Potential Effects of Soybean Diets Supplemented with Cardamom, Green Coffee, and Olive Leaves on Kidney Functions in Acute Renal Failure Rats

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ABSTRACT

The aim of this study was to investigate the effects of soy protein diet (SD) and mixture between (SD) and Casein (1:1 w/w), supplemented with 5% from cardamom (Car), green coffee (GC), and olive leaves (OL), or a or 5% mixture from them, on daily feed intake (FI), body weight gain % (BWG%), organ weights / body weight % (OW / BW%), kidney functions , and histopathological changes of kidneys in acute renal failure rate (ARFR). A total of 78 adult male albino rats of the Spragu-Dawley strain, weighing 200±10 g, were used in this study. The rats were divided into two main groups. The first main group (6 rats) was fed a basal diet (BD) and used as a control negative group (-ve). The second main group (72 rats) was injected with glycerol to induce acute renal failure. These rats were divided into 12 subgroups; one of them (6 rats) was fed on BD used as the (+ve) control group . The other subgroups (11 subgroups) were fed on (SD) or (BD) or mixed protein (1:1) from soybean and casein, supplemented with 5% from (Car), (GC), (OL) or (5%) mixture between them for 8 weeks. At the end of the experiment, rats were anesthetized with ether before being sacrificed after fasting overnight. Kidneys were then removed and weighted. Blood samples were collected, left to clot, and then serum was separated. The serum uric acid, urea nitrogen, and creatinine levels were determined, and the kidneys were examined for histopathological changes. The obtained results revealed that glycerol injection-induced acute renal failure led to a non-significant change in FI while induced a significant decrease in BWG % as compared to the (-ve) control group. The obtained results revealed that diets containing treatments for rats suffer from ARF. Soybean protein, BD, supplemented with

Car, GC, or OL, induced a significant improvement in all parameters. Meanwhile, the positive groups fed a diet containing a mixture of 50% protein from soybean and 50% casein, supplemented with a 5% mixture from (Car, OL, and GC showed the best improvement. This diet led to a non-significant change in feed intake (FI) and a non-significant decrease in body weight gain percentage (BWG%) compared to the positive control group. The dietary treatment significantly decreased the relative weight of the kidney as well as levels of uric acid, urea nitrogen, and creatinine compared to the positive control group. Histopathological examination revealed changes in the kidneys of rats injected with glycerol, but most of these lesions were ameliorated following the dietary treatments, compared to the positive control group fed only the basal diet (BD). In conclusion, the mixture of soybean and casein (1:1) supplemented with a 5% blend of Car, OL, and GC contains a considerable number of healing compounds, namely polyphenols, flavonoids, and isoflavonoids. These compounds can help protect against kidney toxicity and are valuable for dietary therapy in the treatment of acute renal failure.

Keywords : Soybean diets, cardamom, green coffee, olive leaves, kidney functions, histopathological examination, and acute renal failure

INTRODUCTION:

Kidney disease, or renal disease, also known as nephropathy, is damage to or disease of the kidney. Nephritis is an infected kidney disease and has several types according to the location of the inflammation. Inflammation can be diagnosed by blood tests. Kidney disease usually causes a loss of kidney function. Kidney failure is known as the end stage of kidney disease, where dialysis or kidney transplantation are the only treatment options. Chronic kidney disease is defined as prolonged kidney abnormalities (functional and/or structural in nature) that last for more than three weeks. Acute kidney disease is now termed acute kidney injury and is marked by a sudden reduction in kidney function over seven days **(Carrl and David, 2016)**.

Jenkis and Kendall (2003) have shown that substituting animal protein for soybean or other vegetable proteins results in decreased

renal hyperfiltration, reduced protein and renal acid load, and consequently lowers the risk of renal disease in individuals with diabetes. It is due to soybeans contain isoflavones, which have antioxidant properties that may protect the kidneys from oxidative stress. Additionally, their protein content is low in phosphorus, which is beneficial for patients with ki dney disease. Soybeans can help reduce inflammation and improve kidney function by modulating lipid profiles and blood pressure according to **Kamila et al., (2024).**

Ballabh et al., (2008) reported that cardamom has been employed in traditional medicinal plants used against kidney and urinary disorders. because cardamom has diuretic properties, which may help in reducing blood pressure, thereby alleviating stress on the kidneys. Its antioxidant compounds can also protect renal tissues from damage caused by free radicals.

Coffee is a widely consumed beverage that contains a complex mixture of compounds, including caffeine, chlorogenic acid, and diterpenes. These compounds exhibit various in vivo properties, such as anti-inflammatory, antioxidant, and antifibrotic effects **(Ponte, 2002).** They may also improve glucose metabolism, which is crucial in preventing diabetic nephropathy according to **(Wu and Huang, 2018)**.

Olive (Olea europaea) leaves are rich in phenolic compounds such as oleuropein, rutin, luteolin, and apigenin, as well as triterpenes and chalcones these compounds with anti-inflammatory and antioxidant properties. Oleuropein helps in protecting the kidneys from oxidative damage and may also have a role in reducing hypertension, thus preserving kidney function **(Meirinhos et al., 2005).**

Therefore, the aim of this study was to examine the impact of a soybean-based diet supplemented with cardamom, green coffee, and olive leaves on kidney function in albino rats with acute kidney failure.

MATERIALS AND METHODS:

Material: Casein, vitamins, minerals, cellulose, and choline chloride were purchased from El-Gomhoria Company, Cairo, Egypt. Soybeans were obtained from the Agricultural Research Center in

Cairo, Egypt. Cardamom, green coffee, and olive leaves were obtained from Agricultural Herbs and Medicinal Plants, Cairo, Egypt. Kits for biochemical analysis were obtained from Alkan for Pharmaceutical and Chemical Dokki, Egypt.

Rats: Seventy-eight adult male albino rats (Spragu Dawley strain) weighing 200±10 were purchased from the Helwan farm of experimental animals, Ministry of Health and Population, Helwan, Cairo, Egypt.

Methods:

Experimental Design:

After acclimation to a basal diet (BD) for one week, rats were classified into two main groups. The first main group (n = 6) fed on (BD) as a control negative group (-ve). The second main group (72 rats) was injected with glycerol (50% weight/volume) in 0.9% saline at 5 ml/kg to induce acute renal failure according to the method described by **Maree et al., (1994).**

The positive injected groups: the first group was fed a basal diet (BD), the second group served as a control group and was fed a soy protein diet (SD), while the remaining groups were fed either a basal diet (BD) or a soy protein diet (SD), and/or diets containing a combination of casein and soy beans as sources of protein (1–1) supplemented with 5% (Car), (GC), and olive leaves (OL). The diet consumed was recorded every week. At the end of the experiment, the rats were fasted overnight, and then the rats were anesthetized with pentobarbital sodium (40 mg/kg) and sacrificed. Blood samples were collected from the aorta of all rats. The blood samples were centrifuged, and serum was separated by centrifugation of the blood sample. Then it was kept frozen at -20 °C until the analysis. Kidneys were removed from rats by careful dissection, washed in a saline solution (0.9%), dried using filter paper, and independently weighed.

Biochemical Analysis:

Determination of serum uric acid according to **(Fossati et al., 1980)**, serum urea nitrogen according to **Patton and crouch, (1977),** serum creatinine according to **Bartels and Bohmer (1971).**

Histopathological Examination:

Specimens from kidney tissue was taken immediately after sacrificing animals and fixed in a 10% buffered neutral formalin solution. The fixed specimens were then trimmed, washed and dehydrated imbedded in parillin, cut into sections of 46 microns in thickness, and stained with hematoxylin and eosin stain, according to **Sheehan and Hrapchak, (1980).**

Statistical Analysis:

The results of the biochemical analysis and biological evaluation of each group were statistically analyzed using the mean, standard error, and one-way ANOVA test using the SAS package with a level of significance of $P<0.05$ **(SAS, 2004).**

RESULTS AND DISCUSSION:

Biological Effects of Soybean Diets Supplemented with Cardamom, Green Coffee, or Olive Leaves on Feed Intake, Body Weight Gain %, and Kidney Weight / Body Weight % of Rats Suffering from Acute Renal Failure

Table (I) illustrates the effects of the soybean diet (SD), basal diet (BD), and their mixture (1:1 w/w) supplemented with cardamom (Car), green coffee (GC), and olive leaves (OL) on feed intake (FI), body weight gain % (BWG%), and kidney weight / body weight % of rats suffering from acute renal failure (ARF).

Results revealed that the (+ve) control group recorded a non-significant difference ($P<0.05$) in feed intake (FI) as compared to the (-ve) control group. On the other hand, the data in this table showed no significant differences between all the treated groups when compared to the control groups, both negative and positive.

Concerning body weight gain% and kidney weight/body weight% results revealed that the control (+ve) group which fed on (SD) recorded a significant decrease ($P<0.05$) in BWG % and kidney weight/body weight% as compared to the (-ve) control group fed on (BD). On the other hand, the (+ve) group that fed on (BD) supplemented with 5% Car recorded a significant decrease ($P<0.05$) in BWG% as compared to the (+ve) control fed on only (BD). Results showed a significant ($P<0.05$) decrease in BWG% of all (+ve) groups fed on (BD) or (SD) and mixed SD plus Casein (1:1w/w) supplemented with 5% Car, GC, or OL or a (5%) mixture of them as compared to (+ve) groups fed on only (BD) or (SD). On the other

side, the (+ve) group fed on mixed protein (SD plus casein) (1:1) supplemented with 5% Car recorded a significant ($P<0.05$) increase in BWG% as compared to the (+ve) group fed on (SD) supplemented with 5% Car. The (+ve) group fed on SD supplemented with 5% Car recorded a significant decrease in (BWG%) and (KW/BW%) as compared to the (+ve) group fed on SD without 5% Car.

The effect of green coffee (GC) on BWG% in ARF rats results revealed that the (+ve) group fed on SD supplemented with 5% (GC) recorded a significant decrease in BWG% as compared to the (+ve) which fed on BD supplemented with 5% (GC). Also, the mixed (1:1) SD plus BD supplemented with 5% GC recorded a significant decrease in BWG% as compared to BD plus 5 GC.

The results revealed that the positive control groups fed on a soybean diet (SD) or basal diet (BD) supplemented with 5% olive leaves (OL), as well as the group treated with a mixed diet (1:1 soybean and casein as protein sources) supplemented with 5% OL, showed a significant decrease ($P<0.05$) in both body weight gain percentage (BWG%) and kidney weight relative to body weight percentage (KW/BW%) compared to the positive control groups fed on SD or BD without supplementation. Meanwhile, results revealed that the (+ve) group fed on a mixed diet containing 50% SD plus 50% casein supplemented with 5% OL recorded a significant decrease ($P<0.05$) in BWG% and kidney weight / body weight% as compared to the (+ve) groups fed on BD or SD supplemented with 5% OL.

The (+ve) group fed on a mixed diet containing SD plus Casein (1:1) supplemented with a (5%) mixture of Car, GC, and OL recorded a significant decrease in BWG% as compared to all treated groups.

Concerning kidney weight/BW% (KW/BW%). Our findings revealed that the (+ve) control group recorded a significant increase ($P<0.05$) in (KW/BW%) as compared to the (-ve) control group. Our results also revealed that the (+ve) group fed on (SD) recorded a significant ($P<0.05$) decrease in (KW%/BW%) as compared to the (+ve) control fed on (BD). Results revealed that all (+ve) groups fed on (SD) or (BD) supplemented with 5% (Car, GC, or OL) or a 5%

mixture of them induced a significant decrease (P<0.05) in (KW%/BWG%). The best improvement was recorded by the (+ve) group, which fed on mixed (SD and Casein 1-1) supplemented with a 5% mixture of (Car, GC, and OL), which recorded a significant decrease as compared to the to the other (+ve) group fed on different treatments.

Our results agree with **Aydogdu et al. (2006) and Giannoglou et al., (2007)** who found that glycerol injections are used to induce acute renal failure (ARE) in rats due to rhabdomyolysis and myoglobin release, resulting in ischemic injury and nephrotoxicity. Through the development of rhabdomyolysis, a single intramuscular injection of glycerol in rats causes acute kidney injury (AKI) **(Ustundag et al., 2008).** The current study shows that vegetable protein "soybean," animal protein, or mixed between them supplemented with (Car, GC, and OL) induced a significant improvement as well as a favorable effect as well as a significant decrease (P<0.05) in (KW/BW%). Our results agree with **Fouque et al. (1992)** who indicated that not only protein restriction but also modification in the type of protein consumed has favorable effects on renal health because not all proteins are equal in their biological value. Also, soybeans are relatively enriched in isoflavone and rich in phenols, which have been reported to exhibit antioxidant activity.

Effect of Soybean Diets Supplemented with Cardamom, Green Coffee and Olive Leaves on Kidney Functions in Rats Suffering from Acute Renal Failure:

Results presented in Table 2 illustrate the effects of soybean diets supplemented with Car, GC, and OL on the kidney functions of acute renal failure (ARF) rats. Levels of uric acid, urea nitrogen, and creatinine in the control (+ve) group recorded a significant increase (P<0.05) as compared to the control (-ve) group. Also, the result revealed that the (+ve) group that was fed on soybean diet (SD) recorded a significant decrease (P<0-05) in urea nitrogen, uric acid, and creatinin as compared to the (+ve) group fed on BD.

Our results agree with **Wright and Salter, (1998)** who demonstrated that diets containing soy protein cause a significant reduction in serum levels of urea that may be due to certain amino acids that reduce urea production. On the other hand, **Anderson and Fanti (1999)** demonstrated a reduction in urea values due to the

presence of low amounts of methionine in soybean protein. Also, our results cleared that (+ve) groups fed on mixed soybean protein plus casein (1:1%) supplemented with 5% Car, GC, and OL recorded a significant decrease ($P<0.05$) as compared to (+ve) groups in urea nitrogen, uric acid, and creatinine. The best improvement in kidney functions recorded by (+ve) group fed on mixed (SD) and casein (1:1) and supplemented with a 5% mixture from (Car, GC, OL). Since it recorded creatine level as (0.643±0.049) as compared to (0.838±0.055, 0.768±0.041 and 0.960±0.036 respectively for (+ve) group, fed on mixed (SD) and Casein (1:1) and supplemented with 5% from OL, GC, and Car.

The results of this study revealed a significant improvement in kidney function as well as a significant ($P<0.05$) reduction in serum urea nitrogen, uric acid, and creatinin. Our results are in agreement with **Jdonije et al. (2011)** who found that administration of olive leaves (OL) decreased the levels of creatinine, urea nitrogen, and uric acid in STZ diabetic male rats. **Visioli and Galli., (2002)** demonstrated that oleurolein, rutin, luteolin 7-glucoside, verbascosid, apigenin-7-glucoside, hydroxyty, both glycosidic and flavonoid natures.

Winarsi et al., (2012) provide valuable insights into the antioxidant potential of cardamom leaves. The presence of approximately 129.6±6.9 mg of flavonoids per gram, along with 19.22±1.1 mg of vitamin C per gram, underscores the rich phytochemical composition of these leaves. In this respect, **Verma and Kumar (2015)** suggested that the significant reduction in serum uric acid, urea nitrogen, and creatinine is due to improvements in the glomerular function of the kidney and a maintained positive nitrogen balance.

On the other hand, supplementation of soybean plus casein mixed protein diets (50:50) with 5% of Car , GC or OL induced a significant improvement , while the best improvement induced the best results of all kidney functions , induced by a mixed protein diet plus mixed (5% Car , GC and OL).

In this regard, our results are in harm with those of **Amjid and Pawan (2013),** who reported that chlorogenic acid (CGA) in

coffee is a phenolic compound, a family of naturally occurring organic compounds found in plants. It is present in high quantity in coffee, suggesting that administration of CGA improved the GFR in diabetic rats, significantly implicating its nephroprotective action.

Concerning the effect of olive leaves, our results are in line with **Vogel et al. (2015)**, who demonstrated that phenolic compounds present in oleave leaves, especially the oleuropein compounds present in olive leaves, are associated with antioxidants and antihypertensives. Oleave leaves are rich in active constituents showing medical value. They possess many water-soluble antioxidants and anti-inflammatory properties.

Histopathological Examination:

The kidneys of rats from the control (-ve) group showed normal renal parenchyma, a normal renal cortex, and a normal renal medulla, as shown in photos 1 and 2. In rats injected with glycerol control (+ve) group (ARF), kidney sections of (+ve) group fed on (BD) showed a marked vacuolar degeneration of epithelial lining renal tubules (Photos 3, 4, and 5).While some of the examined sections from this group showed a proteinaceous cast in the lumen of some renal tubles (photo 5). On the other hand, kidneys from the (+ve) (ARF) group fed on a soybean diet showed vocuolar degeneration of the epithelial lining of some renal tubles (photo 6) and congestion in renal blood vessels (photo 7). On the other side, kidneys of the (+ve) group fed on (BD) or (SD) supplemented with 5% cardamom showed proteinaceous cast in the lumen of some renal tubles (photos 8, 9, and 10) and focal necrosis of renal tubules associated with inflammatory cell infiltration (photos 11 and 12). Meanwhile, kidneys of (+ve) group rats fed on mixed soybean protein and casein (50:50 w/w) and the other diet containing SD supplemented with cardamom showed no histopathological alterations (photos 13 and 14), except for vacuolar degeneration of the epithelial lining of some renal tubules (photo 15). Results of this study showed that (+ve) group fed on mixed protein (50:50 w/w) soybean plus casein, supplemented with 5% mixture from (Car, GC & OL) induced no histopathological changes as shown (photo 16, and 17)

Histopathological changes occurred in the kidneys of rats injected with glycerol; most of these changes were militated when (+ve) rats were fed a mixed soybean diet plus casein (1:1) and supplemented with a 5% mixture of Car, GC, and OL. Histopathological findings from these studies may confirm the various biochemical changes in some serum constituents. These findings agreed with those obtained from biochemical results.

Conclusion

In conclusion, it was concluded that a soybean diet mixed with casein (1:1 w/w) and supplemented with a 5% mixture of Car, Gc, and OL generates a considerable number of healthy compounds, namely polyphenols, flavouoids and isoflavonoids, that can be helpful for protection against kidney toxicity and valuable for acute renal failure treatment.

Table (1): Biological Effect of soybean diets supplemented cardamom, green coffee and olive leaves on feed intake, body weight gain % and kidney weight / body weight % of rats suffering from acute renal failure.

Parameters / Groups		Feed intake g/day/each rat	Body weight gain %	Kidney weight/ body weight%
Control (-ve) fed on basal diet (BD)		18.343 [a] ± 0.478	35.695 [a] ± 3.458	0.490 [g] ± 0.018
Control (+ve) fed on basal diet		17.970 [a] ± 0.374	24.229 [b] ± 1.669	0.735 [a] ± 0.028
Acute renal failure group fed on	Soybean diet (SD)	17.816 [a] ± 0.407	19.872 [c] ± 0.573	0.685 [b] ± 0.016
	BD containing 5% cardamom	18.060 [a] ± 0.542	17.130 [d] ± 1.052	0.614 [c d] ± 0.015
	SD containing 5% cardamom	17.873 [a] ± 0.219	13.995 [e f g] ± 0.743	0.567 [e] ± 0.017
	Diet supplement with mixed diet casein and soybean protein (1:1) with 5% cardamom	18.00 [a] ± 0.501	15.670 [d e] ± 0.283	0.548 [e f] ± 0.013
	BD supplement with 5% green coffee	17.846 [a] ± 0.736	16.168 [d e] ± 0.647	0.663 [b] ± 0.016
	SD supplement with 5% green coffee	17.910 [a] ± 0.238	12.552 [g] ± 1.155	0.621 [c] ± 0.014
	Diet supplement with mixed diet casein + soybeans (1:1) with 5% green coffee	18.00 [a] ± 0.260	14.166 [e f g] ± 0.148	0.599 [d] ± 0.013
	BD supplement with 5% olive leaves	17.880 [a] ± 0.363	16.450 [d] ± 0.609	0.632 [c d] ± 0.011
	SD supplement with 5% olive leaves	18.060 [a] ± 0.187	13.288 [f g] ± 0.217	0.565 [e] ± 0.009
	Diet supplement with mixed diet casein + soybeans (1:1) with 5% olive leaves	17.940 [a] ± 0.721	14.891 [d e f] ± 0.359	0.564 [e] ± 0.017
	Diet supplement with mixed diet casein + soybeans (1:1) with 5% Mix. of tested materials	17.730 [a] ± 0238	12.179 [g] ± 0.357	0.533 [f] ± 0.019

LSD: Least significant differences (P<0.05)
Mean values in each column with same letters are not significantly different.

Table (2): Biological Effects of soybean diets Supplemented with cardamom, green coffee and olive leaves on kidney functions of rats suffering from acute renal failure.

Parameters / Groups		Uric Acid	Urea Nitrogen	Creatinine
Control (-ve) fed on basal diet (BD)		1.513 ^{g} ± 0.075	27.776 ^{i} ± 2.230	0.583 ^{h} ± 0.080
Control (+ve) fed on basal diet		2.833 ^{a} ± 0.115	62.666 ^{a} ± 2.886	1.866 ^{a} ± 0.047
Acute renal failure group fed on	Soybean diet (SD)	2.486 ^{b} ± 0.061	53.850 ^{b} ± 1.705	1.416 $^{a b}$ ± 0.120
	BD supplemented with 5% cardamom	2.333 ^{b} ± 0.155	51.980 ^{b} ± 2.813	1.313 ^{b} ± 0.090
	SD supplemented with 5% cardamom	2.060 ^{c} ± 0.055	43.876 $^{c d}$ ± 1.622	1.120 ^{c} ± 0.070
	Diet supplemented with mixed Diet casein and soybean protein (1:1) with 5% cardamom	1.933 $^{c d e}$ ± 0.065	40.983 $^{d e}$ ± 0.502	0.960 $^{d e}$ ± 0.036
	BD supplemented with 5% green coffee	1.982 $^{c d}$ ± 0.161	43.040 $^{c d}$ ± 2.474	1.076 $^{c d}$ ± 0.086
	SD supplemented with 5% green coffee	1.807 $^{d e f}$ ± 0.095	36.740 ^{f} ± 0.749	0.760 $^{f g}$ ± 0.059
	Diet supplemented with mixed Diet casein + soybeans (1:1) with 5% green coffee	1.748 $^{e f}$ ± 0.052	32.629 $^{g h}$ ± 1.563	0.768 $^{f g}$ ± 0.041
	BD supplemented with 5% olive leaves	2.070 ^{c} ± 0.153	44.716 ^{c} ± 3.250	1.108 ^{c} ± 0.099
	SD supplemented with 5% olive leaves	1.903 $^{c d e}$ ± 0.097	38.763 $^{e f}$ ± 1.338	0.860 $^{e f}$ ± 0.055
	Diet supplemented with mixed Diet casein + soybeans (1:1) with 5% olive leaves	1.817 $^{d e f}$ ± 0.076	35.603 $^{f g}$ ± 1.283	0.838 $^{e f}$ ± 0.055
	Diet supplemented with mixed diet casein + soybeans(1:1) with 5% Mix. of tested materials	1.664 $^{f g}$ ± 0.029	30.747 $^{h i}$ ± 1.688	0.643 $^{g h}$ ± 0.049

LSD: Least significant differences (P<0.05)
Mean values in each column with same letters are not significantly different

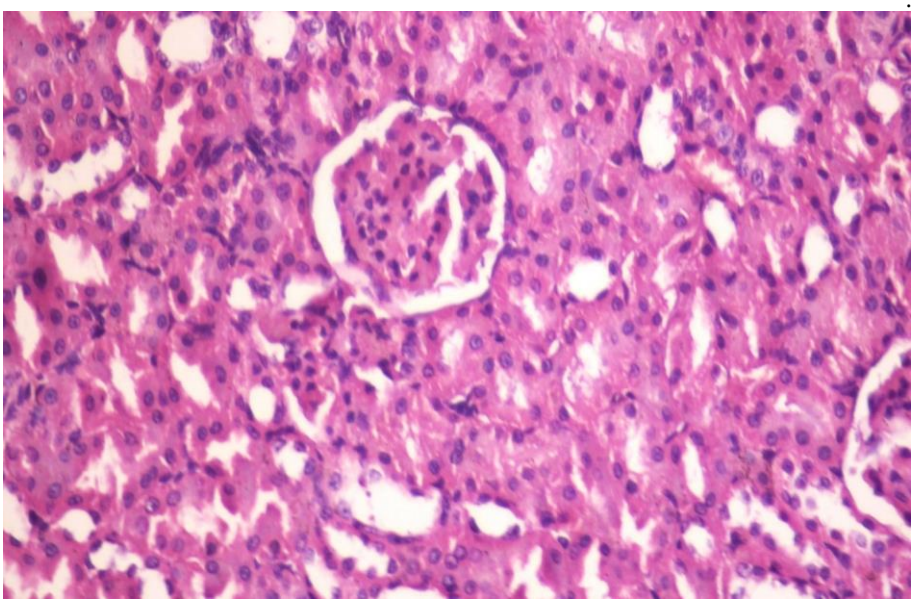

Photo (1): Photomicrograph of kidney of rat from the control negative group showing the normal histological structure of renal parenchyma (H & E X 400).

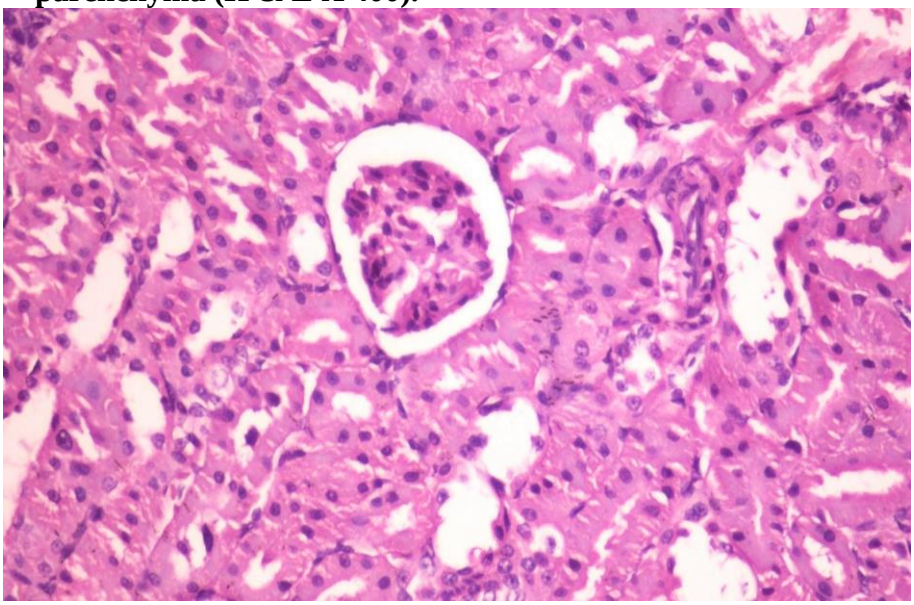

Photo (2): Photomicrograph of kidney of rat from the control negative group showing the normal histological structure of renal parenchyma (H & E X 400).

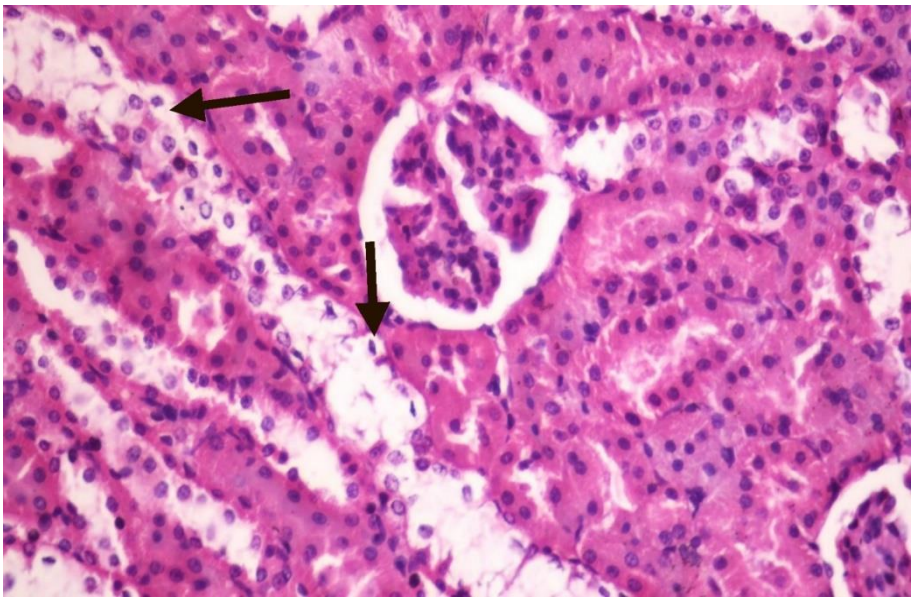

Photo (3): Photomicrograph of kidney of acute renal failure group fed on basal diet showing vacuolar degeneration of epithelial lining renal tubules (H & E X 400).

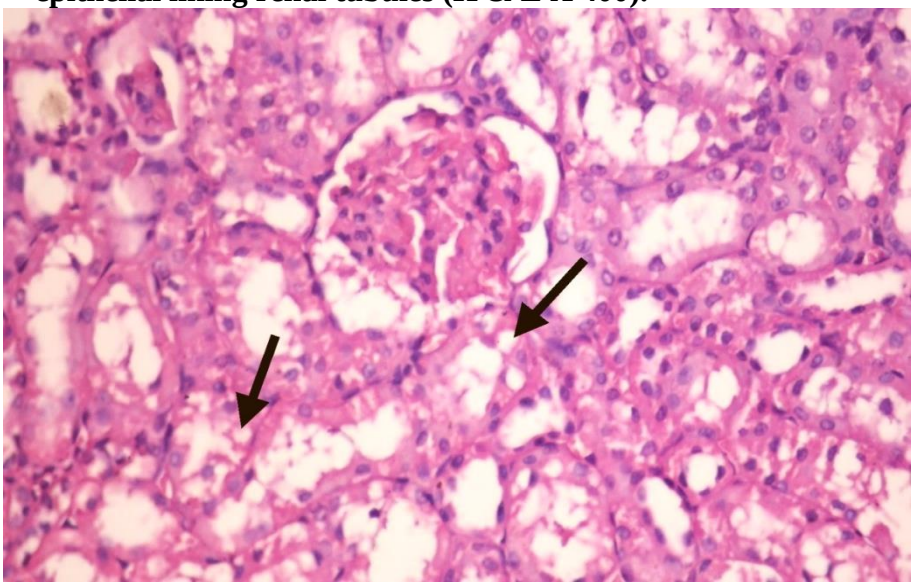

Photo. (4): Photomicrograph of kidney of acute renal failure group fed on basal diet showing vacuolar degeneration of epithelial lining renal tubules (H & E X 400).

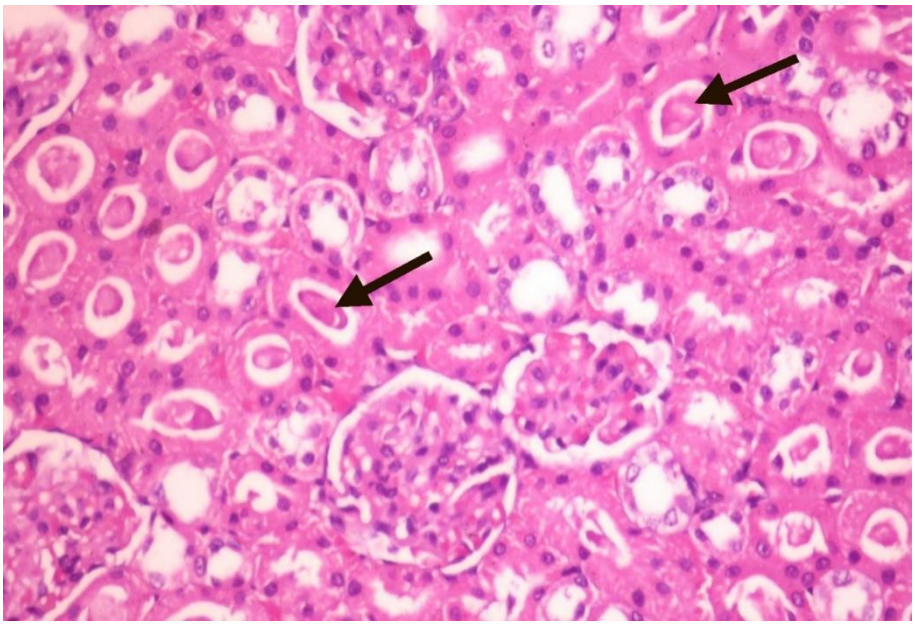

Photo. (5): Photomicrograph of kidney of acute renal failure group fed on basal diet showing proteinaceous cast in the lumen of some renal tubules (H & E X 400).

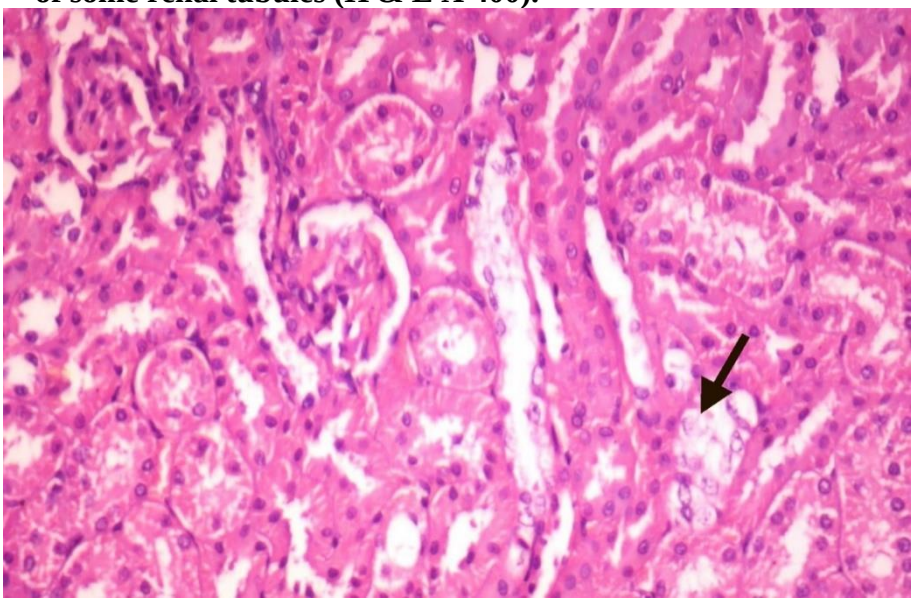

photo (6): Photomicrograph of kidney of acute renal failure group fed on soybean diet showing vacuolar degeneration of epithelial lining of some renal tubules (H & E X 400).

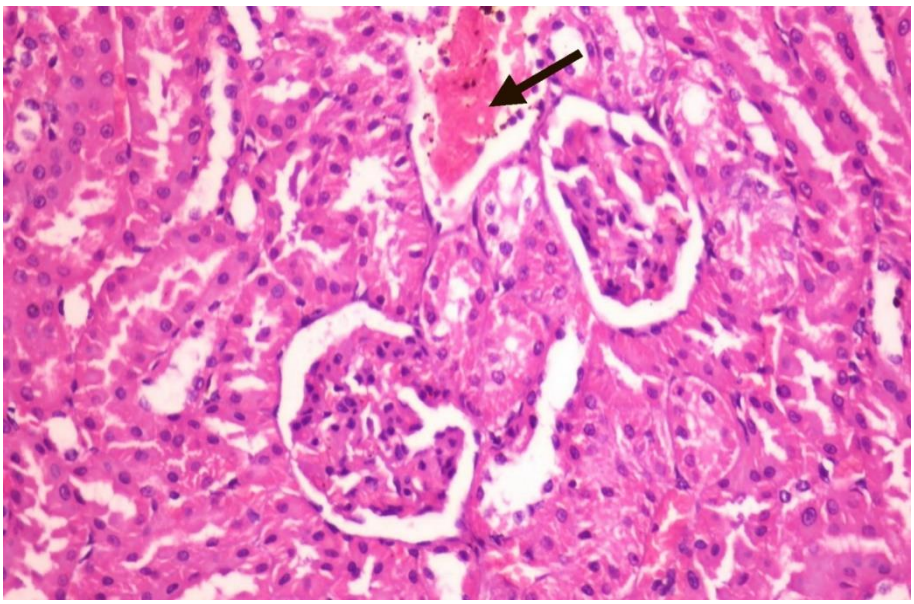

photo (7): Photomicrograph of kidney of acute renal failure group fed on soybean diet showing congestion of renal blood vessel (H & E X 400).

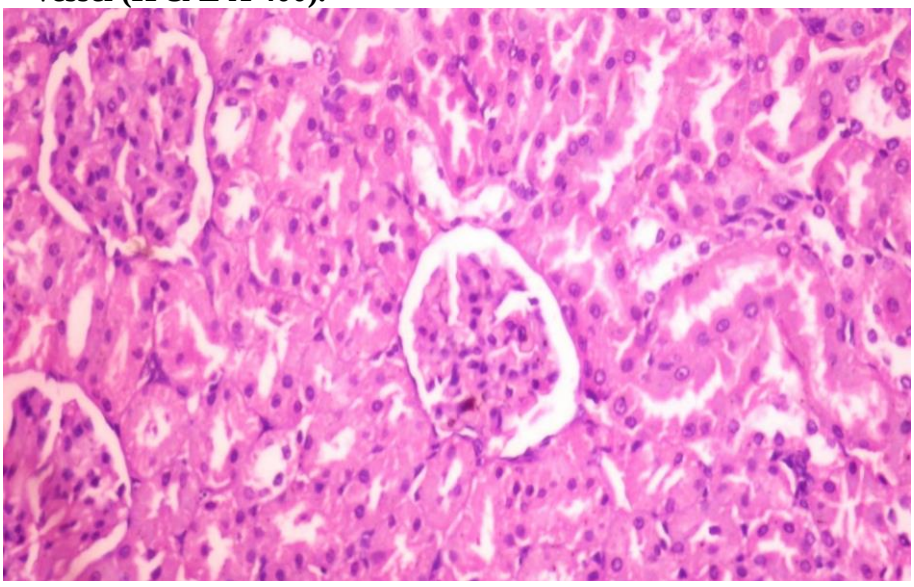

Photo. (8): Photomicrograph of kidney of rat from acute renal failure group fed on basal diet containing 5% cardamom showing no histopathological alterations (H & E X 400).

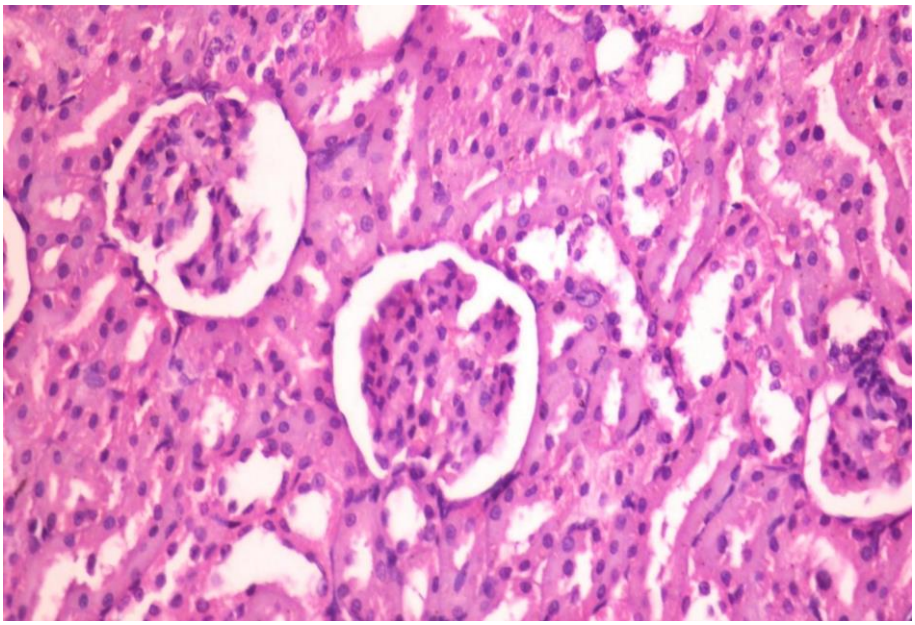

Photo. (9): Photomicrograph of kidney of rat from acute renal failure group fed on basal diet containing 5% cardamom showing no histopathological alterations (H & E X 400).

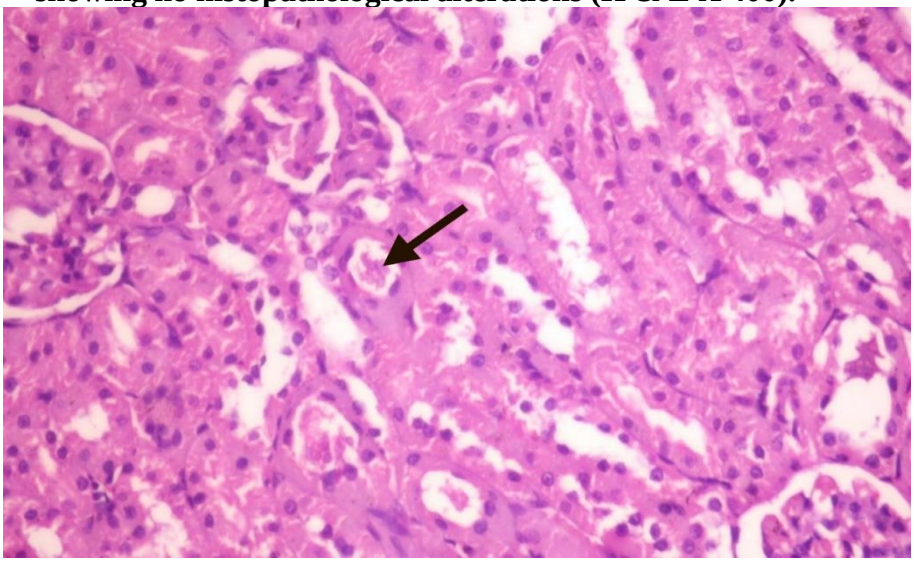

Photo (10): Photomicrograph of kidney of acute renal failure group fed on soybean diet containing 5% cardamom showing proteinaceous cast in the lumen of some renal tubules (H & E X 400).

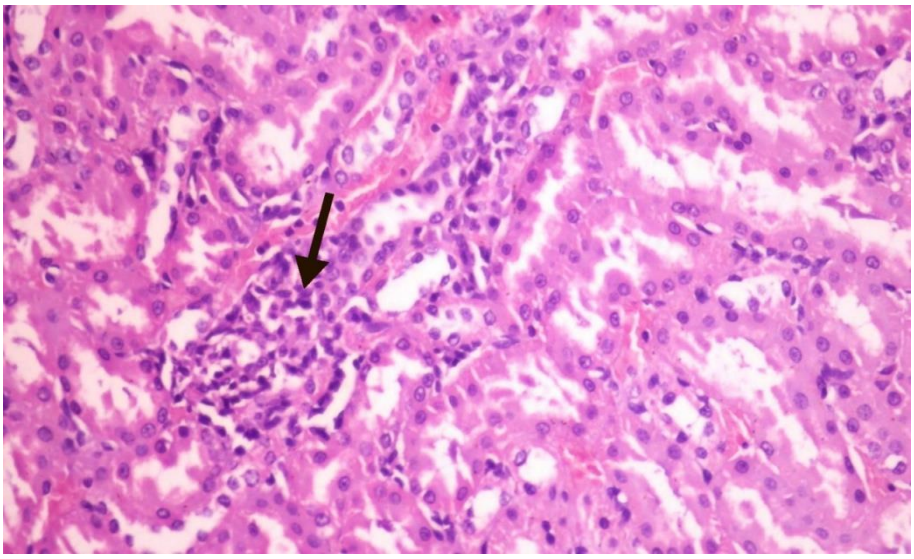

Photo (11): Photomicrograph of kidney of acute renal failure group fed on soybean diet containing 5% cardamom showing focal necrosis of renal tubules associated with inflammatory cells infiltration (H & E X 400).

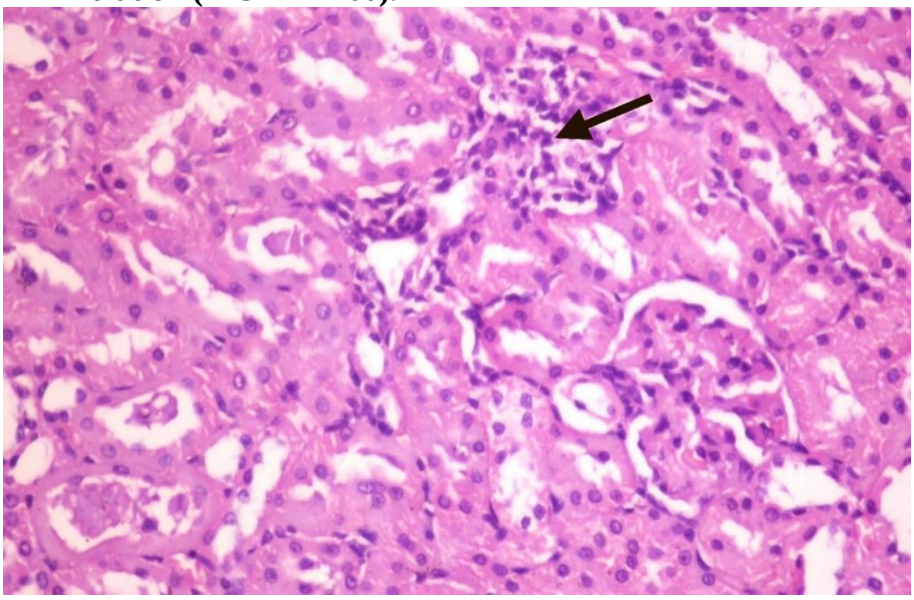

Photo. (12): Photomicrograph of kidney of rat from acute renal failure group fed on soybean diet containing 5% cardamom showing focal necrosis of renal tubules associated with inflammatory cells infiltration (H & E X 400).

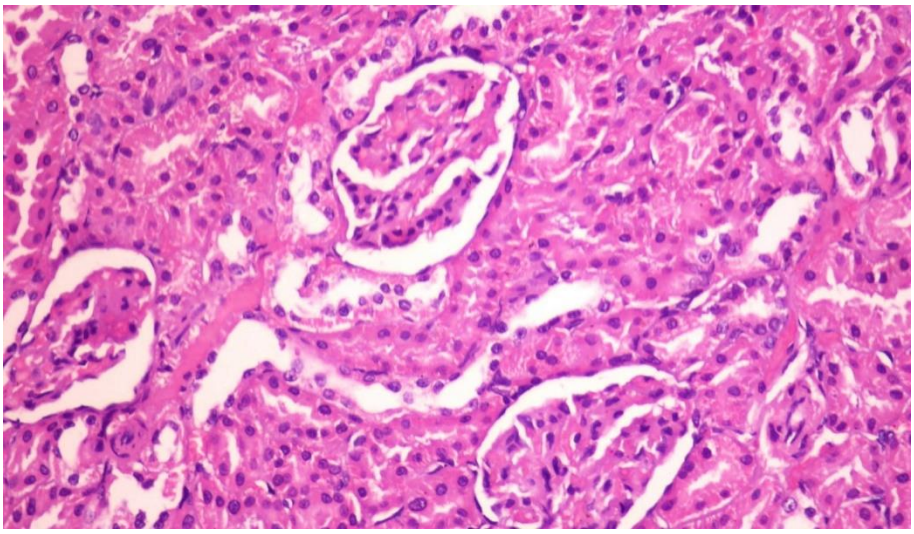

Photo. (13): Photomicrograph of kidney of acute renal failure group fed on diet containing (50%: 50%) soybean plus casein and the other from soybean, in the presence of 5% cardamom showing no histopathological alterations (H & E X 400).

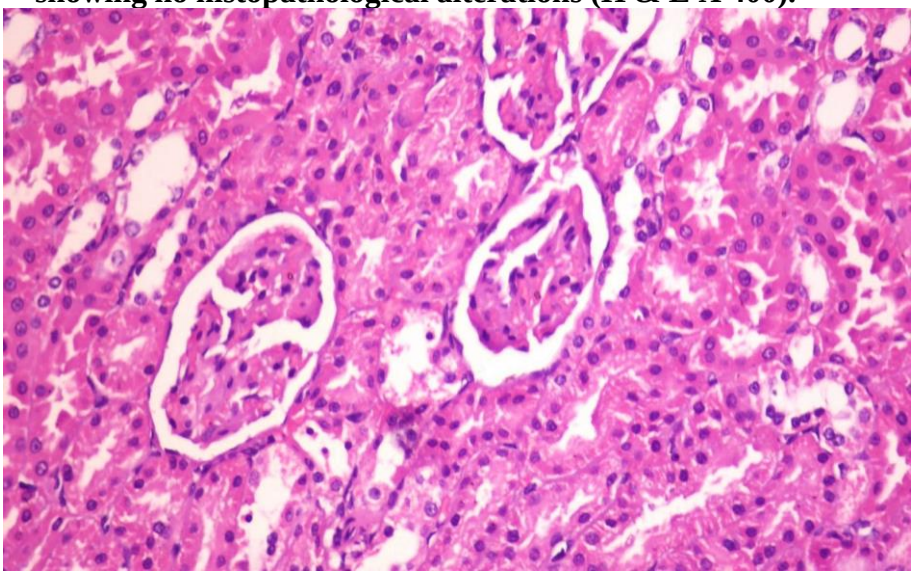

Photo. (14): Photomicrograph of kidney of rat from acute renal failure group fed on diet containing (50:50) soybean protein plus casein and the other from soybean, in the presence of 5% cardamom showing no histopathological alterations (H & E X 400).

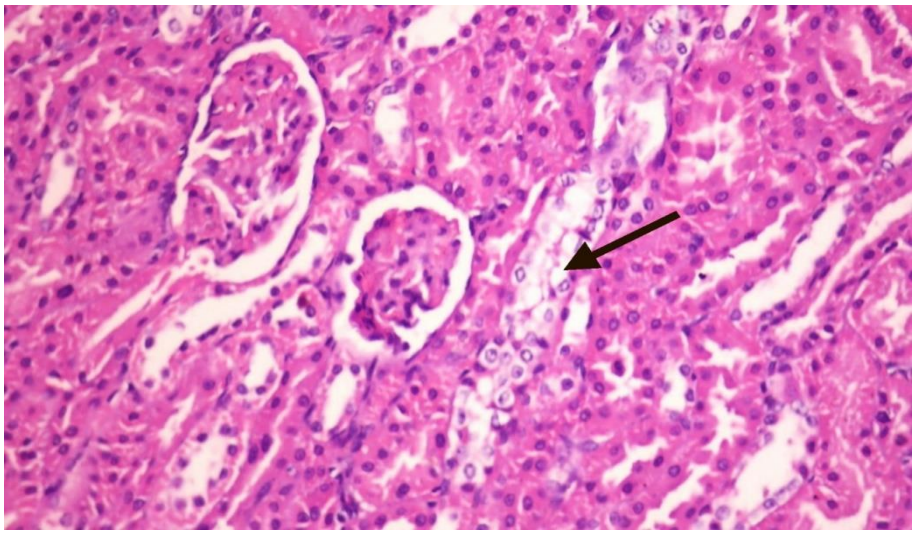

Photo. (15): Photomicrograph of kidney of rat from acute renal failure group fed on diet containing (1:1) soybean diet plus casein from casein and the other from soybean, in the presence of 5% cardamom showing vacuolar degeneration of epithelial lining of some renal tubules (H & E X 400).

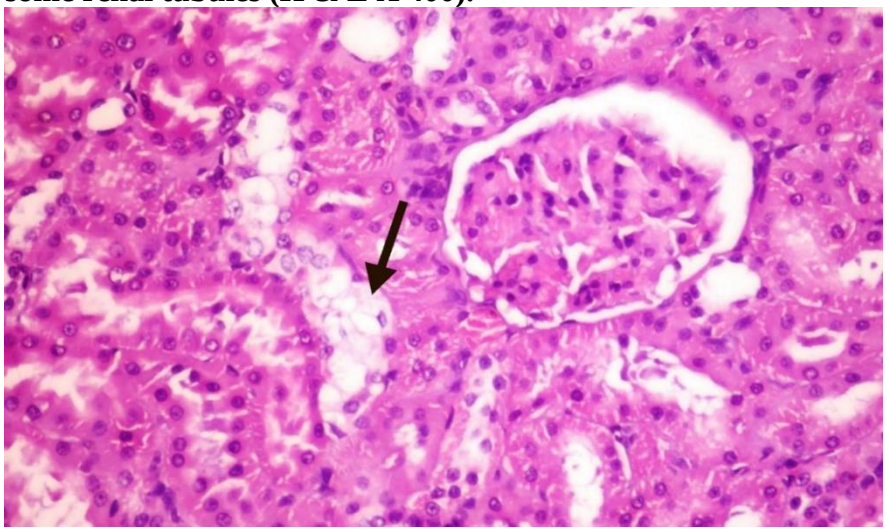

Photo. (16): Photomicrograph of kidney of rat from acute renal failure group fed on diet containing (half amount of protein from casein and the other from soybean, in the presence of 5% mix. of tested materials) showing slight vacuolar degeneration of epithelial lining of some renal tubules (H & E X 400).

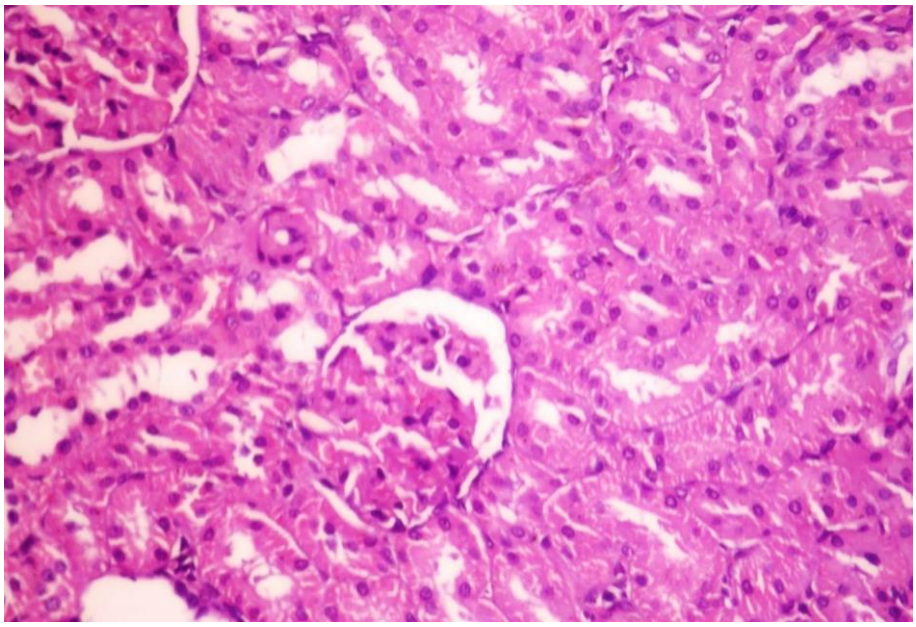

Photo. (17): Photomicrograph of kidney of rat from acute renal failure group fed on diet containing (half amount of protein from casein and the other from soybean, in the presence of 5% mix. of tested materials) showing no histopathological alterations (H & E X 400).

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إمكانية تأثير وجبات الصويا المدعمة بالهيل ، القهوة الخضراء واوراق الزيتون على وظائف الكلى في الفئران المصابة بالفشل الكلوى الحاد.

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المستخلص العربى

الهدف من هذه الدراسة هو معرفة تأثيرات التغذية على وجبات فول الصويا وخليط وجبات الصويا والكازين (١:١) المدعمة بنسبة (٥٪) من الهيل ، القهوة الخضراء واوراق الزيتون منفردة او خليط على المأخوذ اليومى من الطعام، النسبة المئوية للزيادة في وزن الجسم ونسبة وزن الكلى منسوبا إلى وزن الجسم. كذلك تم فحص التأثير على وظائف الكلى، وكذلك معرفة التغيرات الهستوباثولوجية في كلى الفئران المصابة بالفشل الكلوى الحاد. تم استخدام عدد ٧٨ فأر بالغ من فئران الالبينون فصيلة اسبراجو دولي اوزانهم ٢٠٠ ±١٠ جم . تم تقسيم الفئران إلى مجموعتين رئيسين المجموعة الرئيسية الأولى (٦ فئران) تم تغذيته على الغذاء الاساسى واستخدمت كمجموعة ضابطة سالبة. المجموعة الرئيسية الثانية (٧٢ فأر) تم حقنها بالجليسرول لاحداث فشل كلوى حاد للفئران، ثم تم تقسيمها الى (١٢) مجموعة فرعية، تم استخدام (٦ فئران) كمجموعة ضابطة إيجابية تم تغذيتها على الغذاء الاساسى اما بالنسبة (١١ مجموعة) المصابة الأخرى فقد تم تغذيتها على غذاء الصويا او الكازين او خليط الصويا مع الكازين بنسبة (١:١) مدعما بنسبة ٥٪ من الهيل ، القهوة الخضراء أو أوراق الزيتون او ٥٪ من خليط (الهيل ، القهوة الخضراء و أوراق الزيتون) وذلك لمدة ٨ أسابيع . وفى نهاية التجربة تم ذبح الفئران بعد صيام طوال الليل ثم تم فصل الكلى وتم وزنهم كما تم تجميع عينات الدم ثم فصل السيرم كما تم تقدير مستوى البروتين الكلي، والالبيومين، الجلوبيولين ، اليوريا نيروجين ، اليورك اسد و الكرياتينين كما تم الفحص الهستوباثولوجى لخلايا الكلى وقد أوضحت النتائج ان تغذية الفئران المحدث لها إصابة بالفشل الكلوى الحاد والتي تغذت على غذاء يحتوى خليط فول الصويا والكازين بنسبة (١:١) والمدعم بنسبة ٥٪ من خليط (الهيل ، القهوة الخضراء واوراق الزيتون) قد أدت هذه التغذية إلى عدم حدوث فروق معنوى في معدل المأخوذ من الطعام وذلك مقارنة بالكنترول الموجب المغذى على الغذاء الاساسى بينما أدت الى حدوث انخفاض معنوى في وزن الجسم و كذلك أدت الى حدوث انخفاض معنوى لوزن الكلى بالنسبة لوزن الجسم الكلى وذلك بالمقارنة بالكنترول الموجب المصاب المغذى على الغذاء الاساسى .كذلك أظهرت الفحوص

الهستوباثولوجية ان التغيرات الباثولوجية التي حدثت لمجموعة الفئران المصابة بالفشل الكلوى الحاد والمغذاة على الغذاء الاساسى قد اختفت في كلى الفئران المغذاة على خليط البروتين (الصويا والكازين) والمدعم بنسبة ٥٪ خليط (الهيل ، القهوة واوراق الزيتون) وذلك بالمقارنة مع مجموعة المصابة و المغذاة على الغذاء الاساسى فقط. وتخلص نتائج هذا البحث الى ان خليط بروتين فول الصويا والكازين بنسبة (١:١) والمدعم بنسبة ٥٪ خليط (الهيل ، القهوة الخضراء واوراق الزيتون) يحتوى على مركبات علاجية كالبولى فينولات والفلافونون التي من الممكن ان تساعد في الحماية ضد سمية الكلى وكذلك تعتبر ذات قيمة في العلاج الغذائي لمرض الالتهاب الكلى الحاد .