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Hot Aqueous of *Matricaria chamomilla* Extract Modulate Nephritic Toxicity Induced By Methomyl In Male Mice

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Abstract

This projects was planning to evaluate the effects of oral administration of hot aqueous extract of *(Matricaria chamomilla* plant) on the chemical parameters of the kidney in male mice treated with different dose of metomil (methomyl insecticide). Eighteen mice was parting into 6 groups of 3 animals in every one. The study was performed for 28 days and the alterations of the parameters were measured any changings in the weight of kidney , urea and creatninin concentration. The study was revealed a significant increasing in the kidneys weight, levels of serum urea and creatinin of mice treated with methomyl only when compared with control. The results also show the increasing recorded above began to decrease gradually after the mice treated with hot aqueous extract of chamomile with (5 and 7mg/kg b.w) concentrations . This result draw attention to the ability of chamomile extract to modulate the toxic effects of methomyl on kidney.

Introduction

The therapeutic uses of herbs have increased globally over the past few decades due to therapeutic effectiveness and the limited side effects of their use. Although the accurate biological active compounds in these herbs is not known , it is widely used as a herbal remedy in our time because of its low cost and minimal side effects. Chamomile (*Matricaria chamomilla L.*)from family Asteraceae, is one of the earliest known medicinal herbs dating back to ancient Egypt, Greece and Rome (2). It is widely used and has a high reputation among other herbal medicines throughout history. This is due to its anti-inflammatory properties , painkiller, antibacterial activity and is best known for its use as a sedative and anticonvulsant(3,4). It has been widely used as herb tea in various regions of the world. [5] Because of the global need to increase and improve agricultural production, pesticides have been used for a long time and so far. They were used in agriculture and horticultural gardening, especially carbamate pesticides. They are derived from carbamic acid and like organophosphates. These pesticides inhibit the activity of the enzyme acetyl cholinesterase (7). Methomyl [S-methyl N-(methylcarbamoyloxy) thioacetimidate] is used commonly as monomethyl carbamate insecticide (8)

Methomyl is used as a pesticide and for a wide range of insects and spiders and this is obtained through ingestion or direct contact with this insecticide (9). It is commonly contaminating many agricultural crops (10). Through acute toxicity studies of methomyl in laboratory animals it was found to be highly toxic the cells and tissues in the kidney, lung, testes and liver of rats, mice and rabbits(11). Generating free radicals with changes in enzymatic and non-enzymatic antioxidant systems one of the effects of oxidative stress caused by methomyl (12).

(*Matricaria chamomilla L.*) contains compounds that are complex, active and highly therapeutic like sesquiterpenes, flavonoids, coumarins, and polyacetylenes (13). These compounds have the ability to prevent certain oxidizing and harmful effects (such as damage to the skin, membranes, proteins, and DNA) that are produced by oxidizing chemicals found in

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pesticides. By inhibiting free radicals and thus protecting the body against chronic diseases such as high blood pressure and arteriosclerosis caused by the action of these pesticides (14).

Materials and methods

1. *Matricaria chamomilla* **.** It is family Asteraceae the flowers have been bought from a regional market , Najaf city.

2.Experimental design

Eighteen male mice of wistar strain having the weight of (30-35 g) aging 14-16 weeks were placed in divided plastic cages at Faculty of Science / University of Kufa/ Iraq, and had been kept in monitored environment of (27 ± 2°C) and humidity (55 ± 5%) and a 12h cycle of light and dark. Tap water and pellets were provided to the animals ad libitum. Mice were adapted to the environment for one week prior to the start of experiment. The animals were randomly distributed into six equal groups (3 mice in each one) as following:

Group 1: (negative Control): normal diet and water had been fed to mice in this group

Group 2 : positive control : (renaltoxic) accumulative dose of (5 mg/kg) b.wt.,of methomyl 90% had been given to mice .

Group 3 and 4: a combination of Matricaria chamomilla extract (5 mg/kg b.wt), (7 mg/kg b.wt) with the accumulative doses of the mehomyl (5 mg/kg b.w) have been given to mice respectively.

Group 5 and 6 : a Matricaria chamomilla extract (5 mg/kg b.wt) and (7 mg/kg b.wt) only has been given to mice respectively.

3. Preparation of (Matricaria chamomilla hot aqueous extract)

The chamomile flowers were taken after they were purchased from commercial centers in Najaf province. The chamomile extract was prepared using a hot distilled water infusion method. The mixture was then filtered using No.1 Whitman filter paper to obtain a pure extract free from impurities. The extract was then stored in dark bottles in the refrigerator. While preparing the concentrations of the mice according to the design of the experiment. (15)

4. Insecticide The doses have been given orally with distilled water, below their severe LD¬50 level of poisoning as per the weight of the body. The mouse oral LD-50 of methomyl is (10 mg/kg body wt.) (16). The control mice had received a distilled water for four weeks

5. Blood samples

All mice were weighed at the end of the experimental period. By using a mixture of ketamine and xylazine (i.m) the mice were anesthetized then they sacrificed **(17)** . The samples of blood were directly collected from mice by heart puncture , a day prior to the last dose . The slight amount of samples were kept in sterile tubes until they be clotted , the blood was centrifuged at 3000r/m for 15 minutes then serum separation was conducted, and put into sterile tubes and stored at -20 C°.

6. Statistical Analysis The analysis of the data has been proceeded by using (statistical Package for Social Science (SPSS) system/ version 17). The results have been elucidated as(mean ± Standard error) .The analysis of variance (ANOVA) used to this purpose)

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Result

1. Kidney weight

The results which are summarized in this table showed the relative kidney weight (as a percent of final kidney weight) was recorded a significant increase (P<0.05), in the group of mice which treated by methomyl.

Table (1) kidney weight in mice treated with with oral administration of methomyl and Chamomile hot aqueous extract

Studied grou	**Control mean±SE**	**T1 mean±SE**	**T2 mean±SE**	**T3 mean±SE**	**T4 mean±SE**	**T5 mean±SE**
Kidney weight(mg)	**0.12 ± 0.00**	**0.25± 0.28[a]**	**0.20 ± 0.03[b]**	**0.19 ±0.03**	**0.17 ± 0.31[c]**	**0.14 ± 0.0**

T1 means first treatment with methomyl , T2 means second treatment with combined (chamomile 5 and methomyl (5 mg/ kg b.wt) , T3 means third treatment with combined (chamomyl 7 mg/kg b.wt and methomyl 5 mg/ kg b.w, T4 means fourth treatment with Matricaria chamomilla extract (5 mg/kg b.wt) , T5 means fifth treatment with Matricaria chamomilla extract (7 mg/kg b.wt)

a= significant difference P<0.05 between methomyl and control group

b= significant difference P<0.05 between mix 5 and methomyl group

c= significant difference P<0.05 between mix 5 and mix 7 group.

2- Levels of urea and creatinine.

The serum urea and creatinine concentrations are significantly higher in methomyl -treated animals than in controls as shown in table below. The levels of both s.urea and creatinine recorded significantly decreasing gradually after treated the mice in with chamomile in group T3 and T4 respectively (47.00±0.50, 45.00±0.00) when compared with T1 group (48.00±0.51).

Table 1 : The levels of S.urea and creatinine in mice treated with oral administration of methomyl and Chamomile hot aqueous extract .

Studied group	**S. creatinine (g/dl) Mean±SE**	**S. urea (g/dl) Mean±SE**
Control	0.9±0.15	40.00±0.00
T1	1.23±0.16	48.00±0.51 **a**
T2	1.12±0.08	47.00±0.50 **b**
T3	1.06±0.14	45.00±0.00
T4	1.02±0.10	42.00±0.57 **c**
T5	1.00±0.16	40.00±1.76

a= significant difference P<0.05 between methomyl and control group

b= significant difference P<0.05 between mix 5 and methomyl group

c= significant difference P<0.05 between mix 5 and mix 7 group.

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Discussion

Urea is the main end product of protein catabolism. It act ninety percent of the total urinary nitrogen excretion. creatinine is a metabolite of creatine and is excreted completely in urine via glomerular filtration . An elevation of its level in the blood is an indication of impaired kidney function **(18)**.

The results in table (1) showed that methomyl treated mice manifest significant elevation in kidney weight, this finding agree with **(19)** who showed that all of tested insecticide caused an increase in the relative weight of kidney in treated rats. Alteration in the body weight after the pesticides were used as precious indicator of concerning organs damage **(20)**

Mansour in 2011 also suggest that there was a decrease in body weight and alteration in relative organs weight in rats and mice after exposure to insecticides (21).

On the other hand methomyl (lannet) caused rising in levels of s.urea and s.creatinine ,this finding is in agreement with **(22)** who pointed to the examined pesticide caused a significant decrease in total protein and more significant elevation in s.creatinin of experimental animal compared with control **(23)** . **(24)** showed that there was a relationship between the level of urea in blood and increase protein catabolism in the human body. Sundry research have demonstrated that the methomyl insecticides can changes biochemical parameters in treatment animals **(25&26)** .

Renal failure was obviously detected in group that deals with methomyl which recorded an elevation in serum urea and creatinine (table 2). this finding is correspond with the recent studies which explained that workers occupationally exposed to methomyl were suffering from renal dysfunction so as the experimental animal models when have the same conditions **(27) .** The increment in urea and creatinine (table 2) explain decreasing kidney's ability to cleanse the waste products from the blood and excrete them in the urine. A relationship between renal failure and hyperuricemia has also been given an explanation by **(28)** where interstitial inflammation and uric acid-mediated arteriolopathy propose processes that would potentiate or aggravate progressive kidney function.

Recent researchers reported significant increment in creatinine concentration and serum urea in workers exposed to pesticide. Such increase was termed renal damage and disturbance of kidney function **(29&30).** Levels of serum in urea and creatinine have shown to have clinical value that indicates kidney impairment in farmers exposed to pesticide **(31).**

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