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The Effect of Khella Baladi (*Ammi visnaga*) on Hyperoxaluric Rats

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Abstract:

The present study aimed to investigate the effect of Khella Baladi on the amelioration of kidney dysfunction in hyperoxaluric rats. Thirty-six adult male albino rats were divided into six groups, six rats for each. One of them was kept as a (–ve) control group, while the other five groups were treated with ethylene glycol 0.75% and ammonium chloride 1% for a week via the drinking water to induce hyperoxaluria. Khella Baladi was added to five groups in different quantities (1.5, 3, 4.5, and 6%), respectively. The treatment lasted for 28 days. From the obtained results it was showed that treatment with Khella Baladi in different quantities (1.5, 3, 4.5, and 6%), respectively for 28 days caused a significant ($P \leq 0.05$) increase in weight gain%, feed intake, feed efficiency ratio, HDLc, total protein, albumin, globulin, and serum (Na & K), but with significant ($P \leq 0.05$) decrease in relative organs weights, liver functions, kidney functions, urine (Na &K), serum glucose, serum bilirubin fractions, TC, TG, LDL, and VLDL. The best treatment was for Khella Baladi 6%. Therefore, it can be concluded that Khella Baladi could minimize the hyperoxaluric effect of (NH4Cl+EG) and potent a diuretic effect.

Key words: Kidney function, Kidney stones, Ethylene glycol, Ammonium chloride.

Introduction:

Kidney is a pair of small organs in the body that consider the basic purification organ (Köttgen et al., 2010). Also, kidneys remove waste products, drugs from the body and release hormones that regulate blood pressure, balance the body's fluids and produce an active form of vitamin D that promotes healthy, strong bones control the production of red blood cells (Hawkins et al., 2011).

Hyperoxaluria is defined by the presence of excess amounts of oxalic acid (oxalate) in the urine. High concentrations lead to formation of calcium oxalate-apatite crystals and ultimately to nephrolithiasis (Robijn et al., 2011). Hyperoxaluria can be caused by inherited (genetic) disorders, an intestinal disease or eating too many oxalate-rich foods (Martin& Salido, 2017). Therefore, the prevention of kidney diseases has a great significance both in theory and in practice. Herbal drugs play a major role in the treatment of hyperoxaluria in traditional systems of medicine in Egypt (Sahoo and Dey, 2010).
A. visnaga also known as khella baladi or toothpick weed, is an annual or biennial herb. It has been used in traditional medicine a long time ago (Hashim et al., 2014). Nowadays, it is used in modern medicine to treat many aliments such as renal colic, kidney stones and coronary insufficiency and is used as an antioxidant, antifungal and antibacterial effect. These pharmacological activities are due its valuable chemical constituents that include mainly essential oil, polyphenolic compounds including flavonoids, as well as γ-pyrones, represented mainly by khellin and visnagin. The butanol extracts of the aerial parts of A. visnaga were rich in flavonoids. A. visnaga has strong antioxidant and free radical scavenging properties. The phenolic compounds of A. visnaga have antioxidant, anti-inflammatory, cardiovascular diseases (Al-Snafi, 2013). Van & Wink, (2018) showed that the prophylactic effects of A. visnaga on stone formation in rats are due to its diuretic effects. The previous studies showed that khella baladi could be used in treatment or prevention of different diseases successfully. Therefore, the present investigation aims to evaluate the effect of khella baladi on hyperoxaluria induced by ethylene glycol and ammonium chloride in male albino rats.

Material and Methods

Materials:

Khella Baladi was obtained from Ministry of Agriculture. It was dried at 40°C in a vacuum oven, then milled. The powders stored in dark glass jars and kept at less than 30°C till use.
Alloxan, casein, all vitamins, all minerals, cellulose, choline chloride, methionine, ethylene glycol, and ammonium chloride were obtained from El-Gomhoryia Company for Trading Drugs and Medical Instruments.

Experimental design:

Thirty-six male adult albino rats (Sprague Dawley strain) were housed in individual stainless-steel cages under controlled environmental conditions and fed for one week on basal diet prior to start feeding on experimental diet for acclimatization. Then, rats were randomly distributed into 6 equal groups, 6 rats each. Group 1was fed on the basal diet

and set as a negative control group (normal rats). The other 5 groups induced by adding EG 0.75% and NH4Cl 1% to the drinking water for induction hyperoxaluria according to the method described by Johansson et al., (1970). One week after drinking water with (EG and NH4Cl), fasting blood samples were obtained by retro orbital method to ensure occurrence of hyperoxaluria and to estimate kidney function. All groups were fed for 4 weeks according to the following groups:

Group 1: Control negative, rats were fed on basal diet.

Group 2: Control positive, hyperoxaluric rats kept without any treatment and fed on basal diet.

Group 3: Hyperoxaluric rats fed on basal diet with 1.5% khella baladi.

Group 4: Hyperoxaluric rats fed on basal diet with 3% khella baladi.

Group 5: Hyperoxaluric rats fed on basal diet with 4.5% khella baladi.

Group 6: Hyperoxaluric rats fed on basal diet with 6% khella baladi.

Biological Evaluation

During the experimental period (28days), the consumed diet was daily recorded (feed intake), biological evaluation of the different diets was carried out by determination of body weight gain % (BWG%) and feed efficiency ratio (FER) according to Chapman et al., (1959).

Urine and blood Sampling

At the end of the experiment period, the urine of each rats were collected for 24 hours and it analyzed for determination sodium and potassium. Rats were fasted overnight and anesthetized with diethyl ether. Blood samples were collected in clean dry centrifuge tubes from hepatic portal vein; serum obtained by centrifugation was carefully aspirated for at least 15 minutes at 2200-2500 RPM, transferred into clean cuvette tubes and stored frozen at -20°C for analysis (Malhotra, 2003).

Serum samples were analyzed for determination the following parameters:

Aspartate transaminase (AST) and alanine aminotransferase (ALT) were determined as U/L according to Yound (1975), serum alkaline phosphatase (ALP) was determined as U/L according to (IFCC, 1983). Total cholesterol, triglycerides and HDL were determined according to Allain (1974), Fossati and Prencipe (1982) and Lopez, (1974) respectively, determination of LDL and VLDL was carried out according to the method of Lee and Nieman (1996). Urea, creatinine and uric acid were measured according to Malhotra (2003), Bohmer (1971) and While et al., (1970) respectively. Sodium, potassium and glucose were determined according to Henry (1974), Henry (1964) and Kaplan (1984) respectively.

Statistical Analysis

The data were statistically analyzed using a computerized program by one-way ANOVA. The results are presented as mean ± SD. Differences between treatments at $p \leq 0.05$were considered significant.

Results and discussion

Table (1) illustrated body weight gain% (BWG%), feed intake (FI) and feed efficiency ratio (FER) of experimental rats. As shown in this table, the best (BWG%) was recorded for group 6 (hyperoxaluric rats fed on diet contain 6% Khella Baladi), The best (FI) was recorded for group 6 (6% Khella Baladi) with non-significant difference with other treated groups (G5, G4 and G3). All treated groups with Khella Baladi showed significantly ($p \leq 0.05$) increase in FER as compared to (+ve) control group.

Table (1): Effect of feeding with Khella Baladi on body weight gain (BWG %), feed intake (FI) and feed efficiency ratio (FER) of hyperoxaluric rats

Parameters / Groups	BWG %		FI(g/day)		FER(rat/day)	
	Mean±SD	%of change*	Mean±SD	%of change*	Mean±SD	%of change*
(1) Control (-ve)	28.3a±1.8	+98.4	20.34a±0.9	+31.90	0.093a±0.0189	+54.48
(2) Control (+ve)	14.3c±0.62	--------	15.42c±0.44	--------	0.0602d±0.0015	-----
(3) Khella baladi 1.5%	21.43b±0.68	+50.07	17.87b±0.72	+15.89	0.0759c±0.0011	+26.08
(4) Khella baladi 3%	22.22b±0.7	+55.60	17.95b±0.68	+16.40	0.0795c±0.0039	+32.05
(5) Khella baladi 4.5%	22.28b±0.73	+56.02	18.24b±0.75	+18.28	0.0841c±0.0012	+39.70
(6) Khella baladi 6%	26.43a±1.2	+85.08	18.78b±0.60	+21.78	0.0892b±0.0010	+48.17
LSD	1.8605		1.2966		0.0037	

Means with the different superscript letters in the same column were significant different at (P<0.05).LSD:Least significant differences (P<0.05).%Change of (+ve) control group.*

The present study is in accordance with Haug et al., (2012) who showed that BWG, FI and FER of hyperoxaluric rats (positive control group) were decreased significantly, compared with those of the normal rats (negative control group). Also, Al-Snafi, (2015) found that A. visnaga raised the BWG of hyperoxaluric rats. Amin et al., (2015) reported that the improvement of BWG may be the cause of khella baladi was rich in phenolic

compound, antioxidation activities. Lu et al., (2015) found that mix of EG and NH4CL injection lowered considerably the FI taken by hyperoxaluric rats.
Also, Pavela et al., (2015) found that treatment with khella baladi extract increased feed intake and BMI. Aggarwal et al., (2016) come to same conclusion indicating that hyperoxaluric decrease FI in companion with that of the (-ve) control group healthy rats. Kalita et al., (2018) found that treatment with khella baladi extract increased feed intake and BMI.
Table (2) illustrate the internal organs relative weight of negative and hyperoxaluric groups. As shown in this table all treated groups have non-significant relative liver weight with (-ve) control group, the best relative spleen weight was recorded for group 6 (6% khella baladi) with non-significant difference with (-ve) control group and other treated groups (G5, G4 &G3), the best relative lungs weight was revealed for group 6(6% khella baladi) with non–significant difference with (-ve) control group, G5 & G4, the better relative heart weight was observed for group 6 (6% khella baladia) and the best relative heart weight was recorded for groups 6 (6% khella baladi) with non–significant difference with (-ve) control group & G5 when compared with (+ve) control group. The relative kidney weight mean values of G3, G4, G5 and G6 were lower than that of positive control group

Table (2): Effect of feeding with Khella Baladi on relative organs weights of hyperoxaluric rats

Relative organs weight (g/B.Wt.g)					
Groups	Liver	Spleen	Lungs	Heart	Kidney
(1) Control (-ve)	1.40b±0.28	0.15b±0.01	0.52d±0.04	0.20c±0.01	0.32d±0.01
% of change*	-42.4	-62.6	-38.1	-33.8	-38.0
(2) Control (+ve)	2.43a±0.43	0.40a±0.04	0.84a±0.01	0.308a±0.02	0.52a±0.04
% of change*	----	----	-----	-----	-----
(3) Khella baladi 1.5%	1.83ab±0.37	0.20b±0.03	0.691b±0.06	0.266ab±0.04	0.44b±0.03
% of change*	-24.8	-48.9	-18.4	-13.6	-15.4
(4) Khella baladi 3%	1.57b±0.34	0.17b±0.01	0.623c±0.03	0.242bc±0.01	0.39c±0.01
% of change*	-35.3	-57.5	-26.4	-21.4	-25.1
(5) Khella baladi 4.5%	1.51b±0.33	0.16b±0.02	0.576cd±0.02	0.198c±0.03	0.36cd±0.0
% of change*	-37.7	-59.9	-31.9	-35.7	-30.7
(6) Khella baladi 6%	1.433b±0.27	0.15b±0.03	0.55d±0.01	0.189c±0.02	0.29d±0.01
% of change*	-41.1	-62.6	-35.1	-38.6	-44.3
LSD	0.6066	0.0459	0.05945	0.04297	0.0411

Means with the different superscript letters in the same column were significant different at (P<0.05). LSD:Least significant differences (P<0.05).%Change of (+ve) control group.*

These results are supported by the results published by Jaradat et al., (2017) who reported that A. visnaga can reduce symptoms of kidney diseases. Also, Alshammari et al., 2019 showed that A. visnaga has a great role for treatment of urolithiasis. Osama et al., (2019) concluded that khella baladi has been used in a wide variety of diseases, including kidney stones and the inflammations of the kidney. Qasem, (2020) showed that khella baladi can treat ailments associated with spasm and constriction of ease the passing of kidney stones. Data in table (3) show the activities of liver enzymes (AST, ALT and ALP) of all experimental groups. As shown in this table the best treatment for AST enzyme was observed for group 6 (6% khella baladi) with non–significant difference with (-ve) control group, G5 & G4, the better treatment for ALT enzyme was noticed for G6 & G5 with non–significant difference between them, and the best treatment of serum ALP enzyme recorded to group 6 (6% khella baladi), in comparison with (+ve) control group.

Table (3): Effect of feeding with khella baladi on liver functions (AST, ALT and ALP) enzymes of hyperoxaluric rats

Parameters / Groups	AST (U/ L)		ALT (U/ L)		ALP (U / L)	
	Mean±SD	%of change*	Mean±SD	%of change*	Mean±SD	%of change*
(1) Control (-ve)	79.34 c ± 1.30	-49.78	50.53d±1.7	-40.47	98.75 f ± 1.2	-50.61
(2) Control (+ve)	157.3a ± 10.02	-----	84.28a ±2.4	------	199.9a ± 2.6	------
(3) Khella baladi 1 .5%	144.37ab ± 4.1	-25.634	70.4b±1.8	-16.66	144.9b ± 1.6	-27.49
(4) Khella baladi 3%	110.6bc ± 2.30	-30.08	68.3b±1.6	-19.04	130.5c ± 0.8	-34.75
(5)Khella baladi 4.5%	87.5c ± 1.6	-44.70	57.47c± 1.5	-32.14	110.4d ± 0.6	-44.81
(6) Khella baladi 6%	85.65c ± 1.92	-45.56	55.03c± 1.5	-34.45	105.4e ± 1.5	-47.34
LSD	36.9685		2.7826		2.7193	

Means with the different superscript letters in the same column were significant different at (P<0.05). LSD:Least Significant Differences (P<0.05).%Change of (+ve) control group.*

The lowest levels of serum AST, ALT & ALP recorded for hyperoxaluric rats fed on A. visnaga 5.5% with significant difference ($p < 0.001$) compared to positive control fed on basal diet (Ahmed et al., 2017).

These results that obtained confirmed by Osama et al., (2019) who found that phenolic compounds in khella baladi have reduce the increase in serum levels of AST and ALT. Also, Abu-Serie et al., (2019) illustrated that hyperoxaluria-intoxicated rats (positive control group) appeared significant elevations in serum activity of AST, ALT &ALP enzymes compared with those of the normal rats.

Data in table (4) show significant increases in serum urea, creatinine and uric acid for (C +ve) group as compared with (- ve) control group. It is evident the highest recovery rats

showing the least level compared to all groups for urea, creatinine and uric acid was due to group 6 (6% khella baladi) for hyperoxaluric rats by reduced values of these compounds to less levels compared with (+ve) control group, showing a pronounced therapy towards the normal healthy rats.

Table (4): Effect of feeding with khella baladi on serum kidney functions (urea, creatinine and uric acid) enzymes of hyperoxaluric rats

Parameters / Groups	Urea (mg/dl)		Creatinine (mg/dl)		Uric acid (mg/dl)	
	Mean±SD	%of change*	Mean±SD	%of change*	Mean±SD	%of change*
(1) Control (-ve)	25.07f±0.21	-59.12	0.39e±0.006	-59.38	1.85b±0.01	-63.22
(2) Control (+ve)	61.33a±0.42	-------	0.96a±0.01	------	5.03a±0.37	-------
(3) Khella baladi 1.5%	40.09b±0.36	-34.63	0.80b±0.01	-16.67	3.04b±0.22	-39.56
(4) Khella baladi 3%	31.07c±0.32	-49.33	0.72c±0.01	-25.00	2.96b±0.2	-41.15
(5) Khella baladi 4.5%	28.02d±0.27	-54.31	0.51d±0.02	-46.88	2.64b±0.9	-47.51
(6) Khella baladi 6%	26.12e±0.68	-57.41	0.47d±0.01	-51.04	2.2b±0.8	-56.26
LSD	0.7218		0.016		1.510	

Means with the different superscript letters in the same column were significant different at (P<0.05). LSD:Least Significant Differences (P<0.05).%Change of (+ve) control group.*

Data in table (5) show significant increases in urine (Na&K) and significant decreases serum (Na & K) for (+ve) control group as compared with (-ve) control group. As shown in this table the best treatment for serum Na was observed for group 6&5 with non-significant difference between them. The best treatment for serum K was observed for group 6 with non-significant difference with (-ve) control group. It is evident the highest recovery rats showing the least level compared to all groups for urine Na& K was due to group 6 (6% khella baladi) for hyperoxaluric rats by reduced values of these compounds to less levels compared to (+ve) control group, showing a pronounced therapy towards the normal healthy rats.

Similar results were obtained by Alqasoumi et al., (2014) who reported that serum creatinine concentration is a more potent indicator than the in the first phase of kidney diseases. It was reported that khella baladi possessed anti- inflammatory, anti-oxidant and pro-oxidative activities (Hilmi et al., 2014). Urine oxalate, sodium and phosphorus levels were increased respectively after administration of EG while the urine magnesium level was decreased (Lowe et al., 2015).

Kachkoul et al., (2018) results came to a conclusion indicating that treatment with A. visnaga led to highly significant decrease of urine calcium, oxalate, sodium and phosphorus levels as a result of treatment with A. visnaga. Concerning serum, urine and

kidney levels of minerals and solutes, while levels of serum sodium and urine magnesium were decreased as a result of EG-administration, the levels of serum oxalate, serum potassium, urine calcium, urine oxalate, urine sodium, urine phosphorus and kidney oxalate were markedly increased.

Table (5): Effect of feeding with khella baladi on Na and K in urine and serum of hyperoxaluric rats

Groups	Serum Na (mg/dl)	Serum K (mg/dl)	Urine Na (mg/dl)	Urine k (mg/dl)
(1) Control (-ve)	268.5a±4.2	5.31a±.04	43.56e±1.32	6.35f±0.01
% of change*	+91.10	+195.00	-64.44	-76.60
(2) Control (+ve)	140.5e±3.7	1.80d±0.03	121.02a±2.9	27.14a±0.15
% of change*	-----	-----	-----	-----
(3) Khella baladi 1.5%	190.6d±3.9	2.81c±0.33	80.78b±2.7	15.12b±0.05
% of change*	+35.62	+56.11	-33.53	-44.28
(4) Khella baladi 3%	200.2c±4.1	3.31c±0.32	75.17c±2.5	13.27c±0.04
% of change*	+42.49	+83.88	-37.89	-51.10
(5) Khella baladi 4.5%	236.4b±4.2	4.20b±0.34	67.32d±2.34	8.20d±0.02
% of change*	+68.25	+133.33	-44.37	-69.78
(6) Khella baladi 6%	238.6b±4.1	4.82a±0.34	65.15d±2.25	7.99e±0.03
% of change*	+69.82	+167.78	-46.17	-70.56
LSD	7.182	0.546	4.280	0.1215

Means with the different superscript letters in the same column were significant different at (P<0.05). LSD:Least Significant Differences (P<0.05).%Change of (+ve) control group.*

Data presented in Table (6) show the effect of khella baladi on serum glucose of hyperoxaluric rats. It could be noticed that hyperoxaluria raised serum glucose. It could be observed that (-ve) control group showed -52.26% less than that obtained for (+ve) control group, with significant difference between them. Rats pretreated with (NH4CL+EG) and fed on all diets of group 3,4 had significant decrease in the mean value of glucose which were 117.7 ± 2.8 and 110.7 ± 2.5 mg/dl respectively, the percent of decrease were -45.12% & -48.39% as compared to control positive group. In concern to serum glucose the best treatment was recorded for group 6 (6 % khella baladi).
These results are supported by the results published by Alam et al., (2018) found that the extract of khella baladi may use for prevention the complications of diabetic in kidneys and liver.

Table (6): Serum glucose of hyperoxaluric rats as affected by feeding on khella baladi

Groups	Glucose(mg/dl) Mean ± SD	% of change*
(1) Control (-ve)	102.4 d ± 3.1	-52.26
(2) Control (+ve)	214.5 a ± 4.3	-----
(3) khella baladi 1.5%	117.7 b ± 2.8	-45.12
(4) khella baladi 3%	110.7 c ± 2.5	-48.71
(5) khella baladi 4.5%	99.4 de ± 2.2	-53.66
(6) khella baladi 6%	94.9e ± 1.27	-55.75
LSD	5.3001	

Means with the different superscript letters in the same column were significant different at (P<0.05). LSD:Least Significant Differences (P<0.05).%Change of (+ve) control group.*

An aqueous extract of A. visnaga was shown to possess a significant hypoglycemic effect when given to both normal and streptozotocin diabetic rats. A decoction prepared from the fruits of the A. visnaga had the ability to reduce blood glucose level by 51% in normoglycemic rats, compared to an oral hypoglycaemic agent (khalil et al.,2020).

The aqueous extract of A. visnaga possess significant hypoglycemic effect in both normal and STZ diabetic rats (El Karkouri et al.,2020).

Data in Table (7) serum protein fractions (T.protein, albumin & globulin) of all experimental groups. As shown in this table the best treatment for T.protein was observed for group 6 (6% khella baladi), the better treatment for albumin was noticed for group 6 with non-significant difference with G4, G5& (-ve) control group, and the best treatment of globulin recorded to group 6 with non-significant difference with control(-) group, in comparison with (+ve) control group.

Similar results were obtained by Lai et al., (2018) who reported that hyperoxaluria lowered the serum albumin & globulin compared to control (–) group.

Also, Liu et al., (2019) found that by EG intoxication T. protein revealed 59.1 % reduction compared to control (–) group, while feeding on diets containing A. visnaga 2%, A. majus 2% and centaury seeds diets as well as their mix.

Data in Table (8) serum bilirubin fractions (total bilirubin, direct bilirubin and indirect bilirubin) of all experimental groups. As shown in this table the best treatment for total bilirubin was observed for group 6 (6% khella baladi), There are non-significant difference noticed in direct bilirubin for G6, G5 &(-ve) control group, and the best treatment of indirect bilirubin recorded to G6&G5, in comparison with (+ve) control group.

Table (7): Effect of feeding with khella baladi on serum protein fractions (T. protein, albumin & globulin) of hyperoxaluric rats

Parameters / Groups	T. protein(g/dl)		Albumin (g/dl)		Globulin (g/dl)	
	Mean±SD	%of change*	Mean±SD	%of change*	Mean±SD	%of change*
(1) Control (-ve)	10.9a±0.46	+140.55	5.09a±0.48	+153.23	5.8 a ± 0.47	+132.93
(2) Control (+ve)	4.52f±0.20	-----	2.01d±0.28	------	2.49c± 0.15	------
(3) Khella baladi 1.5%	6.01e± 0.38	+32.75	3.06 c ± 0.3	+79.10	2.95 c ± 0.1	+18.47
(4) Khella baladi 3%	7.03d± 0.41	+61.365	4.01b±0.36	+99.50	3.02c± 0.23	+21.28
(5) Khella baladi 4.5%	8.27 c ± 0.5	+82.681	4.09b±0.38	+103.4	4.18b± 0.36	+67.87
(6) Khella baladi 6%	9.89b± 0.41	+132.32	4.7ab±0.30	+134.32	5.31a ± 0.30	+113.45
LSD	0.726		0.2933		0.542	

Means with the different superscript letters in the same column were significant different at (P<0.05). LSD:Least Significant Differences (P<0.05).%Change of (+ve) control group.*

Table (8): Effect of feeding with khella baladi on T. Bil., D.Bil. and Ind.Bil. levels of hyperoxaluric rats

Parameters / Groups	T. Bil (mg/dl)		D. Bil (mg/dl)		Ind. Bil (mg/dl)	
	Mean±SD	%of change*	Mean±SD	%of change*	Mean±SD	%of change*
(1) Control (-ve)	0.21e ± 0.010	-48.157	0.05c±0.00	-38.077	0.16d±0.00	-49.019
(2) Control (+ve)	0.40a± 0.016	-----	0.10 a±0.016	-----	0.31a±0.01	-----
(3) Khella baladi 1.5%	0.36b±0.011	-11.056	0.09b±0.00	-14.423	0.27b±0.01	-11.438
(4) Khella baladi 3%	0.35b±0.012	-13.759	0.08b±0.005	-18.269	0.27b±0.00	-13.399
(5) Khella baladi 4.5%	0.28c±0.004	-31.204	0.07c±0.00	-33.654	0.21c±0.00	-31.699
(6) Khella baladi 6%	0.260 d±0.00	36.118-	0.06c±0.08	-40.385	0.2c ±0.00	-35.621
LSD	0.0172		0.014		0.0134	

Means with the different superscript letters in the same column were significant different at (P<0.05). LSD:Least Significant Differences (P<0.05).%Change of (+ve) control group.*

The present results were in agreement with that of Cheshchevik et al., (2012) who found that flavonoids improved the antioxidant capacity of the liver and diminished the bilirubin concentration compared with the groups without such treatment.

It is clear that from data of table (9) that showed that EG intoxication can led to increase levels of TC, TG, LDL and VLDL in (+ve) control group compared with (-ve) control group while HDL had opposite trend. The results indicated that treatment with 1.5%, 3%,

4.5% & 6% khella baladi can decrease LDL, TC, TG and VLDL levels and increase HDL level compared with (+ve) control group.

Table (9): Effect of feeding with khella baladi on TC, TG, HDL, LDL and VLDL of hyperoxaluric rats

Groups	TC (mg/dl)	TG (mg/dl)	HDL (mg/dL)	LDL (mg/dL)	VLDL (mg/dL)
(1) Control (-ve)	81.66f±2.6	51.16f±5.2	43.13a±0.63	28.30f±0.28	10.23e±0.25
% of change*	-44.57	-63.20	128.21+	-71.87	-63.21
(2) Control (+ve)	147.33a±3.9	139.04a±1.2	18.90f±0.95	100.62a±0.43	27.81a±0.44
% of change*	-----	-----	-----	-----	-----
(3) Khella baladi 1.5%	114.21b±3.1	90.43b±0.8	28.83e±0.96	67.92b±0.39	18.09c±0.28
% of change*	-22.48	-34.96	+52.55	-32.49	-34.95
(4) Khella baladi 3%	102.13c±2.8	74.13c±0.7	30.93d±0.61	56.37c±0.36	14.83c±0.27
% of change*	-30.679	-46.77	+63.65	-43.97	-46.67
(5) Khella baladi 4.5%	96.09d±2.4	63.24d±0.5	38.03c±0.64	45.41d±0.34	12.65d±0.27
% of change*	-34.77-	-54.51	+101.23	-54.86	-54.51
(6) Khella baladi 6%	86.79e±1.50	55.03e±0.3	39.91b±0.76	35.38e±0.28	11.01e±0.26
% of change*	-41.09	-60.42	+111.16	-64.83	-60.40
LSD	4.007	3.984	1.267	0.624	0.55

Means with the different superscript letters in the same column were significant different at (P<0.05). LSD:Least Significant Differences (P<0.05).%Change of (+ve) control group.*

The present study is in accordance with Risaliti et al., (2013) who demonstrated that ethanolic extract of A.visnaga L. (khellin) has, anti-dyslipidemia and anti-oxidative activities, A. visnaga extract decrease LDLc that is the potential risk factor for cardiovascular diseases. Also, Reiner, (2013) showed that elevated levels of lipid profile of triglycerides after using A. visnaga for 9 days the patient has showed increase in HDL-cholesterol levels, but also lowering effect on triglycerides. Akbar, (2020) showed that oral administration of 50 mg of khellin (A. visnaga compound) four times daily for 4 weeks showed significant increased levels of HDL-cholesterol concentration without affecting total cholesterol or triglycerides concentration. This supports that the khellin compound in A. visnaga can also be of value to raise HDL-cholesterol.

In conclusion, khella baladi has been used in traditional medicine for millennia. At present, it is widely cultivated by many peoples and companies aiming to use its extracts or active principals in the pharmaceutical industry. The obtained results from the current study has suggested that khella baladi could be minimized the hyperoxaluric effect of (NH4Cl+EG) and potent a diuretic effect.

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تأثير نبات الخلة البلدية على الفئران المصابة بفرط اوكسالات البول

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هدفت الدراسة الحالية إلى معرفة تأثير الخلة البلدية علي تحسين الخلل الوظيفي الكلوي في الفئران التي تعاني من فرط أوكسالات البول. تم تقسيم ستة وثلاثين من ذكور الفئران البيضاء البالغة إلى ست مجموعات ، ستة فئران لكل مجموعة. تم الاحتفاظ بإحدى المجموعات كمجموعة ضابطة سالبة، بينما عولجت المجموعات الخمس الأخرى بالإيثيلين جليكول 0.75٪ وكلوريد الأمونيوم 1٪ لمدة أسبوع عن طريق مياه الشرب للإصابة بفرط أوكسالات البول. أضيفت الخلة البلدية إلى الخمس مجموعات بكميات مختلفة (1.5 ، 3 ، 4.5 ، 6٪) على التوالي.وقد استمر العلاج لمدة 28 يومًا. وقد أظهرت النتائج المتحصل عليها أن المعاملة بالخلة البلدية بكميات مختلفة (1.5 ، 3 ، 4.5 و 6٪) على التوالي لمدة 28 يوم أدت إلى زيادة معنوية ($P \leq 0.05$) في النسبة المئوية للوزن المكتسب ، المأخوذ الغذائى، معدل الاستفادة من الغذاء، الليبوبروتين مرتفع الكثافة ، البروتين الكلي ، الألبيومين ، الجلوبيولين ومستوى الصوديوم والبوتاسيوم في الدم كما أدت الي حدوث انخفاض معنوي ($P \leq 0.05$) في وزن الأعضاء النسبي ، وظائف الكبد ، وظائف الكلى ، مستوى الصوديوم والبوتاسيوم في البول ،مستوي الجلوكوز في الدم ، مؤشرات البيليروبين في الدم ، الدهون الثلاثية ، الكوليسترول الكلى ، الليبوبروتين منخفض الكثافة ، الليبوبوتين منخفض الكثافة جدا.وكان أفضل المعاملات الخلة البلدية 6٪. لذلك يمكن استنتاج أن الخللة البلدية يمكن أن تقلل من تأثير فرط أوكسالات البول للفئران المصابة بالإيثيلين جليكول وكلوريد الأمونيوم ولها تأثير مدر للبول.

الكلمات المفتاحية: وظائف الكلي ،حصوات الكلى ، الاثيلين جليكول ،رابع كلوريد الامونيوم