

# Effect of *Coriandrumsativum* Leaves Aqueous Extract on Structure and Function of Kidney in Male Albino Mice

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**Abstract:** *Coriandrumsativum* leaves are used in folk medicine to treat several diseases such as digestive system disorder, diabetes, and hyperlipidemia. This study was designed to investigate the effect of aqueous extract of *Coriandrumsativum* on the structure and function of kidney, 30 males of white Swiss mice *Mus musculus* were divided randomly to three groups with 10 mice in each group. Animals of first group (control group) had been given orally 0.1 ml of tap water, animals in the second group had been treated orally with 0.1 ml single dose (125 mg/Kg b. w./day) of *C. sativum* leaves extract and animals in the third group has been treated orally with 0.1 ml (250mg/Kg. b. w./day) of the same extract for 30 days. At the end of experiment, the animals had been scarified and kidney were removed and kept for histological sectioning. The data of body's weight, organs weight, uric acid and creatinine were measured. The results of the present study showed that there was no significant difference ( $P>0.05$ ) in the body's weight between the control and treated groups, as well as the kidney unchanged in its weight in animals treated with (125 mg/Kg/ b. w.), while there was significant reduction ( $P<0.01$ ) in the organs weight in animals treated with (250 mg/Kg/ b. w.) aqueous extract compared to control. Results revealed that mice treated with 250 mg of *C. sativum* extract were increased significantly in uric acid and creatinine while the treatment with (125 mg/Kg/ b. w.) of the extract resulted insignificant increase ( $P>0.05$ ) in these parameters. Moreover the treatment with aqueous extract of *C. sativum* leaves extract at dose 250 mg caused abnormal histopathological changes in kidney tissue represented by degeneration in convoluted tubules epithelium, conjection and glomerular atrophy, while the treatment with extract at dose 125 mg caused slightly changes in kidney tissue. According to above results the daily administration of *Coriandrumsativum* leaves extract induced a huge damage in the structure and functions of kidney.

**Keywords:** Coriander, Leaves, Aqueous extract, Kidney

## 1. Introduction

Nature is the oldest and most comprehensive pharmacy of all time. The phytochemicals has been practiced in treatment of various disease conditions in of traditional medicine [1]. *Coriandrumsativum* commonly known as coriander or Chinese parsley has been used, as a food stuff for centuries [2], its anherbaceous plant which originated from the Mediterranean and Middle Eastern, Indian, Latin American, African and South East Asian [3].

The fresh green leaves are used as aspice for cooking soups, in curries, in salads and as garnishes due to its flavour enhancing properties, aroma and attractive green color [4, 5]. Its strong fragrance and pleasant aromatic taste is due to presence of essential oil [6].

The main constituents of oil are linalool and monoterpenoid [7]. The study of [8] indicated that poly phenols, especially the flavonols such as quercetin, kaempferol and a cacetinare identified in coriander leaves. Also it's leaves contain fats, protein, carbohydrates, carotene fiber, minerals like (calcium, phosphorus and iron) and vitamin especially, (A, B and C) [9], and good amounts of caffeic acid, ferulic acid, gallic acid and chlorogenic acid [10].

Coriander is known for its wide range of healing properties itis generally used in gastro intestinal complaints such as anorexia, dyspepsia flatulence, diarrhea and vomiting [11]. The essential oils and various extracts of coriander have

been shown to possess antidiabetic [12] antibacterial [13] anti-mutagenic activity [14].

Kidney is a chief regulator of all the body fluid and is primarily responsible for maintaining homeostasis or equilibrium of fluid and electrolytes of the body [15]. The aim of this study was to investigate the effect of *C. Sativum* leaves on kidney tissue and function in male albino mice.

## 2. Materials and Methods

### 2.1 Plant preparation and extraction

Coriander leaves were collected from local markets in Baghdad city, that plant was identified by Ibn Al-Haitham College herbarium (BUE) the leaves were separated from the stem, washed with distilled water. Leaves were sliced in to small pieces and ground with pestle to produce a fine paste.

Coriander leaves aqueous extract were prepared by mixing limited weight of the paste in 10ml of distilled water and then the mixture was filtered by cleaning cloth to prepare the extract at dose 125 and 250mg/K.g.b.w fresh extract was administrated to mice at once [16], [17].

### 2.2 Experimental design

Experimental animals using thirty males of Swiss albino mice (*Mus musculus*), Mice's weight range from 25-30g and their ages between 80-100 day. Before the research, these

animals adapted for seven days, these mice fed by pellet and water in *ad libitum* way every day.

Mice were randomly divided in to three groups, 10 animals in each group and treated by oral gavage needle as a follows:

Group1: control group that is received orally 0.1ml of tap water daily for 30 days.

Group2: male mice treated orally with 0.1ml of coriander leaves aqueous extract at dose 125mg/Kg of body's weight daily for 30 days.

Group3: male mice treated with 0.1ml of coriander leaves aqueous extract at dose 250mg/Kg body's weight daily for 30 days.

### 2.3 Blood samples and biochemical analysis

Blood samples from each mouse were collected via cardiac puncture into a sterilized sample tube and was allowed to clot at room temperature, the samples were centrifuged at 3000xg for 10 min and sera were collected and stored at 20°C, the sera were analysed to determine uric acid and creatinine by using standard assay kits [18].

### 2.4 Organ and histological analysis

After 24 hour of the last dose the animals were weighted and then sacrificed, the abdominal of each mice was carefully dissected, kidney was surgically removed and immediately blotted using filter paper to remove traces of blood, weighted and then fixed in formalin (10%) for histological analysis. Tissue section of 10 µm in thickness were prepared according [19] and stained with haematoxylin-eosin stain.

### 2.5 Data analysis

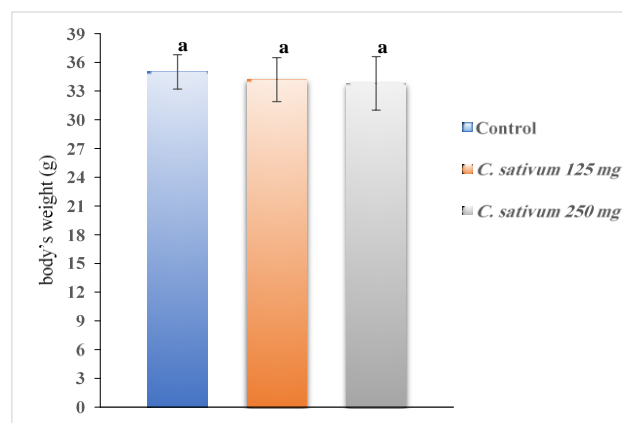
Data analysed with SPSS software to know the difference among the groups. Hypothetical test is used is ANOVA test with LSD post-hoc test [20].

## 3. Results

The results of current study confirmed that the administration of *Coriandrum sativum* at dose 125 and 250 mg/k.g.b.w. for 30 days did not affect, on body's weight, there were no significant changes ( $P>0.05$ ) in the body's weight of treated mice compared to control (Figur-1-). No significant change in kidneys relative weight ( $P>0.05$ ) in the mice treated with 125 mg/k.g.b.w. However, the kidneys weight of mice treated with the plant extract at dose of 250 mg/k.g.b.w. significantly ( $P>0.05$ ) decreased (Figure-2-). There were no significant alteration in serum levels of urea and creatinine in the mice treated with 125 mg/k.g. as compared with control. While a significant decrease ( $P>0.05$ ) in these parameters were observed in mice treated with 250 mg/kg as showed in fig (3 and 4).

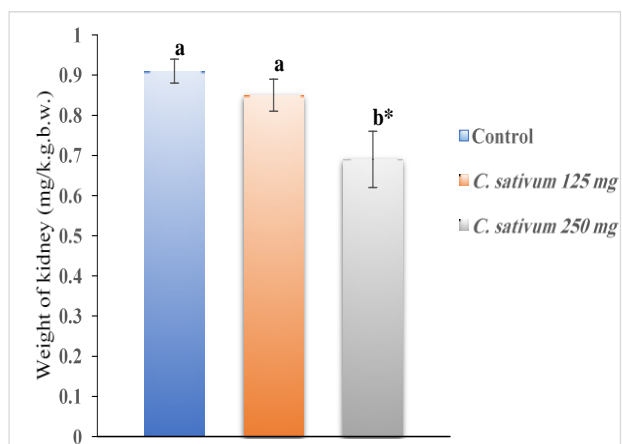
Light microscope observation of kidney tissue of mice in control group showed normal histology (normal

glomerulus and renal tubules) Figure -5-. Kidney sections of mice treated with 125 mg/kg of aqueous extract revealed mild degeneration in the epithelium lining renal tubules, congestion in renal blood vessel, but the renal capsules were appeared normally Figure 6. Whereas kidney section of treated mice at dose 250 mg/k.g. showed severe damage in tissue represented by atrophy in glomerulus, necrosis in parietal layer of Bowmman's capsule with dilation in Bowmman's space, congestion in Blood vessels, further necrosis degeneration in the epithelium lining renal tubules. Figure 7 and Figure 8 with widening in the urinary space.



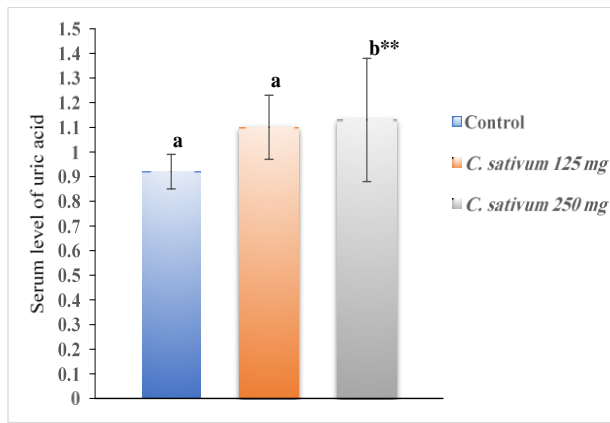
**Figure 1:** Effect of *C. sativum* leaves extract on the body's weight (g)

Values represent the mean  $\pm$  SEM (n=10). Similar litters indicate non significant deference from control ( $P>0.05$ ).



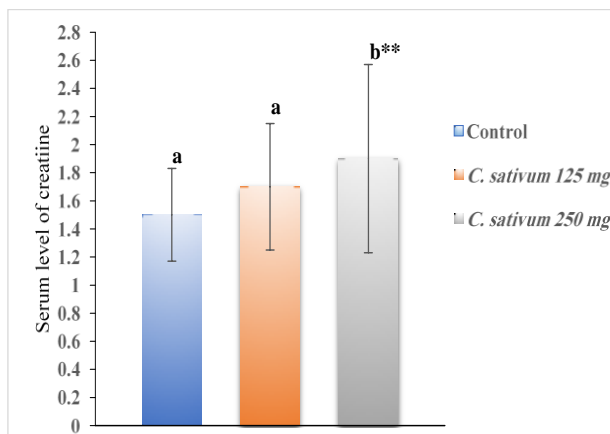
**Figure 2:** Effect of *C. sativum* leaves extract on relative weight of kidney (mg/k.g.b.w)

Values represent the mean  $\pm$  SEM (n=10). b\* Indicates significant difference from control ( $P<0.05$ ). Similar litters indicate non significant deference from control ( $P>0.05$ ).



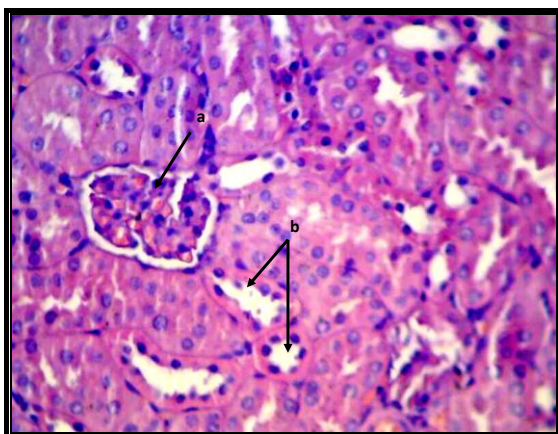
**Figure 3:** Effect of *C. Sativum* leaves extract on the serum level of uric acid

Values represent the mean ± SEM (n=10).  
 b\*\* Indicates significant difference from control (P<0.01).  
 Similar litters indicate non significant deference from control (P>0.05)

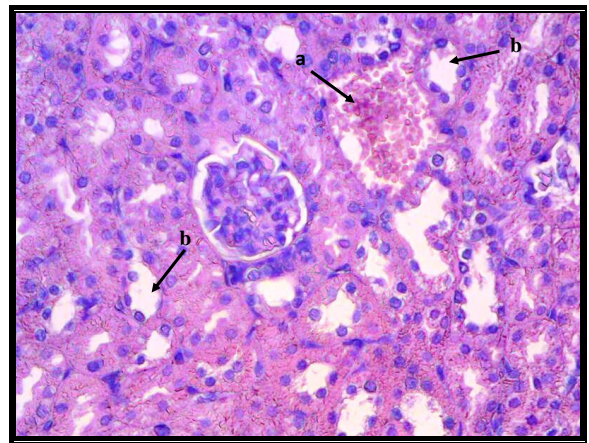


**Figure 4:** Effect of *C. sativum*leaves extract on the serum level of creatinine

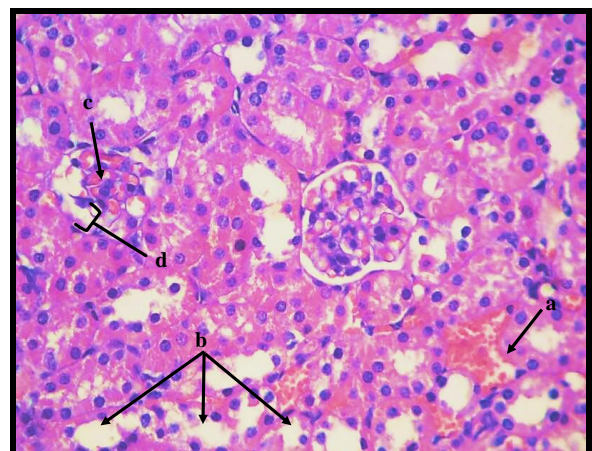
Values represent the mean ± SEM (n=10).  
 b\*\* Indicates significant difference from control (P<0.01).  
 Similar litters indicate non significant deference from control (P>0.05).



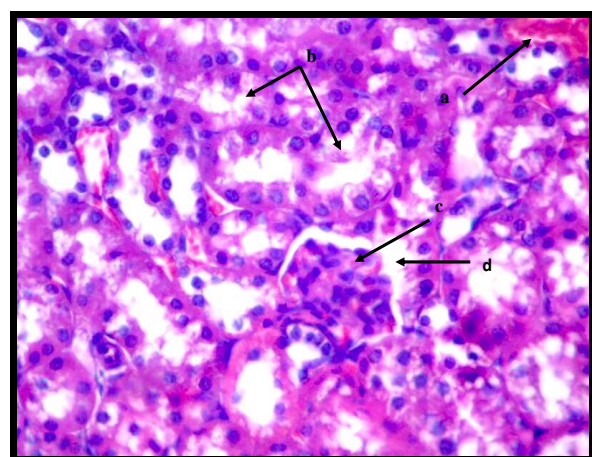
**Figure 5:** Kidney section of control mice showing normal histology (normal glomerulus (a) and renal tubules(b)) (H&E 100x)



**Figure 6:** Kidney section of mouse treated with 125 mg/kg extract showing congestion (a), moderate degeneration in some renal tubules (b) (H&E 100x)



**Figure 7:** Kidney section of mouse treated with 250 mg/kg of extract showing congestion (a), severe degeneration in the epithelium lining renal tubules (b), glomerulus shrank (c), necrosis in parietal layer of Bowmma's capsule and dilation in Bowmman's space (d) (H&E 100x)



**Figure 8:** Kidney section of mouse treated with 250 mg/kg of extract showing: Congestion (a), necrosis in most of renal tubules (b), shrank in glomerulus (c) and dilation Bowmman's space (d) (H&E 100x)



#### 4. Discussion

Herbal medicines are widely used by peoples as a primary health care for their natural origins, healthful and free from side effect. Most people believe that herbal medicines are devoid of side effects, and regarded it as a food stuff supplement and not drug [21]. In this study the light microscope section of treated mice at dose 125 mg/k.g.b.w showed moderate degeneration in renal tubules, congestion and normal renal capsule whereas severe degeneration in renal capsule and tubules observed at dose of 250 mg/k.g.b.w. This finding suggestive of some degree of toxicity effects at the higher dose.

These results in agree with the study of [22] who mentioned that high incidence of degenerative lesions occurred in renal cortex of male rats after treated with coriander oil for 28 days. But in contrast with [23] who reported that no significant alteration was observed in kidney, liver and heart after administrated with coriander seed extract at high dose and considered coriander is safe for consumption. Furthermore, our results are disagreement with [24] who refertoed the protective effect of coriander extracts against hepatotoxicity and nephrotoxicity in male mice. The reasons of contrasty in the results may be related to the part of plant used in the experiment (seed or leaves).

The phytoconstituents of seed and leaves are completely difference [25], as well as, the type of extract, dose, method of administration, duration of experiment and type of animal may be affected. Coriander leaves contain high concentration of flavonoid glycosides, polyphenolic compound and their derivative [26]. Ishikawa *et al.* [27] were confirmed that these glycosides are water soluble compound. According to [28] glomerulus is the primary site of action of various chemicals brought to the kidney by circulation and these chemicals may be injured glomerulus by any toxic metabolic and immunologic, mechanism caused degenerative changes in kidney tissue. Our results showed that the treatment with aqueous extract of plant at both dose did not affecting in body's weight, this suggesting that coriander extract possibly did not cause any alteration in fat, protein or carbohydrate metabolism [29]. So that no significant difference in body's weight between treated and control groups.

Also no significant changes in relative kidney weight at dose 125 mg/k.g.b.w, while kidney's weight was significantly decrease at dose 250 mg/k.g.b.w compared with control. The relative organ weight is primordial to diagnose if the organ was exposed to damage or not [30] and this was confirmed by histopathological section of kidney.

In our study, the damage in kidney tissue probably affecting negatively on its function causing, increase in serum levels of uric acid and creatinine at dose 250 mg/k.g.b.w. it has been reported that the raise in serum levels of uric acid and creatinine, a valuable indicate to impaired renal function or acute renal failure [31]. While no significant alteration in these parameters were observed

at dose 125 mg/k.g.b.w. According to [32] damage in the renal tubular cell will be greater with increasing dose concentration.

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