9^{*}	8831.9^{*}
Sig.	$<0.001^{*}$	$<0.001^{*}$

Means in the same column with different letters are significantly different.

Effect of basil leaves and doum powder on serum lipoprotein cholesterol fraction of hyperglycemic rats:

Results in Table (3) exhibit the effects of basil leaves and doum powder on serum lipoprotein cholesterol fractions i.e, high density lipoprotein (HDL-c), low density lipoprotein (LDL-c) and very low density lipoprotein (VLDL-c) in hyperglycemic rats. The results in Table (3) indicated that the HDL-c of the negative control group recorded the highest value when compared with the positive control group, with a significant difference ($P \leq 0.05$). The mean values were (67.33±0.61 and 31.67±1.59 mg/dl) respectively. While the lowest mean values of HDL-c of treated groups recorded for the group fed on diet containing basil 5% and the group treated with 5% doum, the mean values of this parameter in these groups were (38.67±0.25 and 37.83 ± 4.50 mg/dl), respectively, but, the highest value recorded for the group fed on diet and treated with metformin and the group fed on fed on diet containing (mix 5% basil leaves+5% doum) with no significant difference. The values were (64.93 ±1.09 and 63.00 ±0.68 mg/dl) respectively.

On the other hand, the same table shows that, the LDL-c of the positive control rats group recorded the highest value when compared with the negative control group with significant difference ($P \leq 0.05$). The mean values were (80.33±1.37and 29.67±1.23mg/dl) respectively. While

the highest LDLc values of the treated groups were recorded for the groups fed on diet containing basil 5% and 5% doum, the value was (74.50 ±0.59 and 72.80 ± 16.57), respectively, but the lowest value was recorded for the group treated with metformin and the group fed on diet containing the mix of (5% basil leaves+5% doum) with no significant difference. The values were (31.23±0.50 and 32.33±3.81mg/dl), respectively. Also, as the same table shows, the mean value of VLDL-c in the positive control rats group recorded the highest value when compared with the negative control group, with significant difference (P≤0.05). The mean values were (42.66±2.45and 11.66±0.97 mg/dl) respectively. The highest level of VLDL-c of all treated group recorded for group fed basil 5%, the value was (40.01 ±2.03 mg/dl) but, the lowest value recorded for group treated with metformin and the group treated with the (mix 5% basil leaves+5% doum) with no significant difference. The values were (12.266±0.92 and 12.62±0.91 mg/dl), respectively.

Table 3 shows that the atherogenic indices of the positive control group recorded the highest value when compared with the negative control group, with a significant difference (P≤0.05). The mean values were (3.88 ± 1.09 and 0.62 ± 0.07) respectively. All the treated groups recorded decreasing in atherogenic indices ranging (from 2.96 ± 1.13 to 0.71 ±0.16). The lowest values of treated group recorded for the group treated with metformin followed by the group fed on diet containing the (mix 5% basil leaves+5% doum), with no significant difference, the values were (0.68 ± 0.08 and 0.71 ±0.16), respectively. These results are in agreement with **Gökçea et al., 2021,** who reported that basil supplementation decreases low and very low density lipoproteins while increasing high density lipoproteins in serum. **Hetta and Yassin 2006** who reported that, consuming diets containing doum regulates lipid profiles, and adipose tissue hormones in type 2 diabetic rats.

Table (3): Effect of Basil leaves and Doum powder on serum cholesterol fraction of hyperglycemic rats:

Parameter / Groups	HDL-c (mg/ dl)	LDL-c (mg/ dl)	VLDL-c (mg/ dl)	Atherogenic index(AI)
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
control-	$67.33^{a} \pm 0.61$	$29.67^{d} \pm 1.23$	$11.66^{f} \pm 0.97$	$0.62^{d} \pm 0.07$
control+	$31.67^{f} \pm 1.59$	$80.33^{a} \pm 1.37$	$42.66^{a} \pm 2.45$	$3.88^{a} \pm 1.09$
Basil 5%	$38.67^{e} \pm 0.25$	$74.50^{a} \pm 0.59$	$40.01^{b} \pm 2.03$	$2.96^{ab} \pm 1.13$
Basil 10%	$42.50^{d} \pm 3.13$	$60.50^{b} \pm 2.79$	$35.73^{c} \pm 1.82$	$2.26^{bc} \pm 0.75$
Doum 5%	$37.83^{e} \pm 4.50$	$72.80^{a} \pm 16.57$	$33.86^{c} \pm 1.04$	$2.82^{ab} \pm 0.92$
Doum 10%	$43.33^{d} \pm 1.39$	$55.00^{b} \pm 0.17$	$30.53^{d} \pm 0.98$	$1.97^{bc} \pm 0.74$
mix 2.5 +2.5% :(5%)	$57.67^{c} \pm 1.03$	$46.00^{c} \pm 1.05$	$21.53^{e} \pm 1.54$	$1.17^{cd} \pm 0.53$
mix 5 +5% : (10%)	$63.00^{b} \pm 0.68$	$32.33^{d} \pm 3.81$	$12.62^{f} \pm 0.91$	$0.71^{d} \pm 0.16$
Mitformin	$64.93^{ab} \pm 1.09$	$31.23^{d} \pm 0.50$	$12.266^{f} \pm 0.92$	$0.68^{d} \pm 0.08$
F	393.463^{*}	105.71^{*}	612.86^{*}	23.715^{*}
Sig.	$<0.001^{*}$	$<0.001^{*}$	$<0.001^{*}$	$<0.001^{*}$

Means in the same column with different letters are significantly different.

Histopathological examination of pancreas:

Microscopically, examination of Pancreas of rats from negative control group revealed normal pancreatic acini and normal islets of Langerhans's (Photo. 1). Otherwise, pancreas of rats from positive control group showed congestion of pancreatic blood vessels and marked vacuolation of cells of islets of Langerhan's (Photo. 2). Furthermore, pancreas of rats from group fed on 5% Basil leaves manifested congestion of pancreatic blood vessel and vacuolation of cells of islets of Langerhan's (Photo. 3). However, pancreas of rats from **group** fed on 10% Basil leaves showed only vacuolation some cells of islets of Langerhan's (Photo. 4). Otherwise, some sections from group fed on 5% Doum powder exhibited apparent normal pancreatic parenchyma (Photo. 5), whereas, other sections revealed vacuolation some cells of islets of Langerhan's. Likewise, some sections from group fed on 10% Doum powder revealed no histopathological lesions (Photo. 6). Meanwhile, pancreas of rats from groups fed with (Mix 2.5% Basil leaves + 2.5% Doum powder) showed vacuolation of some cells of islets of

Langerhan's (Photo. 7). Otherwise, pancreas of rats from group fed with (Mix 5% Basil leaves + 5% Doum powder) exhibited no histopathological lesions (Photo. 8). Morever, pancrease of rats from group treated with Metformin showed vacuolation of some cells of islets of Langerhan's and congestion of pancreatic blood vessel (Photo. 9).

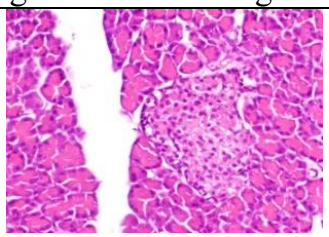

Photo (1): Pancreas of rat from negative control group (control) showing normal pancreatic acini and normal islets of Langerhan's (H & E X 400).

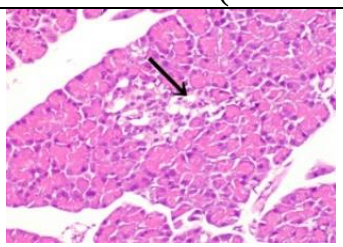

Photo (2):Pancreas of rat positive control group showing marked vacuolation of cells of islets of Langerhan's (H & E X 400).

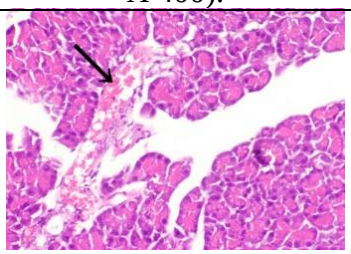

Photo (3): Pancreas of rat from group fed on 5% Basil leaves showing congestion of pancreatic blood vessel (H & E X 400).

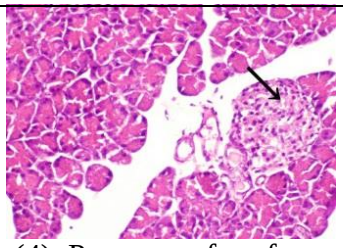

Photo (4): Pancreas of rat from group fed on 10% Basil leaves showing vacuolation some cells of islets of Langerhan's (H & E X 400).

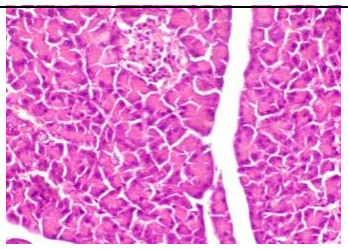

Photo (5): Pancreas of rat from group fed on 5% Doum powder showing apparent normal pancreatic parenchyma (H & E X 400).

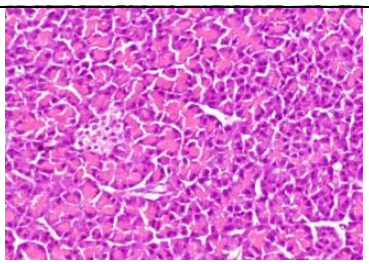

Photo (6): Pancreas of rat from group fed on 10% Doum powder showing no histopathological lesions (H & E X 400).

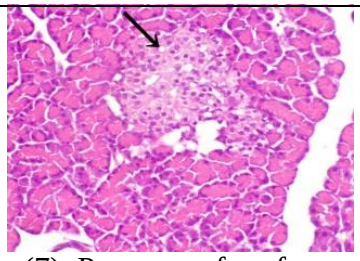

Photo (7): Pancreas of rat from group fed with (Mix 2.5% Basil leaves + 2.5% Doum powder) showing vacuolation of some cells of islets of Langerhan's (H & E X 400).

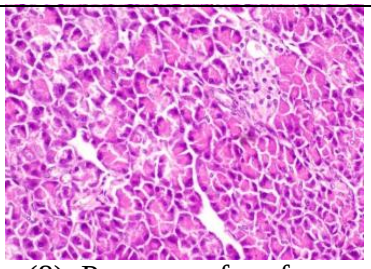

Photo (8): Pancreas of rat from group fed with (Mix 5% Basil leaves + 5% Doum powder) showing no histopathological lesions (H & E X 400).

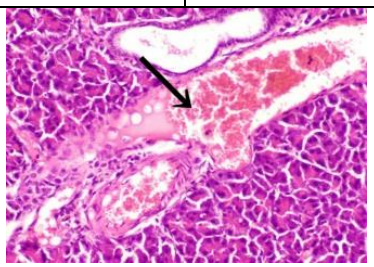

Photo (9): Pancreas of rat from group treated with Metformin showing congestion of pancreatic blood vessel (H & E X 400)

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التأثيرات الكيميائية و البيولوجية و الهستوباثولوجية لأوراق الريحان و ثمار الدوم على الفئران المصابة بمرض البول السكري

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المستخلص العربي

مرض السكري هو اضطراب تمثيلي يتميز بارتفاع سكر الدم المزمن إما بواسطة المناعة (السكري من النوع الأول)، أو مقاومة الأنسولين (السكري من النوع الثاني)، أو الحمل أو غيره (بعض الأدوية، البيئة، العيوب الوراثية والالتهابات). وهو يمثل مشكلة خطيرة بسبب المضاعفات الصحية الخطيرة المرتبطة به. وقد تم اقتراح العديد من الاستراتيجيات للحد من مضاعفات مرض السكري. تهدف هذه الدراسة إلى التعرف على التأثيرات الكيميائية والبيولوجية والنسيجية المرضية لأوراق الريحان وثمار الدوم وعلاقتها بمرض السكري في الجرذان. تم تقسيم 63 فأرًا ألبينو بوزن 160 ± 10 جرام إلى 9 مجموعات. تم تحديد المجموعة الأولى،المكونة من 7 فئران كمجموعة ضابطة سالبة تتغذى على النظام الغذائي الأساسي، بينما تم حقن المجموعات الأخرى بمادة الألوكسان لإحداث مرض السكري. المجموعة الثانية غذيت على العليقة الأساسية واحتفظت بها كمجموعة ضابطة موجبة، أما المجموعات السبع الأخرى فقد غذيت على العليقة الأساسية التي تحتوي على 5، 10% أوراق الريحان ومسحوق الدوم وخليط منهما. وتم علاج المجموعة الأخيرة بالميتفورمين. أدت معاملة الفئران بالألوكسان إلى زيادة معنوية في تركيز الجلوكوز في مصل الدم مقارنة بالضابطة السالبة. وجد أنه عند تغذية الفئران بنسب مختلفة من أوراق الريحان ومسحوق الدوم والخلط بينهما أدى ذلك إلى انخفاض تلك القيم. كذلك تم تسجيل انخفاض لنسبة الدهون (الدهون الثلاثية، الكولسترول الكلي، LDL، VLDLو AI) في الفئران المصابة بالسكري. أفضل نسبة استخدمت هي خليط (5% ورق ريحان + 5% مسحوق الدوم). وتعزى كل هذه التأثيرات بشكل رئيسي إلى التأثير القوي لارتفاع السكر في الدم لأوراق الريحان ومسحوق الدوم نتيجة لارتفاع مركباتها النشطة ومضادات الأكسدة فيها. ويمكن اعتبار أن أوراق الريحان ومسحوق الدوم فعالة في علاج مضاعفات مرض السكري للفئران.

الكلمات المفتاحية: أوراق الريحان، مسحوق الدوم، سكر الدم، دهون الدم,السكري, الكوليستسرول.