



## THE EFFECT OF CABBAGE EXTRACT ON KIDNEY FUNCTION IN MALE RATS EXPOSED TO CARBON TETRACHLORIDE

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Article history:	Abstract:
<p><b>Received:</b> February 26<sup>th</sup> 2023 <b>Accepted:</b> March 26<sup>th</sup> 2023 <b>Published:</b> April 28<sup>th</sup> 2023</p>	<p>The aim of the current study is to determine the preventive effect of the hydrological extract of green and red coiled plant leaves on kidney function by measuring urea, creatinine and uric acid in male white rats. A 50 of male Swiss rats were used, weighting 165- 210 grams, distributed to 10 groups and divided into the following groups: The olive oil dose was given by tubular feeding of 0.3 ml per rat, the second group: it was given 0.2 ml CCl<sub>4</sub> by peritoneal injection, group III: CCl<sub>4</sub> 0.2 ml injected by peritoneal injection for four weeks after which I gave the water extract of 1 ml green cabbage, Group IV: CCl injected the 4 with 2.0 ml by peritoneal injection for four weeks and then gave the water extract of 1 ml red cabbage, Group V: CCl injected 4 0.2 ml by peritoneal injection for four weeks and then gave water extract for green and red cabbage by 1 ml Group VI: salmarine herb was given 1 mg per rat. Group VII: 1 ml green cabbage water extract was given. Group VIII: 1 ml red cabbage water extract, Group IX: I gave the water extract of the green and red cabbage by 1 ml, group X: The control group was given 3 ml distilled water and by means of the infectious feeding tube with the provision of leaf, then the blood samples were withdrawn and the serum was separated by common methods and tested for the physiological and chemical variables. The results of the treatment groups were as follows: -</p> <ul style="list-style-type: none"><li>❖ Results showed a significant increase in the concentration of urea, creatinine, uric acid in totals injected with tetrachloride carbone.</li><li>❖ A significant decrease was observed in the concentrations of urea, creatinine, uric acid in aggregates dosed with cabbage of green and red types and salmarine herb group (free of tetra chloridalcarbon)</li></ul>

**Keywords:** Cabbage, Urea, Creatinine, Uric acid, Kidney.

### INTRODUCTION

Oxidative Stress is defined as an imbalance between oxygen-producing reactive interactions (ROS) Reactive Oxygen Speices and antioxidants <sup>(1)</sup> This defect is due either to the excessive production of oxidation generators or to a shortage of antioxidants, i.e. the increase of Free radicals in numbers greater than the ability of antioxidants to dispose of them and cause imbalance in the production and removal of free radicals modernized by free radicals <sup>(2)</sup>. Oxidative stress constitutes the beginning of the development of most diseases in the organism such as cardiac diseases, diabetes, cancer, aging diseases as well as urinary and reproductive tract diseases <sup>(3)</sup>.

Increasing the intake of foods rich in antioxidants or antioxidant supplements and reducing exposure to free radicals will enhance the body's potential to reduce the

risk of health problems related to free radicals. Therefore, enhancing antioxidant capacity as a useful approach to treatment and prevention of chronic inflammatory disorders has been considered as the production of activated (ROS) continuously <sup>(4)</sup> The oxidation balance is maintained by prevention and repair of any damage to the tissue <sup>(5)</sup>.

Carbon tetrachloride (CCl<sub>4</sub>) is a toxic substance that induces oxidative stress in different tissues by altering the antioxidant defence system.<sup>(6)</sup>

### Articles and working methods

#### Study animals

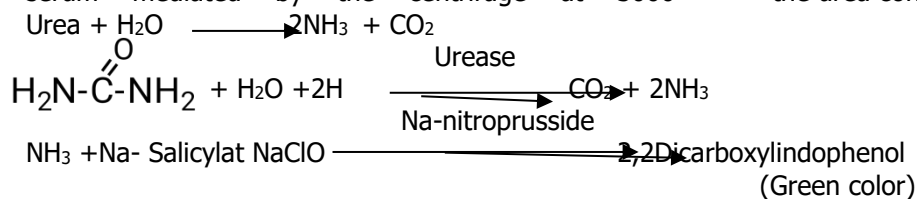
The study was conducted at Tikrit University/Faculty of Education for Girls/Department of Biology Sciences, and Animal House Laboratories in the college of Veterinary Medicine for the period from March to April 2021. In this study, 50 male Swiss white rats were used (Sprague



Dawely) weighted (210-165) grams, placed in plastic cages with dimensions (15.2-30) cm with metal lids prepared for this purpose, animals have undergone laboratory conditions of light cycle divided into 11 hours light and 13 hours darkness, and temperature has been established on  $(22 \pm 2)$  °C, the aspect of cage hygiene care has been taken into account and sterilized with the switch of sawdust every week, The animals were left for two weeks to adapt to the new conditions and to make sure they were free of disease The animals were fed on fodder consisting of 35% wheat, 34% yellow corn, 20% soybeans and 10% animal protein and 1% dried milk, with 50 grams of preservatives, vitamins and antifungal substances and continuously given food and water (ad libitum) in sufficient quantities for the duration of the research.

### Serum Collection

After the expiration of the trial period. The animals were drugged with chloroform mediation, blood was pulled from the heart and placed in test tubes free of anticoagulant left for a quarter of an hour at room temperature. The blood was then separated to get the serum mediated by the centrifuge at 3000



### Estimation of Creatinine in serum

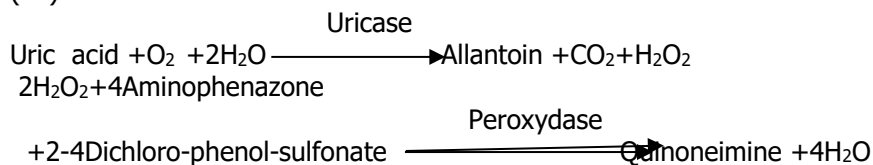
#### Principle of interaction:

Creatinine reacts by Jaff reaction with picric acid at a wavelength of 492 nm without precipitation, forming a colored complex according to (11).

### URIC acid concentration

#### Estimation serum in Principle of interaction:

This method is based on the effectiveness of the enzyme Uricase, which reacts with uric acid to produce Allantoin,  $\text{CO}_2$  and hydrogen peroxide, and in the presence of the enzyme peroxidase POD, hydrogen peroxide reacts with the compounds DPSDichloro-hydroxybenzensulfonate and 4AminophenazoneAMP, to give a red color complex according to (12).



### Statistical Analysis

The results were analysed statistically by applying the electronic statistical program (Minitab,2006) and I use the anova test. The calculation averages were compared using the Duncun multiple range test to a moral level of  $0.05 > P1$   $0.0 > (P$  (13).

rounds/minute. The serum was withdrawn with micropipette mediation. (-20) Pending analyses of physiological, chemical, immunological and enzymatic tests.

### Preparation of water extract for cabbage plant

The water extract of the cabbage plant was prepared after the cabbage leaves were picked and placed in the oven at a temperature of 37 Celsius until dried. and then the plant powder was taken with a weight of 50g and added to it 500ml of distilled water (7) and then placed on a bowl and then placed on a Hotplate & Magnetic Stirrer to move the extract and then loaded from the device and then covered the receptacle with an advance and left the cold models in the water extract for 24hr 8 refrigerator at 4 Degree Celsius temperature until use (9).

### Estimation of urea concentration in serum:

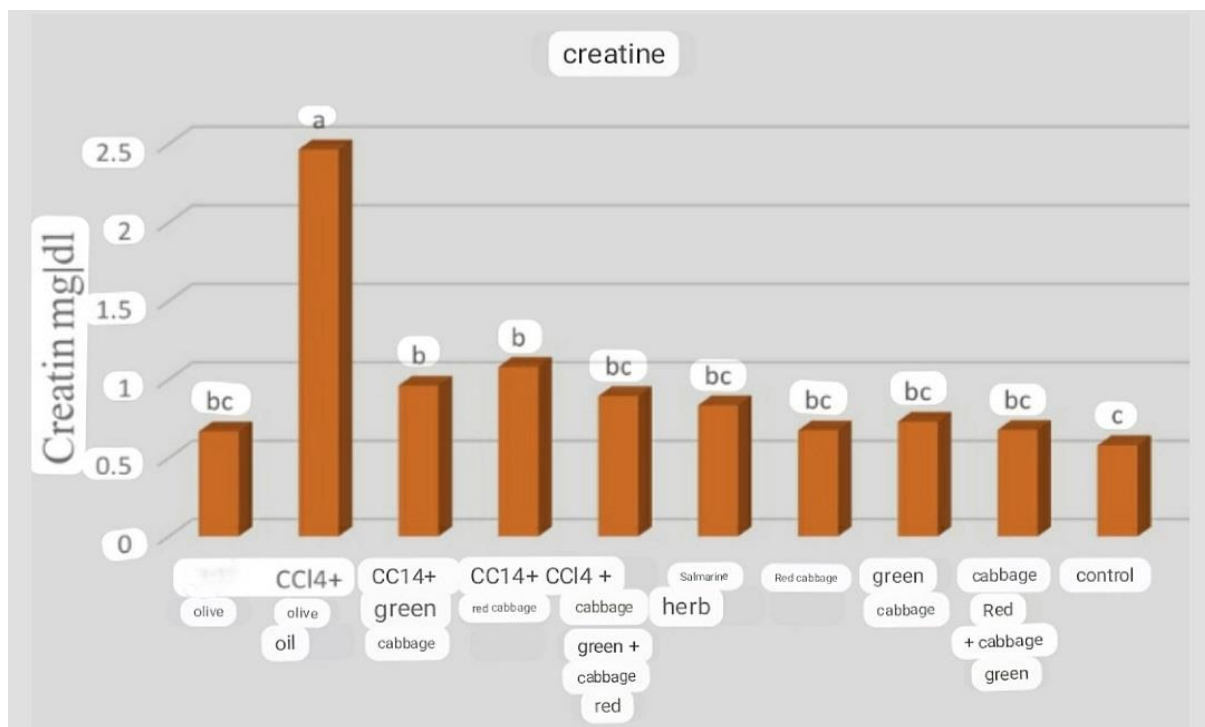
#### Interaction principle:

Urea is hydrolyzed to ammonia and  $\text{CO}_2$  and ammonia interacts with Salicylate and Hybochlorite to form Green indophenol, and the tonal density is commensurate with the urea concentration in blood (10).

### Outcome and discussion

Protective effect of cabbage plant water extract on the concentration of urea, creatinine and uric acid in healthy male rats and with oxidative stress developed by carbon tetrachloride mediation

Impact of different transactions on the level of Uriurea



**Figure (1) Effect of different coefficients of cabbage extract on urea concentration in study groups**

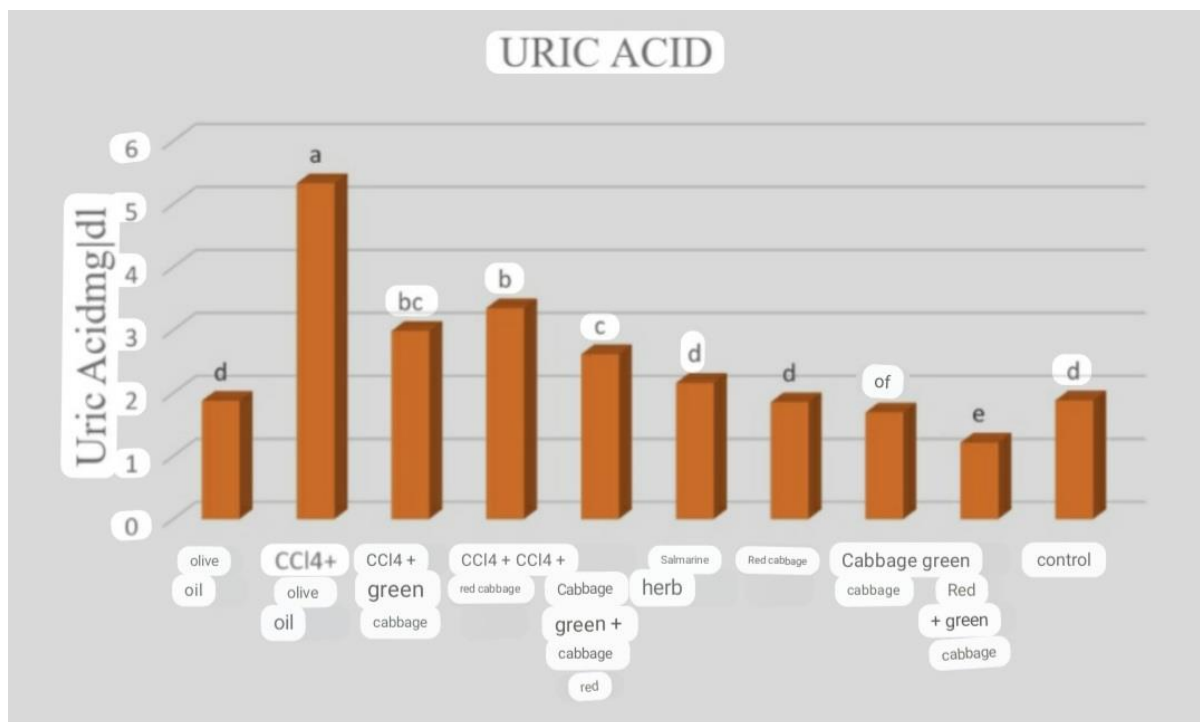
- Number of rats (5) in each group
- The values are expressed in arithmetic mean  $\pm$  standard deviation.
- Different letters mean a significant difference at the level of significance  $(0.05) \geq 0.01$  ,  $p \geq p$

**Creatinine concentration**

**Figure 2: Effect of different coefficients of cabbage extract on creatinine concentration in study groups**

- Number of rats (5) in each group
- The values are expressed in arithmetic mean  $\pm$  standard deviation.
- Different letters mean a significant difference at the level of significance  $(0.05) \geq 0.01$  ,  $p \geq p$

**Uric acid concentration**



**Figure (3) Impact of different transactions of cabbage extract in uric acid concentration in study totals**

- Number of rats (5) per group
- Values are expressed in average arithmetic  $\pm$  standard deviation.
- Different characters mean a moral difference at a moral level  $(0.05) \geq 0.01, p \geq p$

The results of the current study in forms (1), (2) and (3) showed moral altitude  $p \leq 0.01$  In the concentration of urea, creatinine and uric acid in the second group that injected carbon brachloride mg 'dl ( $6.10 \pm 74.36$ ), mg' d ( $0.991 \pm 2.4660$ ) and  $5.329 \pm 0.641$  mg 'dl compared to the control group, these results agreed with (14) which indicated its elevation due to oxidative stress due to renal morbidity in addition to the damage caused by free radicals which in turn causes functional disturbance to the glomerular capillary in the kidney and makes it unable to filter and subtract waste, increase urea and creatinine and decrease its subtraction with urine (15) (16) Because of the inability of the naphronate to subtract them with urine, due to the damage done in the twisted tubes, which has disrupted the efficiency of the naphron in clearing the body of cellular metabolite waste. The college's ability to subtract creatinine and urea is an important biomarker in assessing kidney performance (17) The cause of elevation may be major damage due to hyperlipidemia, which accelerates the development and emergence of kidney disease, and as a result of the lack of exposure outside the body, there is a dysfunction of the kidney

function leading to its accumulation in the blood, which is consistent with (18) (19).

The rise in urea and creatinine levels may also be attributed to the loss of energy source (Chlucose) as a result of the loss of insulin, forcing the animal to use proteins as an alternative source of energy, which results in an increase in urea and creatinine, and also agreed with (20) which explained why it was elevated was due to chronic complications in some organs of the body caused by high sugar Diabetic nephropathy) which is characterized by negative changes in kidney function and consequently results in its high level (21), the rise in uric acid is also caused by the impairment of kidney function as a result of the reduction of the glomeruli. This results from changes in metabolism, in addition to the fact that uric acid is a strong non-enzymatic antioxidant that inhibits the lipid peroxide process by binding to iron or copper or by its direct interaction with free radicals Hyperuric acid is associated with insulin resistance, pancreatic cell dysfunction and therefore with the development of chronic kidney disease and type 2 diabetes as a result of its association with metabolic, renal and cardiovascular disorders through



pathogenic mechanisms such as oxidative stress and inflammation (28) (26) (25) (24).

While a moral decrease in the level of urea, creatinine and uric acid was observed in Group VII which dosed with green cabbage mg 'dl ( $6.45 \pm 30.41$ ) dl ( $0.1550 \pm 0.6755$ ), mg 'dl ( $0.583 \pm 1.856$ ) and Group VIII red cabbage dl ( $3.24 \pm 30.32$ ) ( $0.1274 \pm 0.7312$ ) mg 'dl, mg' dl ( $0.344 \pm 1.693$ ), and group IX dosed with mixed cabbage  $27.87 \pm$  mg'dl ( $4.13$ , ( $0.2395 \pm 0.6783$ ) mg 'dl mg 'dl ( $1.212 \pm 271$ ) and group VI injected with salmarinmg' dl ( $5.73 \pm 28.12$ ), mg 'dl ( $0.296 \pm 0.8360$ ), mg' dl ( $0.464 \pm 2.161$ ), and these results were consistent with what was reached) 29) which was interpreted as a result of the accumulation of free radicals that raise the state of oxidative stress and lead to loss of the hormone insulin or decrease its effectiveness that means loss of direct energy source (Chlucose) which obliges the animal to use alternative sources of energy such as fat and proteins that result in urea as an accidental product (15) (16) tearing the renal naphronate and then losing control of the glomerulus filtration (30).

It is also because the kidneys work to dispose of nitrogen waste and put it so that it is not accumulated in the blood. A precise matrix of this process is called glues with membranes that allow the disposal of toxins and harmful waste outside the body. (31) Their low levels in the aquatic extract dosage group are due to the plant's active and antioxidant compounds, including flavonides, phenolics, carotenoids and vitamin C, which have the potential to curb free radicals, reduce oxidative damage to kidney cells and blood glomerates, maintain naphronate tissue, glomerate filtration rate, prevent the oxidation of fatty proteins and fatty cysts Contained by cabbage which worked to protect the kidney naphronate and enhance its ability in the process of filtration, reabsorption and excretion. (34) (33) (32) Thus maintains the kidney tissue of urea, creatinine and uric acid filtration and subtraction in urine and their low level of serum (35).

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