

Retraction

Retracted: The Role of Gum Arabic for a Protective Kidney Dysfunction Induced Gentamicin on Diabetes Rats

Advances in Materials Science and Engineering

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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- [1] G. Ali Alshehry, "The Role of Gum Arabic for a Protective Kidney Dysfunction Induced Gentamicin on Diabetes Rats," *Advances in Materials Science and Engineering*, vol. 2022, Article ID 8617445, 8 pages, 2022.

Research Article

The Role of Gum Arabic for a Protective Kidney Dysfunction Induced Gentamicin on Diabetes Rats

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The target of this study was to estimate Gum Arabic for total phenols and flavonoids. In addition to antioxidant activities, estimate gum Arabic for total phenols and flavonoids. In addition to antioxidant activities, the problem of studying the potential effect of experimental diabetes kidney failure induced by gentamicin and the effect of taking gum Arabic. The results were observed to increase the content of phenols and total flavonoids. The method of study was that diabetic rats groups were fed on a basal diet, and intake of drinking water separately at concentrations of 5, 10, 15, and 20 g gum Arabic dissolved in 100 ml of water/day indicated that the lipid profile gradually decreased in triglycerides from group (1) was 128.30 mg/dL to group (4) was 77.53, total cholesterol-lowering from 163.18 mg/dL to 111.19 mg/dL, LDL reducing from 101.61 mg/dL to 37.83 mg/dL, VLDL lessening from 25.73 mg/dL to 15.51 mg/dL, and glucose reduced from 192.52 mg/dL to 111.24 mg/dL. and glucose became less from 192.52 mg/dL to 111.24 mg/dL. The kidney functions indicated to creatinine, urea, uric acid, blood urea nitrogen, and bilirubin were decreased from 1.34, 0.95, 2.24, 45.61, and 0.66 mg/dl in group (1) to 0.78, 29.84, 2.12, 16.25, and 018 mg/dL in group (4), respectively, when taking Gum Arabic. Furthermore, in the treatment group with Gum Arabic at different doses, the results could be noticed that sodium and calcium were gradually increased, and there was gradual reduction in potassium, phosphor, and magnesium. The results found that the treatment with GA had lowered the effects of gentamicin and streptozotocin, as evidenced by improvement of the lipids profile, kidney function, some minerals in serum, and antioxidant enzyme in kidney tissue, which may be referred to as its content of antioxidant active ingredients. Therefore, it is recommended that Gum Arabic is a beneficial dietary tool in reducing the advancement of chronic kidney disease in diabetic rats.

1. Introduction

Diabetic kidney disease (DKD), previously known as diabetic nephropathy, is a popular complication of diabetes and about 20–40% of diabetic patients have this condition [1] due to damage to kidney function. This complication is caused to significant microvascular alternatives due to high glucose in the blood, elevated lipid profile, and oxidative stress [2].

Diabetes mellitus (DM) is a metabolic disease that causes increased glucose in the bloodstream, which could be due to more complications, including kidney failure [3]. This is a much-intended result treatment but is very expensive due to the cost of obtaining the donor's kidneys [4].

The basics of chronic kidney disease and exacerbated conditions, which include inflammation, oxidative stress, cell death, and lineaments, are consistently seen in humans and rats [5]. There are other main diseases like tumor necrosis agents and oxidative enzymes and oxidative stress leading to influences in rats' kidney failure [6, 7].

Gum acacia (GA) is a soluble dietary fiber, and the benefit of GA has been confirmed in humans with kidney failure, and more experimental studies have assured the beneficial effects of GA in kidney failure [8]. The benefit of GA has been confirmed in rats with diabetic kidney failure and in diabetes rats [9].

Gum Arabic (GA) is globally used in the diet and pharmaceutical industries. Therefore, it has become clear that GA has an antioxidant effect. [10]. Gum Arabic contains

excellent emulsifying characteristics and reduced viscosity; these characteristics are used globally mostly in food industries and soft drinks as a stabilizer [11].

Gum Arabic contains hydrophilic carbohydrates and hydrophobic protein, which adsorbs on the oil droplets while keeping the hydrophilic carbohydrate flocculation and aggregation particles through electrostatic for vacuum repulsion in food additives [12, 13].

The authors of [14, 15] studied antioxidant assays for the detection of total phenolic compounds (TPCs) and the selection of appropriate and inexpensive methods for determining antioxidant capacity in Gum Arabic (GA) samples. The results revealed that the Folin-Ciocalteu Index (FCI) and copper-reduced antioxidant capacity (CUPRAC) are closely related to ferric antioxidant capacity (FRAP). Therefore, these methods are successful in their ability to determine GA antioxidant activity. Thus, GA is mostly known as less acidic that can be obtained from proper methods to detect antioxidant capacity. The research contribution was conducted to study gum Arabic as a dietary intake on kidney failure in diabetic rats.

2. Materials and Methods

2.1. Materials. Gum Arabic (*Acacia Senegal* L.) and kits were purchased from Sigma-Aldrich Corp., St. Louis, MO, USA. 48 adult male Wistar rats weighing 180–200 g were obtained from a pharmacy college at King Saud University. Animals were fed on a basic diet for a week; it consisted of cornstarch 60%, casein 20%, corn oil 10%, salt mixture 4%, vitamin mixture 1%, and cellulose 5% according to [16].

Gum Arabic goes into solution water at 10% w/v and is given to rats as drinking water. The drinking daily intake for every rat in the separately different groups has doses of about 5, 10, 15, and 20 g/kg body weight rat/day.

2.2. Methods

2.2.1. Extraction of Antioxidant. The quantitative content of phenols and flavonoids as well as the antioxidant activity of Gum Arabic were estimated. Use solvents were methanol, ethanol, and acetone 70% according to [17].

2.2.2. Determination of Phenols and Flavonoids Content. The phenol content was measured according to [18] with Folin-Ciocalteu reagent and then measured at 760 nm and calculated as mg Gallic acid equivalents/100 g sample.

The total flavonoid content was determined according to [19] and then measured at 510 nm and calculated as mg quercetin equivalent/100 g dry weight.

2.2.3. DPPH Assay. The antioxidant activity was measured according to [20] and then measured at 515 nm and calculated as mg Trolox/100 g sample.

2.2.4. Cupric Ion Reducing Antioxidant Capacity (CUPRAC) Assay. The CUPRAC was determined according to [21]. It was recorded at 450 nm wavelength and mg Trolox/100 g of the sample.

2.2.5. FRAP Assay. Ferric Reducing-Antioxidant Power (FRAP) was assayed according to [22] and then measured at 593 nm and calculated as mg Trolox/100 g of the sample.

2.3. Nutritional Experiments. Forty-eight rats were divided into two groups: the first group (8 rats) was named the negative group, fed on the basic diet for six weeks. The residual forty rats were injected with gentamicin to induce kidney failure according to [23]. Then, the same rats were injected with streptozotocin into their leg muscles (5 mg/100 g rat) to stimulate diabetes according to [15, 24]. After that, the injected rats were re-divided into five groups, with the diabetic kidney rats positive group fed on the basic diet. The four treatment groups were fed on a basic diet and the daily intake of drinking water was measured for each group separately at concentrations of 5, 10, 15, and 20 g from Gum Arabic dissolved in 100 ml water per day.

The blood samples were collected at the end of the experiment and centrifuged to obtain sera and kept at -20°C for analysis. The levels of serum glucose, total cholesterol, and triglycerides were determined according to [25–27], respectively. High, low, and very-low-density lipoprotein cholesterol in serum was estimated by [28–30]. Kidney functions such as serum creatinine, urea, uric acid, and blood urea nitrogen (BUN) concentrations were estimated by [31–34], respectively. Moreover, total bilirubin was assessed according to [35].

Sodium (Na) and potassium (K), calcium (Ca), phosphorus (P), and manganese (Mn) were determined in serum calorimetrically according to [36].

The kidney sample was taken, and malondialdehyde (MDA), superoxide dismutase (SOD), and catalase (CAT) were determined by [37–39].

2.4. Statistical Analysis. The results were presented for analysis of variances, and Duncan's multiple range tests at the ($P \leq 0.05$) level were used to compare the means. The analysis was carried out using the ANOVA procedure of the Statistical Analysis System [40].

3. Results and Discussion

3.1. Total Phenolic, Flavonoid, and Antioxidant Activity Extracted from Gum Arabic. The quantitative determination of phenols and flavonoids content extracted from 70% different solvents (methanol, ethanol, and acetone) at Gum Arabic and the finding are tabulated in Table 1. The results showed that in 70% methanol, the highest extracted phenols and flavonoids content were 55.28 mg GAE/100g, and 40.35 mg QE/100g dry weight. Furthermore, total phenolic content in 70% from ethanol and acetone were 30.67 and 8.58 mg GAE/100 g, in addition,

TABLE 1: Effect of the various solvents on total phenolic, flavonoid, and antioxidant activity extracted from Gum Arabic.

Antioxidant content and activity	Solvent extraction of Gum Arabic		
	Methanol	Ethanol	Acetone
Total phenolic acids mg GAE/100 g of dry weight	55.28 ± 1.25	30.67 ± 0.81	8.58 ± 0.04
Total flavonoid mg QE/100 g dry weight	40.35 ± 1.12	27.38 ± 0.46	5.89 ± 0.03
DPPH mg Trolox/100 g of dry weight	30.68 ± 0.98	25.91 ± 0.38	11.58 ± 0.07
CUPRAC mg Trolox/100 g of dry weight	35.18 ± 0.84	22.39 ± 0.17	9.87 ± 0.06
FRAP mg Trolox/100 g of dry weight	32.28 ± 0.76	28.23 ± 0.52	10.38 ± 0.05

Values expressed are means ± SD of three replicate.

and total flavonoids were 27.38 and 5.89 mg QE/100 g dry weight, respectively. The result was agreed with those findings reported in literature methods which recorded that methanol was also chosen for apricots to determine total antioxidant capacity [41, 42]. Phenols are important to antioxidant activity due to chelating redox-active metal ions, disrupting lipid-free radical chains, and inhibiting transformations of hydroperoxide into reactive oxygen [43].

The table shows that the antioxidant activities as DPPH, OUPRAC, and FRAP were the highest in 70% methanol with 30.68, 35.18, and 32.28 mg Trolox/100 g of dry weight, respectively, extracted from Gum Arabic. In addition, the activities extracted from Gum Arabic from ethanol and acetone were 25.91, 22.39, and 28.23 mg Trolox/100 g in ethanol followed by 70% acetone which were 11.58, 9.87, and 10.38 mg Trolox/100 g of dry weight, respectively. Furthermore, the authors of [44] found a relationship between phenolic content and FRAP. Moreover, the authors of [45] indicated that the phenolic content was linked with ABTS activity. Therefore, it could be noticed that the significant content of phenolic acids as a reducing agent may be due to an electron donation. The authors of [6] found the DPPH capacity for scavenged free radicals independently. Therefore, plant extracts had phenolic content that readily donated a hydrogen atom to DPPH to give DPPH-H, considered as required to be done mechanism of antioxidants.

3.2. Serum Lipid Profile Assay in Different in Rats Diabetic Kidney Failure. Results from Table 2 and Figure 1 show that the lipid profile of control group diabetic kidney failure rats was the highest in triglycerides. Total cholesterol, LDL, VLDL, and glucose were 146.38, 180.38, 122.73, 29.28, and 220.39 mg/dL, respectively. Meanwhile, HDL cholesterol was the lowest in the control group rats with diabetic kidney failure was 25.19 mg/dL, and the highest in the control healthy rats group (50.59 mg/dL), compared with the different treatment groups at various doses with Gum Arabic.

The results from different diabetic kidney rats groups fed on a basal diet and that had daily intake of drinking water separately at concentrations of 5, 10, 15, and 20 g Gum Arabic dissolved in 100 ml water/day indicated that the lipids profile were gradually decreased. Therefore, it could be noticed that the triglycerides decreased from group (1) at 128.30 mg/dL to group (4) at 77.53, total cholesterol-

lowering from 163.18 mg/dL to 111.19 mg/dL, LDL reducing from 101.61 mg/dL to 37.83 mg/dL, VLDL lessening from 25.73 mg/dL to 15.51 mg/dL, and glucose was become less from 192.52 mg/dL to 111.24 mg/dL, respectively. Gum Arabic had contained dietary fiber and is utilized to treat chronic kidney disease patients [46] and relieve chronic renal failure in rats [47].

The first pathway indicates that Gum Arabic elevated the excretion of the bile salts in the feces, which may be due to the liver consuming the cholesterol and lowering body fat along with blood cholesterol. Moreover, GA in a diet for rats is responsible for cholesterol formation and overexpresses genes involved in lipid oxidation in rats. Furthermore, the authors of [50–52] reported that overexpression of the fasting-induced lipid factor gene in Gum Arabic-fed mice stimulates lipolysis and reduces fat accumulation in their bodies.

3.3. Serum Kidney Assay in Rats' Diabetic Kidney Failure.

Serum creatinine, urea, uric acid, blood urea nitrogen, and bilirubin were determined in different rats' group diabetic kidney failure, and the results are shown in Table 3 and Figure 2. Diabetic kidney failure rats' positive group was the highest in the kidney functions by 1.35, 110.67, 2.28, 55.43, and 0.82 mg/dL, respectively. This complication is due to significant microvascular changes due to hyperglycemia, hyperlipidemia, and oxidative stress [1]. The diabetic rats in different groups treated with various doses from Gum Arabic were improved to nearly equal control rats' healthy group. The results indicated that the creatinine, urea, uric acid, blood urea nitrogen, and bilirubin were decreased from 1.34, 0.95, 2.24, 45.61, and 0.66 mg/dl in group (1) to 0.78, 29.84, 2.12, 16.25, and 0.18 mg/dL in group (4), respectively. Furthermore, the preventative influence of Gum Arabic on kidney function was also certain to considerably lowering kidney functions concentrations in diabetic kidney failure patients [53]. Gum Arabic has been reported to have a direct antioxidant influence. The kidneys are protected from the kidney failure influence of gentamicin, which is a recognized reason for kidney damage through elevated oxidative stress mechanisms [54].

The authors of [55] noted that Gum Arabic treatment is effective with lowering uric acid, bilirubin, and anti-inflammatory influences, causing that Gum Arabic is a possible treatment supplement, useful in kidney failure and cardiovascular diseases, and it has no side effect when consumed for a long time.

TABLE 2: Serum lipid profile assay in different study groups.

Groups treatment	Triglycerides mg/dL	T. cholesterol mg/dL	LDL mg/dL	HDL mg/dL	VLDL mg/dL	Glucose mg/dL
Control negative	75.25 ^c ± 5.57	110.69 ^c ± 12.49	36.82 ^c ± 1.98	50.59 ^a ± 2.76	15.05 ^c ± 0.17	110.26 ^c ± 12.17
Control positive	146.38 ^a ± 13.26	180.38 ^a ± 14.16	122.73 ^a ± 12.76	25.19 ^e ± 1.16	29.28 ^a ± 0.21	220.39 ^a ± 14.16
Group (1)	128.3 ^b ± 12.14	163.18 ^b ± 13.58	101.61 ^b ± 10.37	31.17 ^d ± 1.24	25.73 ^b ± 0.18	192.82 ^b ± 13.28
Group (2)	111.88 ^c ± 9.59	146.16 ^c ± 14.31	80.46 ^c ± 7.05	37.22 ^c ± 1.36	22.38 ^c ± 0.19	156.76 ^c ± 14.15
Group (3)	95.06 ^d ± 8.91	128.78 ^d ± 12.79	59.78 ^d ± 4.86	43.69 ^b ± 2.38	19.12 ^d ± 0.23	138.53 ^d ± 12.46
Group (4)	77.53 ^e ± 5.12	111.19 ^e ± 13.45	37.83 ^e ± 2.53	49.76 ^a ± 1.42	15.51 ^e ± 0.15	111.24 ^e ± 11.49

Values are mean and SD ($n=8$); where: Mean values in the same with the letter are significantly different at 0.05 levels.

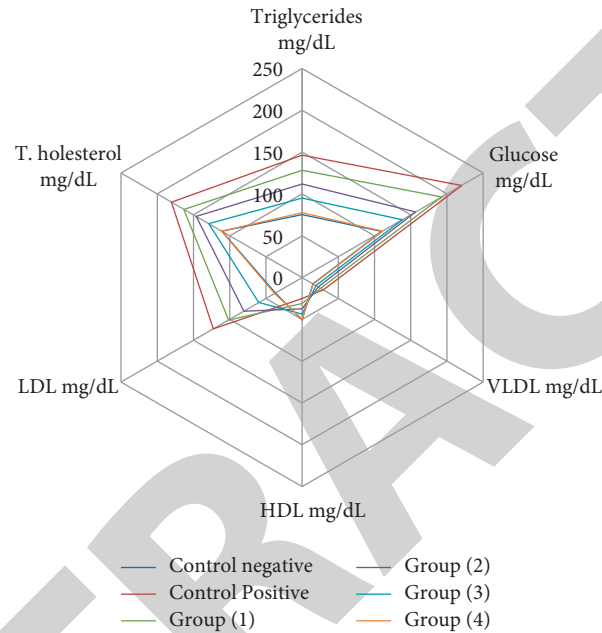


FIGURE 1: Serum lipid profile assay in different study groups.

TABLE 3: Serum kidney assay in different study groups.

Groups treatment	Creatinine mg/dL	Urea mg/dL	Uric acid mg/dL	BUN mg/dL	Bilirubin mg/dL
Control negative	0.72 ^c ± 0.01	30.54 ^e ± 0.24	2.11 ^e ± 0.01	15.76 ^e ± 0.28	0.15 ^e ± 0.01
Control positive	1.53 ^a ± 0.03	110.67 ^a ± 3.07	2.28 ^a ± 0.03	55.43 ^a ± 0.79	0.82 ^a ± 0.04
Group (1)	1.34 ^b ± 0.04	95.64 ^b ± 2.13	2.24 ^b ± 0.04	45.61 ^b ± 0.82	0.66 ^b ± 0.05
Group (2)	1.15 ^c ± 0.02	70.49 ^c ± 1.27	2.20 ^c ± 0.06	35.74 ^c ± 0.46	0.51 ^c ± 0.03
Group (3)	0.98 ^d ± 0.01	51.24 ^d ± 0.25	2.16 ^d ± 0.05	26.18 ^d ± 0.37	0.35 ^d ± 0.02
Group (4)	0.78 ^e ± 0.01	29.84 ^e ± 0.29	2.12 ^e ± 0.01	16.25 ^e ± 0.24	0.18 ^e ± 0.01

BUN: blood urea nitrogen. Values are mean and SD ($n=8$), where mean values in the same with the letter are significantly different at 0.05 levels.

3.4. Some Minerals on Serum in Rats Diabetic Kidney Failure.

Results in Table 4 and Figure 3 observed that diabetic kidney rats had the lowest sodium and calcium levels (105.36mmol/L and 5.76 mg/dL) and the highest potassium, phosphor, and magnesium levels (18.51mmol/L, 8.34mg/dL, and 3.15mg/dL). The authors of [56] showed a significant increase in calcium and sodium ratio as well as a lowering phosphorous and potassium ratio in patients taking the GA for six months. Excess serum phosphorous is a risk agent of death for patients' chronic renal failure (CRF). The authors of [55, 57] found that chronic kidney disease can lead to elevations in circulating magnesium

that can cause heart diseases and can decrease the secretion of parathyroid hormone that causes hypocalcaemia and sodium, which causes arrhythmias out of its influence on the potential heart cell membrane [58]. Hyponatremia can be referred mainly to elevate sodium loss due to inhibition of kidney reabsorption of sodium. Magnesium increases in serum due to lowering urine excretion of magnesium out of the kidneys that are not working satisfactorily [59].

Furthermore, in the treatment rats group with Gum Arabic at different doses, the results could be noticed that sodium and calcium were gradually increased from

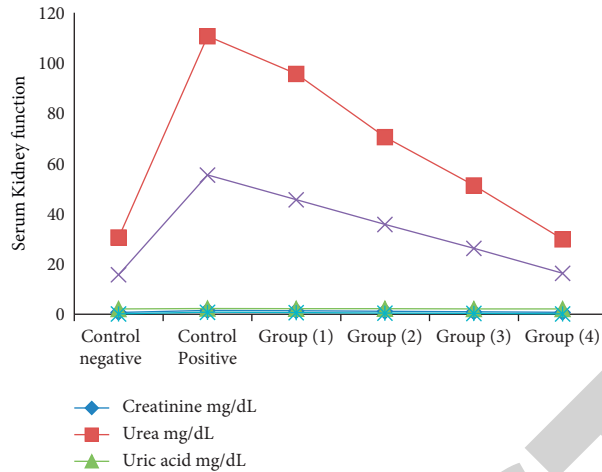


FIGURE 2: Serum kidney assay in different study groups.

TABLE 4: Effect of Gum Arabic and some minerals on serum in rats diabetic kidney failure.

Groups treatment	Sodium m mol/L	Potassium m mol/L	Phosphorus mg/dL	Calcium mg/dL	Magnesium mg/dL
Control negative	130.17 ^a ± 4.29	18.51 ^a ± 0.49	4.51 ^e ± 0.15	10.29 ^a ± 0.38	1.79 ^e ± 0.01
Control positive	105.36 ^c ± 2.64	9.82 ^c ± 0.08	8.34 ^a ± 0.24	5.76 ^c ± 0.04	3.15 ^a ± 0.04
Group (1)	111.56 ^d ± 3.17	11.98 ^d ± 0.15	7.42 ^b ± 0.17	6.89 ^d ± 0.03	2.83 ^b ± 0.07
Group (2)	117.43 ^c ± 2.69	14.12 ^c ± 0.18	6.51 ^c ± 0.16	7.94 ^c ± 0.07	2.53 ^c ± 0.09
Group (3)	123.15 ^b ± 3.17	16.71 ^b ± 0.36	5.56 ^d ± 0.09	9.06 ^b ± 0.12	2.19 ^d ± 0.08
Group (4)	129.86 ^a ± 1.68	18.49 ^a ± 0.48	4.62 ^e ± 0.07	10.16 ^a ± 0.15	1.82 ^e ± 0.02

Values are mean and SD ($n = 8$), where mean values in the same with the letter are significantly different at 0.05 levels.

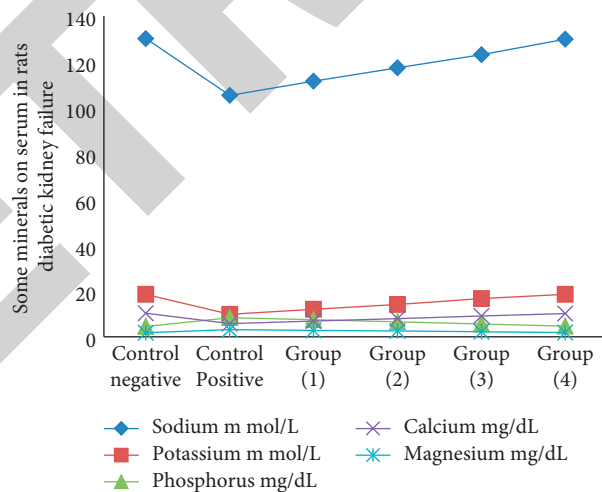


FIGURE 3: Effect of Gum Arabic and some minerals on serum in rats' diabetic kidney failure.

111.56 mmol/L and 6.89 mg/dL to 129.86 mmol/L and 10.16 mg/dl, respectively. The high calcium content in GA led to a considerably elevated calcium level [46]. A reduction in plasma phosphate ratio leads to an elevation in the ratio of ionized calcium in the plasma and therefore nullifies hyperparathyroidism, the major pathophysiological factor in advanced kidney disease [60]. Intake GA which contained calcium has been reducing blood pressure, activating calcium-receptors, in addition, subsequent inhibition of

sodium, potassium, and chloride transport to the outer layer [61].

3.5. Malondialdehyde, superoxide dismutase, and catalase in kidney tissues rats. Over the years, it has begun to be clear that elevated oxidative stress may lead the development of a great number of diseases and disease-attached complications [62].

TABLE 5: Oxidative enzymes in the kidney tissues of rats in different groups.

Groups treatment	MDA nmol/g tissue	SOD U/g tissue	CAT (K unit/g)
Control negative	220.15 ^e ± 7.28	1543.48 ^a ± 50.68	3.12 ^a ± 0.03
Control positive	340.59 ^a ± 10.35	851.35 ^e ± 20.18	1.43 ^e ± 0.01
Group (1)	310.70 ^b ± 11.19	1024.37 ^d ± 30.48	1.85 ^d ± 0.02
Group (2)	280.58 ^c ± 7.95	1197.26 ^c ± 25.79	2.26 ^c ± 0.03
Group (3)	250.71 ^d ± 8.36	1370.39 ^b ± 30.79	2.68 ^b ± 0.05
Group (4)	221.12 ^e ± 6.73	1540.23 ^a ± 55.17	3.09 ^a ± 0.07

Values are mean and SD ($n=8$), where mean values in the same with the letter are significantly different at 0.05 levels.

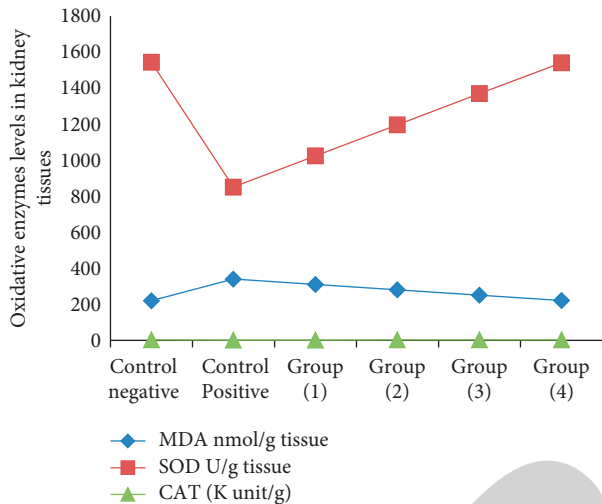


FIGURE 4: Oxidative enzymes in kidney tissues of rats in different groups.

The increased MDA level combined with decreased glutathione (GSH) in diabetic mice refers that peroxidation may be included in the progress of diabetes complications [63] due to free radical damage [64]. Meanwhile, when taking the different fats group various doses, the MDA was decreased from 310.70 to 221.12 nmol/g tissue; this may be the MDA decrease when the rats' group increases doses from gum Arabic. Administration of Gum Arabic considerably reduced MDA levels, which indicates that the Gum Arabic therapy may be caused by the high activity of antioxidants. Elevated oxidative stress has been reported in diabetic rats as an aid development of complications in diabetes [65].

Moreover, Gum Arabic contained high amounts from total phenolic and flavonoids. In addition, it had the highest antioxidant activity and dietary fiber, which reducing the oxidative enzymes as superoxide dismutase (SOD), and catalase (CAT) in rats' diabetic kidney failure when taken Gum Arabic. The results reported that when rats' different groups diabetic kidney failure took high doses of Gum Arabic, the SOD and CAT were improved and increased to 1540.23 U/g and 3.09k unit/g, respectively. The authors of [9] found that the activity of oxidative enzymes was considerably elevated in the Gum Arabic group than in diabetic groups and the control groups. Furthermore, to prohibit damage from oxygen-free radicals, tissues have developed an antioxidant defense system that includes nonenzymatic antioxidants and enzymatic activities such as the dissociation of the superoxide anion

(O⁻²) into H₂O₂, GSH-Px, and CAT and both detoxification of H₂O₂ and the conversion of lipid hydroperoxides into nontoxic alcohols [66].

Oxidative stress can produce significant interrelated imbalances in cellular metabolism and the destruction of cells by lipid peroxidation. Lipid peroxidation has attracted a lot of attention due to its connection with a number of abnormal physiological processes [67].

4. Conclusion

Gum Arabic contains rich amounts of phenols and flavonoids; in addition, it was found that Gum Arabic had the highest antioxidant activity. The rats' diabetic kidney failure was fed on a basal diet, and the daily intake of drinking water for each group separately at concentrations of 5, 10, 15, and 20 g Gum Arabic dissolved in 100 ml water per day. The results observed that the rats' diabetic kidney failure, when taken high doses from Gum Arabic, as well as the lipid profile, kidney functions, some minerals in serum, and antioxidant enzymes in the kidney, were improved. This may be because the Gum Arabic is safe, edible, and protective against diabetic and kidney damage.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The author declares that there are no conflicts of interest.

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