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Preparation Cupcake Samples Fortified with some Herbs for Kidney Patients

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ABSTRACT

We have seen significant developments over the past ten years in our knowledge of how food contributes to human health promotion. The basic function of food as a source of energy and body-forming chemicals has given way to the more subtle effects of biologically active dietary components on human health as the first frontier of scientific research. Consumer interest in the active function of food in health and life extension, as well as in the prevention of the onset, promotion, and development of cancer, cardiovascular diseases, and osteoporosis, has exploded throughout the industrialized world. Consequently, the phrase "functional food" was coined. Since ancient times, spices and herbs have been utilized as dietary supplements to enhance food flavor as well as in traditional medicine in various nations, where they have a variety of medicinal and preventative benefits, including acting as diuretics. Additionally, medicinal plants are well known for their phytochemical and antioxidant qualities. The present study was initiated to investigate the possibility of producing functional cupcake based mainly on wheat flour of 72% extraction enriched with some plant supplements such as (Barley, Fennel, Parsley, Nigella Sativa, Arabic gum and Halfa bar) at different levels (6%, 2% ,6 %,4% ,1.5%, and 2.5%), respectively (These ratios are based on the published data by Amira (2023)) which would serve as dietetic food for kidney patients. then a biological experiment was done. The results indicated that the selected herbs have an effective role in reducing or preventing kidney diseases.

***Keywords*:** Kidney patients, Kidney enzymes, Kidney histology, Creatinine - Herbs and Plant Supplement.

INTRODUCTION

The prevalence of chronic renal disease is far higher than previously thought. In western nations, it affects 10 to 15% of the adult population, with many requiring expensive therapies or renal replacement therapy. 26 million Americans fall into this group, according to the Third National Health and Nutrition Examination Survey and the National Kidney Foundation Kidney Disease study. The prevention and early identification of CKD has become a top concern in both industrialized and developing nations due to the rising frequency of disorders including hypertension, diabetes, obesity, and others that predispose people to the condition (Matovinovic, 2009).

Nugent *et al.* (2011) said that the burden that chronic kidney disease places on people, families, and society. It is linked to negative health outcomes, an increase in cardiovascular problems, early mortality, and renal failure progression. In the United States, 14.8% of individuals have chronic kidney disease, with stage 3 having the greatest frequency.

Since ancient times, many cultures have utilized spices and herbs as food additives to enhance food flavor as well as in traditional medicine (Marijana et al., 2016). Today, the antioxidant benefits of therapeutic plants are well known. Parsley is one of the herbal diuretics with the longest history in traditional medicine and contemporary phototherapy in Europe, Asia, and America.

Herbs that improve the taste of foods as flavor enhancement spices can be used safely by the chronic kidney disease patient population (Kirk and Dunker, 2014).

Medicinal plants that can relieve kidney discomfort include yarrow, horsetail, barberry, veneris, Physalis alkekengi, Ilami onobrychis, Tribulus terrestris, parsley, camel thorn, jujube, chamomile, licorice, and Silybum marianum. Through several processes, including the activation and inhibition of pain receptors, they lessen kidney discomfort. Additionally, these plants include antioxidant compounds including phenol, flavonoids, and anthocyanins that block pain receptors and lessen discomfort (Kiani *et al*., 2013 and Bahmani *et al*., 2014).

Fennel (*Foeniculum vulgare*) known for its high concentration in 1, 8-cineole, linalool, fenchone, and estragol, it was also valuable for the pharmaceutical business (Özcan and Chalchat., 2010). Fennel's various chemical constituents, including its volatile components, flavonoids, phenolic compounds, amino acids, and fatty acids, give it a healthy relevance. It has therefore been utilized for many different sorts of illnesses (Badgujar *et al*., 2014).

Parsley (Petroselinum crispum), a member of Apiaceae family, is a widely grown herb, spice, and vegetable throughout Western Asia and the Mediterranean (Al-Ghamdi et al., 2007). due to the presence of bioactive components such as ascorbic acid, tocopherol, coumarins, flavonoids, and carotenoids (Rezazad and Farokhi 2014). Potential complementary/alternative uses for parsley and its extracts as a therapy for different kidney illnesses (Kreydiyyeh, Usta 2002 and Vamenta-Morris et al., 2014).

In all non-tropical nations, barley (*Hordeum vulgare* L.), a commonly eaten cereal, is grown as the fourth most significant cereal crop after rice, maize, and wheat. Due to its

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chemical makeup and ease of digestion, barley is regarded as the most beneficial grain. According to Kazuhiko Kubota's study findings, barley leaf extracts have a variety of pharmacological properties, including anti-inflammation and anti-ulcer properties (Sharma *et al*., 2009).

According to Hayatdavoudi et al. (2016), *Nigella sativa* has been utilized in Iranian traditional medicine to treat kidney stones. In ethylene glycol-induced lithiatic mice, calcium oxalate deposits were reduced and the calcium oxalate content in the urine was lowered by seed ethanolic extract (Khoei et al., 2009). Thymoquinone, the main compound in the seeds, prevented and treated renal calculi in rats that were brought on by ethylene glycol. In the renal tubules of rats, this phytochemical molecule reduced the size and quantity of calcium oxalate deposits (Hajzadeh *et al*., 2008).

Its primary component, thymoquinone (30–48%), has been shown in both clinical and experimental trials to have a variety of therapeutic benefits, including antioxidant, anti-inflammatory, and anti-tumor properties (Burits and Bucar, 2000).

According to Ali *et al*. (2009), Arabic gum is an exudate that is high in non-viscous soluble fiber and is derived from the stems and branches of *Acacia senegal* and *Acacia seyal* trees. It is edible and dried, sticky, and is frequently used as an emulsifier and stabilizer in the pharmaceutical, cosmetic, and food industries. It has been demonstrated that including Arabic gum in the diet increases fecal urea nitrogen excretion and concurrently lowers serum urea nitrogen concentration (Ali *et al*., 2008).

One significant medicinal plant, *Cymbopogon schoenanthus*, is often known as camel grass. It is a desert species that thrives in rocky, arid areas and is also known locally as Sakhbar, Izkhir, or Athkhar. According to Al-Ghamdi *et al*. (2007), it is mostly used in Saudi traditional medicine as a diuretic to prevent kidney stone development and as an anti-infective medication for urinary tract infections.

In many nations, cakes have become customary fare. Their extended shelf lives, diverse flavor offerings, and ease of use have all contributed to their enduring appeal. Cake is one of the most significant bakery items for Egyptians, whether it is made at home or on a large scale.

The purpose of this study was to produce functional cupcakes using wheat flour plus various amounts of herbs. Additionally, the fortified cup cake's physical, chemical, biological and sensory qualities were evaluated as a trial for CKD.

MATERIALS AND METHODS

1. Materials and chemicals: -

Wheat flour (72% extraction), Barley (*Hordeum vulgare* L.), Fennel seeds (*Foeniculum vulgare* Mill.), Parsley (*Petroselinum crispum*), Black seed (*Nigella sativa* L.), Camel grass (*Cymbopogon proximus*) and Arabic gum (were purchased from local market (HARAZ), Cairo, Egypt. Sugar, corn oil, butter, fresh eggs, dry milk powder, baking soda, salts, and vanilla were purchased from local market, Cairo, Egypt. All the analytical-grade chemicals and solvents were utilized in this study's analysis were obtained from Al Badr Company in Cairo, Egypt.

2. Preparing of selected plants:

Fennel, Parsley, and Barley were initially cleaned and released of wrecked elements, grime and other unknown stuff, dried it and then milled by perten laboratory mill 3100 to whole meal. Then, sieved through a 50-mesh screen.

Camel grass plants were dried, Then, sieved through a 50-mesh screen.

Black seed was used as a seed and Arabic gum was used as a powder.

3. Preparing of cupcake samples in the laboratory:

The cupcakes were formulated according to Doweidar (2001). The cupcake samples were formulated from wheat flour with replaced by some herbs at several ratio according to previous research and sensory evaluation based on the published data by Amira (2023) (6% barley powder, 6% parsley powder, 2% fennel powder, 4% black seeds powder, 1.5 % Arabic gum powder and 2.5 % camel grass powder) In addition to control sample, whole fresh eggs (25 gm), sugar (60 gm), butter (21.5 gm) and vanilla (1 gm) were mixed. Flour was added with dry milk powder (10 gm), baking powder (4.5 gm) and salt (1 gm) to mixture and added gradually on the sugar, eggs, vanilla mix and combine for 3 min via an electric mixer then put thirty grams of cupcakes formula in cupcake packages. Cupcakes were baked at 180 ˚C in a preheated oven for 30 min. After baking, cupcakes were eradicated from packages and chilled at RT then packed in polyethylene bags until analysis.

4. Determining the Chemical Composition:

Moisture, crude protein, crude fat, ash, and crude fiber contents for raw materials and samples were assessed using the AOAC's recommended techniques (2012).

Available carbohydrates were calculated by difference as performed as follows:

% Available carbohydrates =100 – (%protein + %fat+%ash+%crude fiber).

All measurements were done in triplicates and the means were noted.

Analyses of the minerals Ca, Mg, and Fe were conducted using an atomic absorption spectrophotometer (Agilent Technologies 4210 MP-AES), while analyses of the minerals K and Na were conducted using a flame photometer based on AOAC (2012).

5. Biological experiment:

This study was designed to determine the shielding impact of some herbs on gentamicin-caused nephrotoxicity in rats were fed on samples of cake enriched with different herbs.

A biological experiment was conducted on male albino experimental rats (40 rats), weighing 170-250 grams, suffering from renal failure, divided into eight groups (each group contains five mice). The groups were divided as follow , to study and know the effect of herbs used in the treatment of kidney patients**.**

Group 1: Fed on basal diet only throughout the experimental era (Negative control group).

Group 2: Fed on basal diet + injection with gentamicin for 28 d (Positive control group).

Group 3: Fed on cake with 6% parsley powder for 28 d.

Group 4: Fed on cake with 2% fennel powder for 28 d.

Group 5: Fed on cake with 6% barley powder for 28 d.

Group 6: Fed on cake diet with 1.5% Arabic gum powder for 28 d.

Group 7: Fed on cake diet with 4% black seed for 28 d.

Group 8: Fed on cake diet with 2.5% camel grass powder for 28 d.

All experimental and controlled animals were immediately retained in separate metabolic cages after the last treatment to collect serum for the assessment of renal function. The animals were killed by decapitation, and blood samples were obtained by heart puncture, centrifuged, and used to extract the serum for the analysis of renal function. The instant removal of kidney tissues followed by a quick rinsing in ice-cold physiological saline and homogenization in 0.1 M Tris-HCl buffer (pH 7.4) produced a tissue homogenate that was employed in biochemical experiments. The kidney was divided into sections for histopathological examination.

Determination of creatine and urea in kidney of control and studied rats:

Serum in a simple vial was separated at 4 ◦C In a cooled centrifuge for 15 minutes at 1985 x g. Using a Beckman Spectrophotometer, serum creatinine was measured using the alkaline picrate technique. Blood urea by using the Hallet and Cook technique, was measured.

Determination of Na and K in kidney of normal and infection rats:

The colorimetric method was used at wavelength 620-650 nm.

where the sample was placed in cuvette 1 cm light route at the temperature 25-30 ˚C. Then the absorbance degree was taken (A), Fujita *et al.* (1980).

Determination of liver enzymes of normal and infection rats:

The kinetic approach was used to measure the activity of glutamate pyruvate transaminase (GPT) and glutamate oxaloacetate transaminase (GOT) (Burtis and Ashwood, 2006).

Histology analysis:

Rat kidney tissues were embedded in paraffin wax after being preserved in buffered 10% formalin solution for 24 hours. After that, tissues were cut into 5-m sections and stained with hematoxylin and eosin (H & E). By rating the degree of severity using the previously established criteria, a semi-quantitative evaluation of the renal tissues was achieved (Teixeira et al., 1982). Using a Carl Zeiss Axioscope, the whole slide for each kidney segment was evaluated for parietal cell hyperplasia, tubular vacuolization, and tubular necrosis.

6. Statistical analysis of data:

All data collected from results of the chemical composition and biological of cupcake samples, were subjected to statistical via analysis of one-way analysis of variance (ANOVA) followed by multiple comparisons using Duncan's Test, (Yaman, İ., and Balikci, E. (2010). results were expressed as mean ± standard deviation (SD). and values $p < 0.05$ were regarded as statistically significant using SPSS 12.0 for Windows..

RESULTS AND DISCUSSION

1. Proximate chemical constituents of wheat flour and herbs:

Chemical constituents are of immense importance in judging the quality of food products. the chemical constituents of raw materials (on dry weight). (Wheat flour (WF) of 72% ext, Parsley powder (PP), Fennel seeds powder (FSP), Barley flour (BF), Arabic gum powder (AGP), Black seed powder (BSP) and Camel grass powder (CGP)) were analyzed for moisture, crude proteins, total lipids, crude fibers, ash, and available carbohydrates.

The results in Table (1) displayed that wheat flour (WF) of 72% extraction contained moisture, crude protein, ether extract, crude fibers, ash, and total carbohydrates, on dry weight, were 11.55, 11.68, 0.59, 1.27, 0.82 and 74.09%, respectively.

Available carbohydrates and crude protein were the highest values (74.09% and 11.68%, respectively.) .Crude fibers and ash were the lowest values (1.27 and 0.82 %, respectively). These outcomes agree with those acquired by El-Qatey *et al.*, (2018),who showed that available carbohydrates and crude protein were the highest values (72.00 and 10.26 %, respectively.), Dziki *et al*., (2022) showed that the available carbohydrates and crude protein were the highest values (73.6 and 10.1 %, respectively). and Aly *et al*., (2021) showed that the available carbohydrates and crude protein were the highest values (76.1 and 10.5 %, respectively). Crude fibers and ash were the lowest values (0.09 and 0.60%, respectively).

Also, the results showed that Parsley powder (PP) (on dry weight basis) contained moisture, crude protein, ether extract, crude fibers, ash, and total carbohydrates (11.91, 10.80, 2.89, 9.00, 16.2 and 49.20%), respectively. Crude fiber and available carbohydrates showed the highest values (16.2 and 49.20%, respectively), while ether extract and ash had the lowest values (2.89 and 9 %, respectively).

These findings are in treaty with those acquired by Dziki *et al*., (2022) who showed that available carbohydrates and crude fiber were the highest values (50.9 and 14.8 %, respectively), while fat and ash were the lowest values (3.4 and 8.8%, respectively).

The results showed that Fennel seeds powder (FSP) contained moisture, crude protein, ether extract, crude fibers, ash, and total carbohydrates, on dry basis, representing 6.3, 9.5, 0.16, 13.4, 18.6 and 52.04%, respectively.

The results in Table (1) noted that barley flour (BF) contained moisture, crude protein, ether extract, crude fibers, ash, and total carbohydrates, on dry basis, representing 11.2, 13.61, 1.16, 1.8, 1.74 and 68.9%, respectively. Total carbohydrates and crude protein showed the highest values (68.9, and 13.61%, respectively), while ether extract and ash had the lowest values (1.16, and 1.8%, respectively).

These outcomes agree with those acquired by Aly *et al*. (2021) who showed that available carbohydrates and crude protein were the highest values (69.3 and 11.3 %, respectively), while fat and ash were the lowest values (2.69 and 2.81%, respectively).

The results showed that Arabic gum powder (ARB) (on dry weight basis) contained moisture, protein, ether extract, crude fibers, ash, and total carbohydrates, in dry basis, of 11.00, 2.00, 1.1, 1.60, 1.40 and 82.90%, respectively.

These outcomes agree with those acquired by Ali et al. (2009) who showed that GA contains 1.5%–2.6% protein, Dauqan and Abdullah. (2013) who showed that GA contains 13-15 % moisture and 2-4% ash, also agree with Mariod(2018) who showed that GA contains 13–15% moisture and 1.5 to 3.0% protein.

The results showed that Black seed powder (BSP) contained moisture, crude protein, ether extract, crude fibers, ash, and obtainable carbohydrates, on dry basis, were 6.42, 20.8, 34.6, 5.10, 8.32 and 24.76%, respectively. Total carbohydrates and ether extract showed the highest values (24.76 and 34.6%, respectively), while ash, moisture and crude

fibers had the lowest values (5.10, 6.42 and 8.32%, respectively).

The results showed that Camel grass powder (CGP) contained moisture, crude protein, ether extract, crude fibers, ash, and obtainable carbohydrates, on dry basis, were 13.45, 10.20, 20.08, 7.23, 9.80 and 38.54%, respectively. Total carbohydrates and ether extract showed the highest values (38.54 and 20.8%, respectively).

Table 1. Proximate chemical components of raw substances (on dry weight):

Raw materials	Chemical constituents (%)					
	Moisture	Crude protein	Ether extract	Ash	Crude fiber	Available carbohydrates
Wheat flour (72% ext.)	11.55	11.68	0.59	1.27	0.82	74.09
Parsley powder	11.91	10.80	2.89	9.00	16.22	49.20
Fennel seeds powder	6.30	9.50	0.16	13.4	18.6	52.04
Barley flour	11.20	13.61	1.16	1.80	1.74	68.90
Arabic gum powder	11.00	2.00	1.1	1.60	1.40	82.90
Black seed	6.42	20.8	34.6	5.10	8.32	24.76
Camel grass powder	13.45	10.2	20.08	7.23	9.80	38.54

2. Proximate mineral content (mg/100g) of raw materials (on dry weight):

The human body requires minerals for a variety of metabolic and physiological functions, including immune function, blood acid-base balance, muscle contraction, enzyme activation, normal heart rhythm, bone health, nerve impulse conduction, oxygen transport, and oxidative phosphorylation. An adult requires around 350 mg of magnesium, 1000 mg of calcium, and 3000 mg of potassium each day (Eroglu Samur, 2012).

The content of minerals potassium (K), magnesium (Mg), calcium (Ca) and iron (Fe) were determined in raw materials by atomic absorption. Table (2) showed the mineral contents of raw materials (on dry weight).

Minerals composition of wheat flour, Parsley powder, Fennel seeds powder, Barley flour, Arabic gum powder, Black seed and Camel grass powder in Table (2) showed that arabic gum ,black seed and camel grass contained high value in K which recorded 736 ,1780 and 1750mg/100 g, respectively), but low levels showed in wheat flour (72%) and barley flour which recorded 109.38, 280 mg/100 g, respectively.

Arabic gum powder and black seed powder contained higher value in Ca which recorded 1074, 1330 mg/100 g, respectively, but lowest levels was in wheat flour ,barley flour and fennel seeds which recorded 21.5, 29, 44 mg/100 g, respectively.

Arabic gum powder and black seed contained high value in Mg which recorded 208, 386 mg/100 g, respectively, but lowest levels showed in fennel seeds powder and barley flour which recorded 15, 19 mg/100 g, respectively.

Camel grass powder and Arabic gum contained high value in Fe which recorded 23.8, 20 mg/100 g, respectively, but lowest levels showed in fennel seeds powder and wheat flour (72%) which recorded 0.16 , 1.4 mg/100 g, respectively.

Table 2. Proximate Mineral Content of raw substances (on dry weight basis):

Raw materials	Minerals content (mg/100 g sample)			
	Potassium (K)	Calcium (Ca)	Magnesium (Mg)	Iron (Fe)
Wheat flour (72% ext.)	109.38	21.5	108.5	1.4
Parsley powder	554	138	50	6.2
Fennel seeds powder	290	44	15	0.16
Barley flour	280	29	19	2.13
Arabic gum powder	736	1074	208	20
Black seed powder	1780	1330	386	19.12
Camel grass powder	1750	124	154	23.8

3. Proximate chemical composition of cupcake samples:

Determination chemical composition of cupcake to know the nutrition value of cake, Proximate chemical composition of cupcake that fortified with some herbs was showed in Table (3). It was found that the proximate composition of cupcake samples were formulated by replacing the wheat flour with barley powder, parsley powder, fennel powder, Arabic gum powder, black seed and camel grass powder compared to control cupcake.

Findings implied that the ultimate value of fiber was the highest in parsley cake (4.71%) and Arabic gum (4.23%), but the lowest value in control cake (3.56%) This result may be due to the high fiber content of Arabic gum compared to control cake (wheat flour). These results are agreement with those obtained by Nasir et al., (2008) who stated that Gum Arabic is rich in dietary fiber.

Results indicated that there was an increase in available carbohydrates in control and barley samples which are (35.80, 34.87) % , respectively. Also results show that moisture, fat, ash, fiber, and protein for barley samples were (21.74, 30.28, 0.91, 8.60, 3.59) % respectively. These results are not agreement with those obtained by Yaqoob et all (2018) who stated that moisture, ash, protein, fat and carbohydrates for barley samples were (10.12,0.9,11.20,13.81 and 63,97) respectively. While the moisture, fat, ash, fiber, and protein for Arabic gum were (23.06, 33.24, 1.01, 10.45, 4.23) %, respectively.

Table 3. Proximate chemical constituents of studied cupcake (on dry weight basis):

	Moisture	Fat	Ash	Crude protein	Crude fiber	Available carbohydrates
Control	$21.58^{d} \pm 0.61$	$30.24^{bc} \pm 0.4$	$0.92^{ab} \pm 0.06$	$7.96^{b} \pm 0.29$	$3.56^{b} \pm 0.20$	$35.80^{a} \pm 0.27$
Fennel cup cake (2%)	$24.09^{bc} \pm 0.63$	30.39b ± 0.9	$0.94^{ab} \pm 0.02$	$8.20^{b} \pm 0.17$	$3.61^{b} \pm 0.21$	$32.76^{c} \pm 0.73$
Parsley cup cake (6%)	$29.30^{a} \pm 0.68$	31.09b±0.34	$0.89^{b} \pm 0.02$	$7.95^{b} \pm 0.23$	$4.71^{a} \pm 0.10$	$26.06^{a} \pm 0.03$
Barley cup cake (6%)	$21.74^{d} \pm 0.69$	$30.28^{bc} \pm 0.73$	$0.91^{ab} \pm 0.02$	$8.60^{b} \pm 0.34$	$3.59^{b} \pm 0.34$	$34.87^{ab} \pm 0.17$
Black seed cup cake (4%)	$25.14^{b} \pm 0.37$	$30.22^{bc} \pm 0.73$	$0.88^{b} \pm 0.02$	$8.25^{b} \pm 0.15$	$3.57^{b} \pm 0.20$	$31.93^{c} \pm 0.22$
Arabic gum cup cake (1.5%)	$23.06^{cd} \pm 0.38$	$33.24^{a} \pm 0.16$	$1.01^{a} \pm 0.01$	$10.45^{a} \pm 0.13$	$4.23^{ab} \pm 0.13$	$28.00^{d} \pm 0.06$
Camel grass cup cake (2.5%)	$24.18^{bc} \pm 0.12$	$28.44^{c} \pm 0.02$	$0.95^{ab} \pm 0.02$	$8.10^{b} \pm 0.17$	$4.03^{b} \pm 0.14$	$34.29^{b} \pm 0.17$

Groups indicated with different letters (a,b)in the same line are statistically significant ($p < 0.05$).

4. Proximate minerals content (mg/100g) of cupcake samples:

The minerals content of cupcake samples (on dry weight basis) were evaluated. The results in Table (4) showed that the utmost value of potassium (k) in black seed cupcake which recorded (845.805) mg/100g, compared to control which gave (109.50) mg/100g, but the lowest value was in Fennel cupcake which was (562.7485) mg/100g. Also, the

result confirmed that the utmost value of Magnesium (mg) in Barley Sample which was (879.735) mg/100g while the minimal value in Fennel sample which was (298.7525) mg/100g.

Table 4. Proximate minerals content (mg/100g) of cupcake samples:

Raw materials	Minerals content (mg/100 g sample)			
	Potassium (K)	Calcium (Ca)	Magnesium (Mg)	Iron (Fe)
Control	109.50	22.3	109	1.9
Fennel cup cake (2%)	562.7485	650.7624	298.7525	22.73561
Parsley cup cake (6%)	665.6825	721.979	613.0855	43.69364
Barley cup cake (6%)	921.429	896.959	879.735	83.8367
Black seed cup cake (4%)	845.805	945.947	763.561	67.2013
Arabic gum cup cake (1.5%)	761.711	995.364	438.3233	45.14133
Camel grass cup cake (2.5%)	687.966	987.4357	313.596	33.06772

5. Biological experiment:

Determination of creatine and urea in blood of control and treated rats:

In this study the results in Table (5) showed the parameters of biological value. The results showed significant differences. The highest value of creatine shown in group 1 and 2 were (0.75, 0.73), but the lowest value shown in group 8, 6 and 3 were (0.42, 0.44, 0.48) This is due to the protective effect of GA on renal function that was also confirmed to significantly reduce blood creatinine and urea nitrogen concentrations in diabetic nephropathy patients Nasir and Salim (2016). In the same table the highest value of urea was shown in group 5 and 3 were (47.43, 46.23) For parsley, these results are in contrast to the results those acquired by Rahmat *et all* (2019) who showed that parsley reducing the elevated level of uric acid as well as improving renal and hepatic damages caused by hyperuricemia, while the lowest value shown in group 2 and 6 were (40.33, 42.16). The maximum value of ureic acid shown in group 7 and 8 recording (4.00, 3.22), while minimum value was shown in group 4 and 2 were (2.33, 2.35).

Table 5. Determination of creatine and urea in blood of control and treated rats:

Treatments	Urea (mg/dL)	Creatin (mg/dL)	Ureic acid (mg/dL)
G 1 (-C)	42.23^{f} ±0.23	0.75^{a}±0.014	2.70^{bc}±0.19
G 2 (+C)	40.33^{g} ±0.20	0.73^{a}±0.017	2.35^{c}±0.20
G 3 (6%PP)	46.23^{c} ±0.20	0.48^{d}±0.023	2.67^{bc}±0.13
G 4 (2%FS)	42.73^{ef}±0.17	0.52^{cd}±0.023	2.33^{c}±0.12
G 5 (6%BF)	47.43^{b}±0.18	0.54^{cd}±0.023	2.73^{bc}±0.17
G 6 (1.5%AG)	42.16^{f}±0.20	0.44^{f}±0.017	3.11^{b}±0.12
G 7 (4% BC)	43.27^{e}±0.14	0.57^{bc}±0.020	4.00^{a}±0.23
G 8 (2.5% CG)	44.46^{d}±0.20	0.42^{f}±0.017	3.22^{b}±0.13

Determination of Na and K content (mmol/l) in blood serum of control and treated rats:

The findings in Table (6) revealed that the highest value of sodium was shown in Camel grass and Arabic gum (group 8 and 6) were (157.00, 155.00 mmol/l), Arabic gum value of potassium due to that arabic gum enhances small intestinal absorption of sodium in normal experimental rats Rehman *et al* (2003); Codipilly and Wapnir (2004), but the lowest value was shown in (+) Control and (-) Control group 1 and 2 were (145.93, 147.83). While the highest value of potassium shown in Black seed and Barley powder (group 7 and 5) were (5.68, 5.67), but the lowest value was shown in Parsley powder and Camel grass samples (group 3 and 8) were (4.37 and 4.70) ,Parsley value of potassium due to that parsley inhibiting kidney Na+/K+ activity, This inhibition results in decreased reabsorption of K and Na from the tubular lumen; water follows these ions, which leads to a diuretic effect Kreydiyyeh and Usta(2002).

Table 6. Determination of Na and K content (mmol/l) in blood serum of control and treated rats.

Treatments	Sodium (Na) Mmol/l	Potassium (K) Mmol/l
G 1 (-C)	145.93^{g} ± 0.17	4.82^{cd} ± 0.08
G 2 (+C)	147.83^{g}±0.44	4.92^{bcd} ±0.21
G 3 (6% PP)	149.06^{g}±0.46	4.37^{e} ±0.16
G 4 (2%FS)	152.06^{e}±0.41	5.18^{abc} ±0.17
G 5 (6% BP)	151.00^{f}±0.17	5.67^{a}±0.20
G 6 (1.5% AG)	155.00^{c}±0.12	5.58^{ab}±0.26
G 7 (4%BS)	152.00±0.29	5.68^{a}±0.39
G 8 (2.5% CG)	157.00^{ab}±0.63	4.70^{d}±0.28

Determination of liver enzymes of control and treated rats:

The findings in Table (7) implied that the elevated level of GOT showed in group 7 was (36.93 U/L), but the lowest value shown in group 6 was (17.97 U/L). While the highest value of GPT shown in group 7 was (17.10 U/L), but the lowest value shown in group 6 was (5.86 U/L).

Table 7. Determination of liver enzymes of normal and infection rats:

Treatments	GOT U/L	GPT U/L
G 1 (-C)	19.00^{g}±0.44	15.07^{c}±0.12
G 2 (+C)	21.00^{g}±0.27	8.96^{g}±0.20
G 3 (6%PP)	26.83^{d}±0.72	7.93^{g}±0.06
G 4 (2%FS)	23.03^{f}±0.26	8.83^{f}±0.44
G 5 (6%BF)	24.07^{e}±0.34	10.03^{de}±0.43
G 6 (1.5% AG)	17.97^{h}±0.09	5.86^{h}±0.24
G 7 (4% BS)	36.93^{a}±0.17	17.10^{a}±0.21
G 8 (2.5%CG)	27.10^{cd}±0.20	16.07^{b}±0.17

Histological analysis:

Without knowing which treatment group each histological section came from, the kidneys of all the rats had their histological sections evaluated qualitatively. Only the renal cortex was thoroughly studied since most of the gentamicin-induced morphological abnormalities in the rat kidney are in the proximal tubules and the other components of the kidney do not show significant histological modifications.

The results showed that some slices from group 3 exposed necrobiotic changes of epithelial linning some renal tubules and focal inflammatory cells infiltration (Fig 5), while other slices described no histopathological variations (Fig 6), The protective role of parsley may be attributed to its higher content of these flavonoids and vitamine C which either scavenge free radical which aid to remove damage from kidney Jassim(2013). Furthermore, kidneys of rats from group 4 revealed no histopathological alterations (Figs.7 and 8) except focal interstitial nephritis (Figs.9 and 10) in some examined sections . Moreover, cytoplasmic vacuolization of epithelial lining some renal tubules was the only histopathological variations noted in kidneys from group 5 (Fig. 10). Furthermore, kidneys of rats from group 6 manifested no histopathological alterations (Figs. 12 and 13) ,These outcomes agree with some studies whereas Several studies indicated that GA is exert a nephron-protective effect against gentamicin (antibiotic) and cisplatin-induced

nephrotoxicity in rat Al-Majed *et al* (20003) and Al-Majed *et al* (2022) . Meanwhile, cytoplasmic vacuolization of epithelial lining some renal tubules was the lesion noted in kidneys of rats from group 7 (Figs.14 and 15). Otherwise, kidneys of rats from group 8 exposed no histopathological variations (Fig. 16) excepting congestion of renal blood vessel and glomerular tuft (Fig.17).

Histology of kidney:

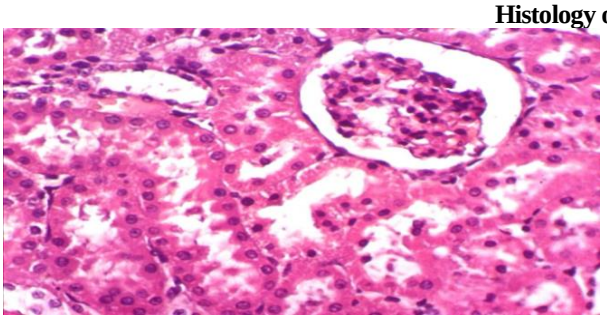

Fig. 1. Kidney of rat from group 1 proving the normal histological structure of renal parenchyma (H & E X 400).

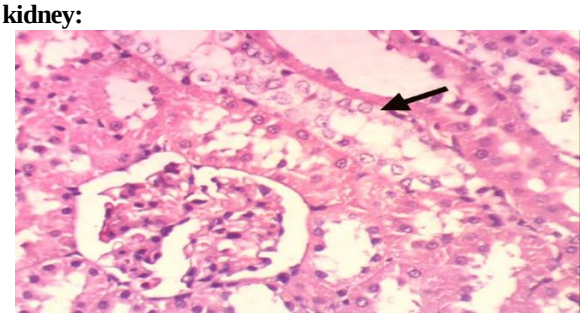

Fig. 2. Kidney of rat from group 2 proving cytoplasmic vacuolization of epithelial lining renal tubules (H & E X 400).

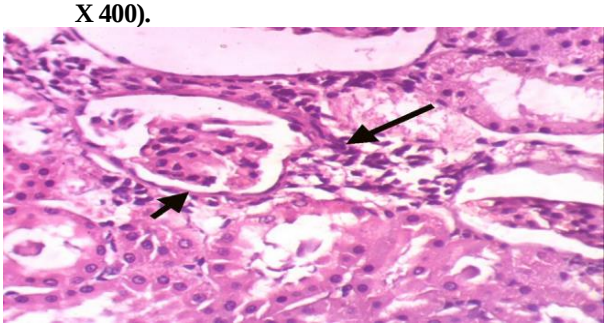

Fig. 3. Kidney of rat from group 2 proving thickening of the parietal layer of Bowman's capsule s and periglomerular inflammatory cells infiltration (H & E X 400).

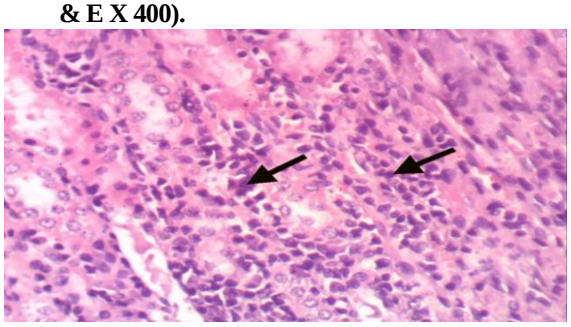

Fig. 4. Kidney of rat from group 2 proving interstitial nephritis (H & E X 400).

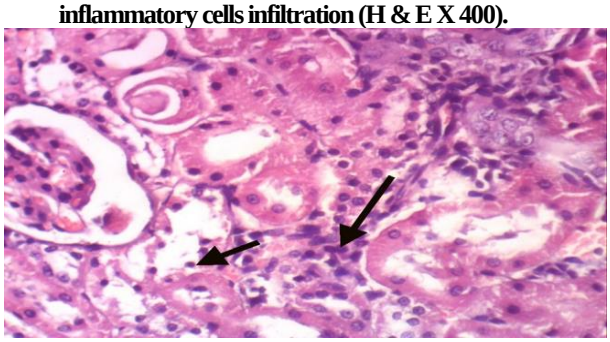

Fig. 5. Kidney of rat from group 3 proving necrobiotic changes of epithelial linning some renal tubules and focal inflammatory cells infiltration (H & E X 400).

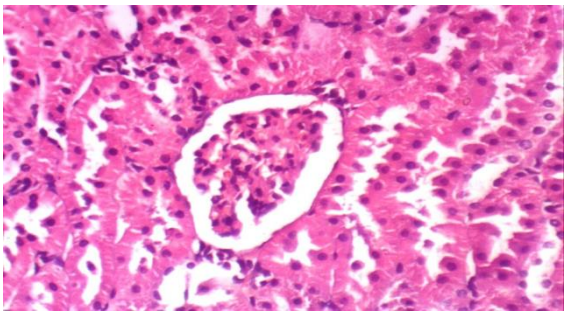

Fig. 6. Kidney of rat from group 3 proving no histopathological changes (H & E X 400).

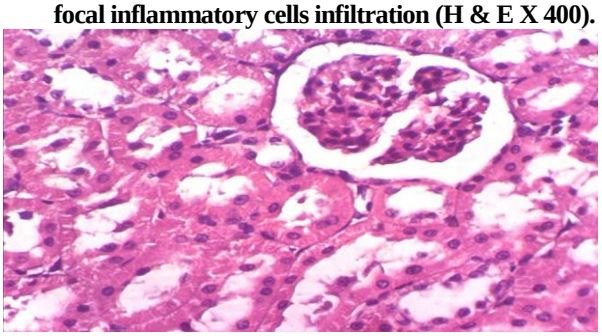

Fig. 7. Kidney of rat from group 4 proving no histopathological changes (H & E X 400).

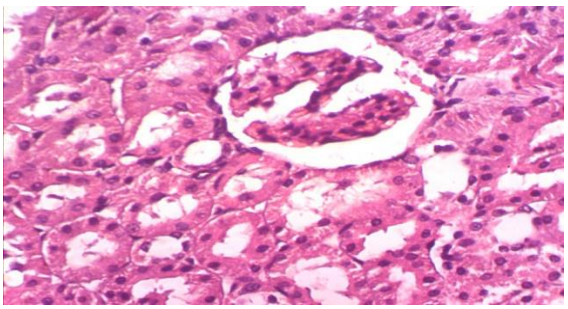

Fig. 8. Kidney of rat from group 4 proving no histopathological changes (H & E X 400).

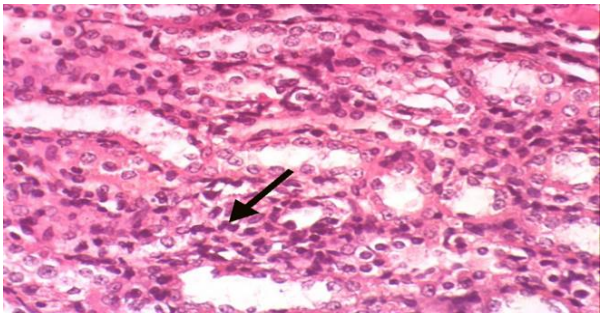

Fig. 9. Kidney of rat from group 4 proving focal interstitial nephritis (H & E X 400).

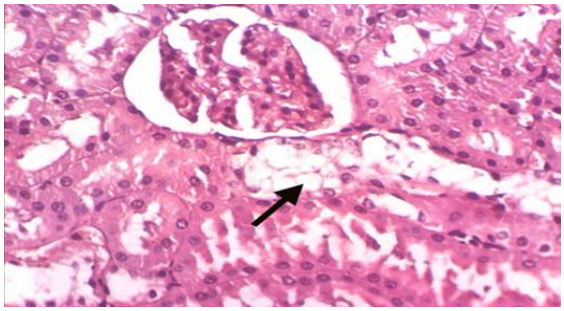

Fig. 10. Kidney of rat from group 4 proving cytoplasmic vacuolization of epithelial lining some renal tubules (H & E X 400).

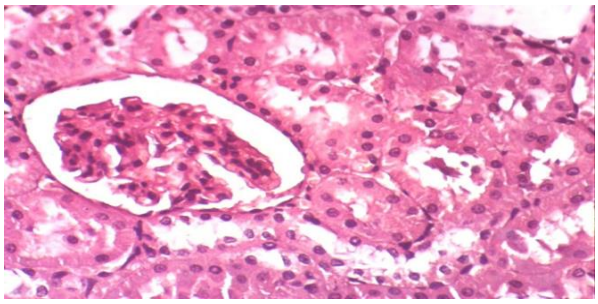

Fig. 11. Kidney of rat from group 5 proving no histopathological alterations (H & E X 400).

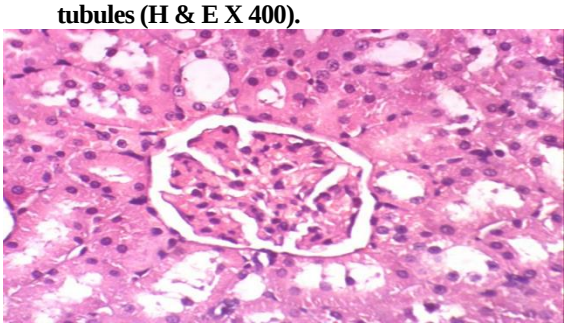

Fig. 12. Kidney of rat from group 6 proving no histopathological changes (H & E X 400).

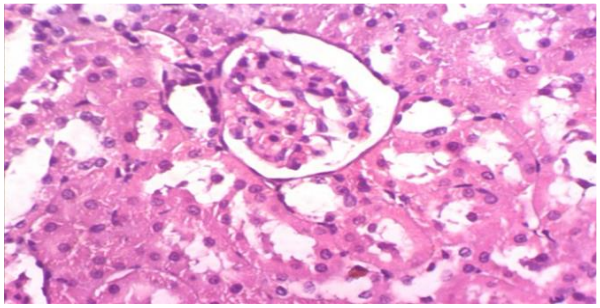

Fig. 13. Kidney of rat from group 6 proving no histopathological changes (H & E X 400).

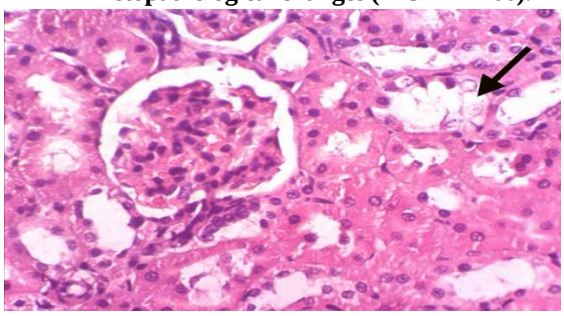

Fig 14. Kidney of rat from group 7 proving cytoplasmic vacuolization of epithelial lining some renal tubules (H & E X 400).

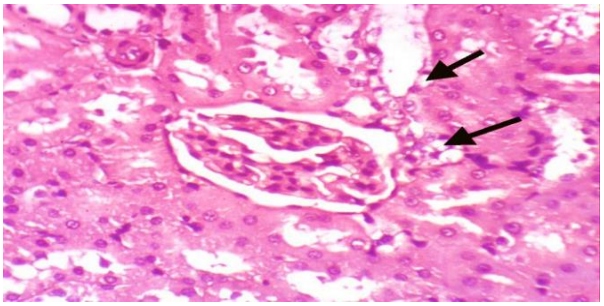

Fig. 15. Kidney of rat from group 7 proving cytoplasmic vacuolization of epithelial lining some renal tubules (H & E X 400).

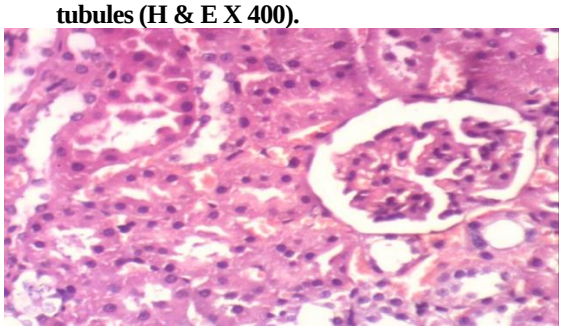

Fig 16. Kidney of rat from group 8 proving no histopathological changes (H & E X 400).

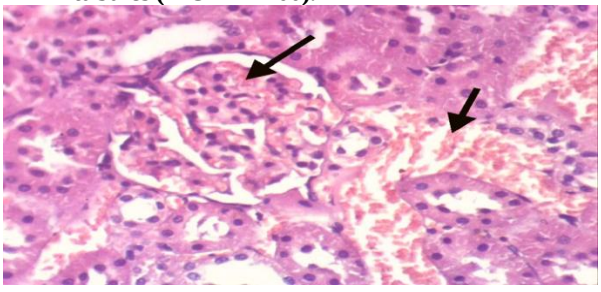

Fig. 17. Kidney of rat from group 8 proving congestion of renal blood vessel and glomerular tuft (H & E X 400).

CONCLUSION

The findings displayed that the greatest herbs that have an effective role in reducing or preventing kidney diseases were fennel, barley, arabic gum, parsely and black seeds, which improved the general functions of the kidneys and prevented the formation of stones and facilitated the process of diuresis. whereas Thymoquinone, the major component of the black seed, showed preventive and therapeutic effects on ethylene glycol-induced kidney calculi in rats. This phytochemical compound decreased the size and number of calcium oxalate deposits in the renal tubules in rats Hajzadeh *et al* (2008), Parsley and its extracts have been used potentially as a complementary/alternative treatment for various renal diseases Vamenta-Morriset *et al* (2014), These beneficial activities of Parsley could be due to its bioactive constituents, including flavonoids, carotenoids, coumarins, tocopherol, and ascorbic acid Rezazad and Farokhi(2014) . Wherefore the study recommends the use of medicinal plants and herbs in the treatment of chronic kidney diseases because of their effective role in preventing and reducing kidney diseases and because they do not negatively affect human health compared to drugs and chemical medicines that have harmful effects on human health and their high prices.

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تحضير كب كيك مدعم ببعض الاعشاب لمرضى الكلى

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الملخص

لاحظنا فى الأونه الاخيرة إرتفاع نسبه مرضى الكلى فى جميع أنحاء العالم ,مع إرتفاع تكلفه الادويه العلاجيه , فلجأ المتخصصين فى الغذاء والتغذيه الى تقديم علاج غذائى لمرضى الكلى , حيث أن للتغذيه دور رئيسى فى علاج مرضى الكلى ., لذلك أجريت هذه الدراسة لبحث إمكانية إنتاج كب كيك وظيفي يعتمد بشكل أساسي على دقيق القمح بنسبة استخلاص ٧٢٪ مدعم ببعض الاعشاب النباتية مثل (الشعير ، الشمر ، البقدونس ، حبة البركة ، الصمغ العربي وحلفا بار) بنسب مختلفة والتي ستكون بمثابة علاج غذائي لمرضى الكلى حيث تشتهر النباتات الطبية بخصائصها المضادة للأكسدة والمواد الكيميائية النباتية(مثل المركبات المضاده للأكسدة بما في ذلك الفينول والفلافونويد والأنثوسيانين) . تم إجراء التقييم الحسي لاختيار الاعشاب ثم أجريت تجربة حسية لتحديد أفضل نسبة إضافة لكل عشب مستخدم في التجربة، وأظهرت النتائج أن أفضل نسبة للشعير كانت (٦٪)، الشمر (٢٪) ، البقدونس (٦٪)، الصمغ العربي (١,٥٪)، حبة البركة (٤٪)، الحلفابار (٢,٥%). وتم إجراء إختبارات كيميائية للكب كيك .ثم أجريت تجربة بيولوجية وتم إجراء تحليل إنزيمات الكلى وتحليل نسبه الصوديوم والبوتاسيوم، كما تم إجراء تحليل هستولوجى لأنسجه الكلى، وأظهرت النتائج أن الأعشاب المختارة لها دور فعال فى تقليل أو منع أو الحد من أمراض الكلى حيث حسنت من الوظائف العامه للكلى ومنعت تكوين الحصوات وسهلت من عمليه إدرار البول. وتوصى الدراسه باستخدام الأعشاب النباتيه فى علاج أمراض الكلى لما لها من دور فعال فى الحد من أمراض الكلى ولعدم تأثيرها سلبيا على صحة الأنسان مقارنه بالعقاقير والادويه الكيميائية ذات التأثير الضارعلى صحة الانسان وارتفاع اسعارها.

الكلمات الدالة: مرضى الكلى – الاعشاب النباتيه – إنزيمات الكلى – أنسجه الكلى - الكرياتينين