Plant Archives Volume 20 No. 2, 2020 pp. 7635-7638 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

EVALUATION OF THE PROTECTIVE EFFECT OF AQUEOUS EXTRACT OF *MATRICARIA CHAMOMILLA* ON KIDNEY AND ACTH HORMONE IN MALE MICE

Leena Adeeb Mehdi[1]* and Alaa Mohammad Hasoon[2]

[1]*Department Animal Production, Faculty of Agriculture, University of Kufa, Iraq.
[2]Department of Biology, Faculty of Science, University of Al-Qadisiyah, Iraq.

Abstract

The protective impact of Matricaric Chamomilla in kidney tissue and adrenocorticotrophic hormone (ACTH) was the aim of this study. Thirty male mice were divided into three groups, control group administrated orally normal saline, first experimental group administrated orally (50)mg/kg of *Matricaria chamomilla* for one month, second experimental group was given orally (100) mg/kg of chamomile for the same period. There were no significant differences in total body weight between treated groups and control .the results indicated raise the level of (ACTH) hormone at high concentration, while there were diminished in level of hormone at low concentration of *Matricaria chamomilla*. Histological results showed moderate damage in renal tubules and congestion in blood vessels of mice kidney that treated with concentration of (100) mg/kg of *Matricaria chamomilla*.

Key words: *Matricaria chamomilla*, Kidney, ACTH, mice

Introduction

Matricaria chamomilla is one of the most popular herbal tea ,prepared from dried flower .chamomile has antioxidant and anti-microbial effects , it is fact that chamomile contains large number of active compounds such as ,crucial oil and flavonoid that used as anti-inflammatory of skin and mucosa (Srivastava *et al*., 2010). Also, oil can be essential for treating the irritation of lung disease. There are numerous kinds of chamomile but the most popular are Roman chamomile and German chamomile (Amsterdam *et al*., 2009). German chamomile is called Matricia Chamimilla and it has scientific evaluation and its extract showed renal protective activity (Kovcik *et al*., 2008). The chamomile oil can be processed into pills, but the flower head can also be used as a whole to make use of the beneficial effect. It can be taken as a herbal tea, two teaspoons of dried flower per cup of tea, which should be steeped for 10 to 15 minutes while covered to avoid evaporation of the volatile oils (Srivastava *et al*., 2010). The whole plant, harvested when in flower, is used to make a homeopathic remedy It is especially suited to teething children and those who have been in a highly emotional state over a long period of time (Sebai *et al*., 2014). For a sore stomach, some recommend taking a cup every morning without food for two to three months, commonly used to relieve inflammatory skin conditions and calm sensitive skin. Provides some antioxidant protection and can be used to soothe, moisturize and inhibit the growth of bacteria (Bhaskaran *et al.,* 2010).

The aim of this study is to determine the protective effect of aqueous extract of *Matricaria chamomilla* in kidney and ACTH hormone.

***Author for correspondence :** E-mail : leena.alweli@uokufa.edu.iq

Materials and Methods

Preparation of aqueous extract of chamomile

Dried flowers were obtained from medical herbal pharmacy ,then they were crushed until they became powder to prepare aqueous extract of chamomile then weighed (10 and 20gm) for its powder then divided in glass with 100 ml of water and putting in oven for 60 minute (Kovacik *et al*., 2008). After that, nominate the extract to be gotten a pure extract. The extract will keep in black glass inside refrigerator until use (Newall *et al*., 2011).

Experimental design

30 albino male mice were used in this experiments, weighing (25-30) g were kept the animal house of Faculty of science /University of Kufa, at temperature (22-25ºC). Food (pellets) and tap water were provided to animals. Mice were weighted every week for recorded any changes in weight .the animals divided into three groups:

1- Control group : (10) mice administrated orally normal saline for one month.

2- First experimental group (E1) : (10) mice administrated orally with (50) mg/kg body weight of *Matricaria chamomilla* for one month. 3-second experimental group (E2): (10) mice administrated orally with (100) mg/kg body weight of *Matricaria chamomilla* for one month.

The animal weight were recorded at the beginning and the end of experiment

Blood samples collection

At the end of experiment mice were sacrificed and anesthetized the with ketamine and xylene (AVMA Panel on Euthanasia, 2013), blood samples were collected in tubes and centrifugation for separate the serum and measure the levels of ACTH hormone. Kidney were removed then fixed with (10%) formalin for histological routine preparations.

Statistical analysis

The statistical analyses of the results with graphing were obtained by using Excel program (Cemek *et al*., 2008). These analyses include mean and standard error (SE) ANOVA and Independent test, comparisons between the data in results.

Results and Discussion

Results in Fig. 1 indicated that no significant differences ($p>0.05$) in weights of male mice between second and third group, also there were no significant differences ($p<0.05$) between control and (E1, E2) groups that treated with extract of *Matricaria chamomilla*, these results agreement with (Gupta & Misra 2006), that achieved the effect of extract of *Matricaria chamomilla* to maintain body weight and reduce the blood glucose (Anon, 2010). Fig. 2 observed significant increase ($p<0.05$) in levels of ACTH hormone in E2 group that treated with 100 mg/kg of *Matricaria chamomilla* as compared with control, while showed significant decrease ($p<0.05$) in the levels of ACTH hormone E1group as compared with control. The reason of high value of hormone in concentration of 100mg/kg of *Matricaria chamomilla* which contain many natural compound like,

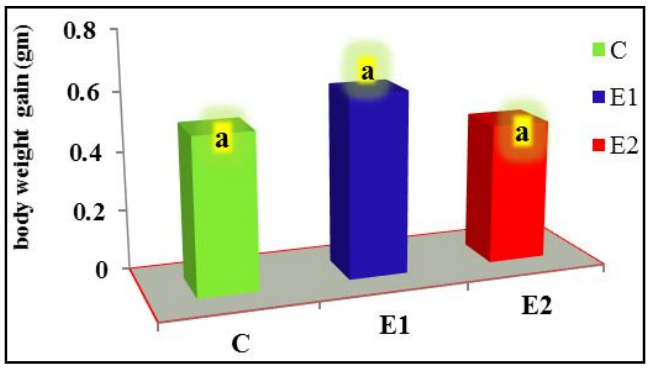

Fig. 1: Show the effect of *Matricaria chamomilla* on the body weights gain (gm) of male mice, similar letter indicate to no significant different ($p>0.05$).

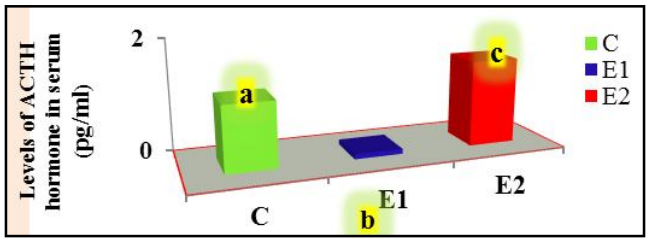

Fig. 2: show the effect of *Matricaria chamomilla* in the levels of ACTH hormone(pg/ml)in serum of male mice, different letter indicate to significant different ($p<0.05$).

flavonoids, mono terpens, coumarins and phenolic acid, these molecules may have action to induce secretion of ACTH Adrenocorticotrophic hormone from pituitary gland and raise its value in serum of mice (Soltani *et al.,* 2017).

While, low concentrations of *Matricaria chamomilla* caused significant decrease in levels of hormone, because the effect of chemical compounds of chamomile that regulate the metabolism and prevent any disorder in the level of hormone (Roby *et al*., 2013). With decrease secretion of ACTH hormone from adrenal gland by administrated of extract *Matricaria chamomilla*, that caused decrease secretion of stress epinephrine hormone that release from adrenal gland in to blood stream, subsequently, the adrenal gland also, secrete extra cortisol, another stress hormone into blood stream (Janmejai *et al*., 2010). During the stress response, hypothalamus secrete corticotrophin -releasing factor which is stimulate the pituitary gland to release Adrenocorticotrophic hormone ACTH which stimulate releasing more cortisol. Stress may cause serious incident including myocardial fraction and cardiac arrest, all previous events will decrease and may not happened when administrated extract of Matricaria chamomilla (Ragaa *et al*., 2011).

Histological results

Histological results observed normal structure of mice renal tissue contains all comments of normal nephron that appeared Bowman's capsule with distal and proximal

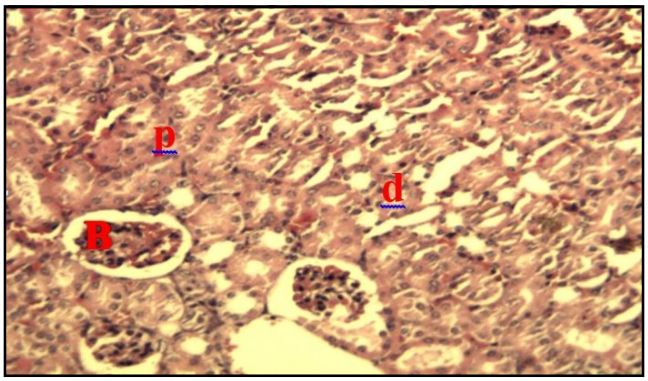

Image 1: Renal tissue of control group appear (B) Bowman's capsule, distal tubules (d), proximal tubules (p). (400X) H & E stain.

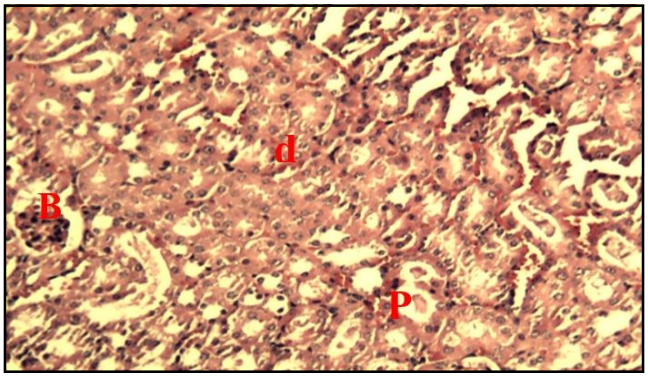

Image 2: Renal tissue treated with (50) mg/kg of *Matricaria chamomilla* showed :normal bowman's capsule (B), distal tubules (d), proximal tubules(p).

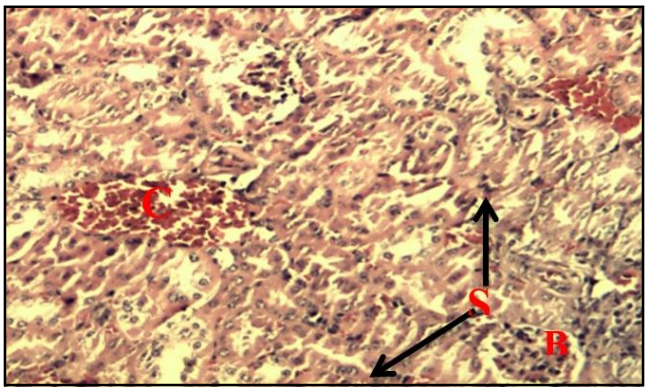

Image 3: Renal tissue treated with (100) mg/kg of *Matricaria chamomilla* showed : congestion in blood vessel (C) ,normal bowman's capsule(B), swelling in some renal tubules (S). (400X) H&E stain.

tubules in the control group (image 1) , while renal tissue that treated with (50) mg/kg of chamomile (image 2) showed normal bowman's capsule, normal proximal and distal convoluted tubules, these results agreement with (Srivastava., 2009). This study suggest that administrated orally (50mg/kg) of *Matricaria chamomilla* for one month not adversely effect on kidney tissue (18). Images 3 and 4 showed high concentrations of *Matricaria chamomilla* that treated with kidney tissue at (100) mg/

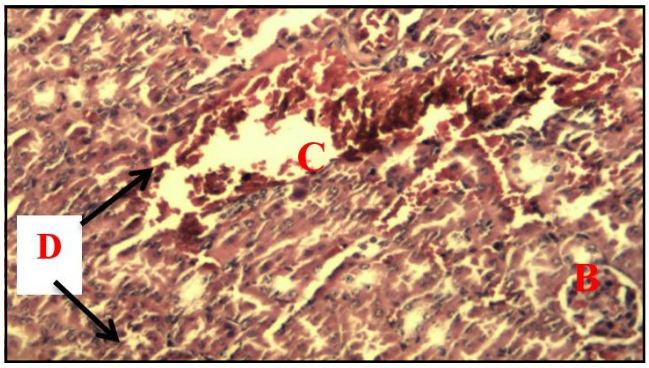

Image 4: Renal tissue treated with (100)mg/kg of *Matricaria chamomilla* showed : congestion in blood vessel (C), bowman's capsule (B), degeneration in some renal tubules (D). 400X) H&E stain.

kg of body weight, there were congestion in blood vessel and swelling in renal tubules, degeneration in in some renal tubules although normal bowman's capsule, these moderate damage in kidney may due to high concentration and long period that administrated mice orally to matricaria chaamomilla which caused changes in filtration activity of kidney and congestion in vessel as compared with low concentration of the same material (Fabian *et al*., 2011). These results agree with (Pinto *et al.,* 2008), most studies found that *Matricaria chamomilla* have multiple compounds that give its medical properties and renal and liver protective when treated these organs with M.C for two weeks and at (50) mg/kg (McKay *et al.,* 2006). At high concentration (100)mg/kg and long period administrated (one month) may cause histological changes and damage to kidney tissue like ,degeneration of renal and congestion in renal tubules and blood vessels ,these results agreement with (Johari *et al*., 2011).

Conclusions

Administration orally of *Matricaria chamomilla* at low concentration protect kidney and consider anti-oxidant and anti-inflammation by reducing the level of ACTH hormone which has very important role in stimulation oxidative stress and lower concentration of using in this study may suggested the anti-oxidative of *Matricaria chamomilla* at (50) mg/kg for one month, rather than high concentration that caused moderate damage to renal tubules and blood vessels of kidney mice.

References

Anon. L. (2010). Regulators restrict Avandia in the US and suspend it in the EU. *Nat. Rev. Drug Discov.,* **9:** 828-828.

AVMA Panel on Euthanasia (2013). Report of the AVMA panel on euthanasia. Journal of the American. Veterinary Medical Association.

Amsterdam, J.D., Y. Li, I. Soeller, K. Rockwell, J.J. Mao, J. Shults

and A. Randomized (2009). Double-blind, placebo-controlled trial of oral *Matricaria recutita* (chamomile) extract therapy for generalized anxiety disorder. *J. Clin. Psychopharmacol.,* **29:** 378-82.

Bhaskaran, N., S. Shukla, J.K. Srivastava and S. Gupta (2010). Chamomile an anti-inflammatory agent inhibits inducible nitric oxide synthase expression by blocking RelA/p65 activity. *Int. J. Mol. Med*., **26(6):** 935-40.

Cemek, M., S. Kaga, N. Simsek, E.M. Buyukokuroglu and M. Konuk (2008). Ant hyperglycemic and ant oxidative potential of *Matricaria chamomilla* L. in Streptozotocin-induced diabetic rats. *J. Nat. Med.,* **10:** 1-10.

Fabian, D., S. Juhás2, A. Bukovská, D. Bujòáková, L. Grešáková and J. Koppel (2011). Anti-Inflammatory Effects Of Chamomile Essen-tial Oil In Mice. *Slovak J. Anim. Sci.,* **44(3):** 111-116 .

Gupta, A.K. and N. Misra (2006). Hepatoprotective Activity of Aqueous Ethanolic Extract of *Chamomile capitula* in Paracetamol Intoxicated Albino Rats. *Am. J. Pharmacol. Toxicol.,* **1:** 17-20.

Janmejai K.S., S. Eswar and G. Saanjay (2010). Chamomile : A herbal medicine of the past with a bright future. *Mol. Med. Report,* **1(3(6)):** 896-901.

Johari, H., E. Sharifi, M. Mardan, F. Kafilzadeh, V. Hemayatkhah, H. Kargar, *et al.,* (2011). The effects of a hydroalcoholic extract of *Matricaria chamomilla* flower on the pituitary-gonadal axis and ovaries of rats. *Int. J. Endocrinol. Metab.,* **9:** 330-4.

Kovcik, J., J. Gruz, M. Backor, J. Tomko, M. Strnad and M. Repcak (2008). Phenolic compounds composition and physiological attributes of *Matricaria chamomilla* grown in copper excess. *Environ. Exp. Bot.,* **62:** 145-52.

Kovacik, J. and M. Backor (2008). Oxidative status of *Matricaria chamomilla* plants related to cadmium and copper uptake. *Ecotoxicology,* **17:** 471-9.

McKay, D.L. and J.B. Blumberg (2006). A review of the bioactivity and potential health benefits of chamomile tea (*Matricaria recutita* L.). *Phytother Res.,* **20:** 519-530.

Newall, C.A., A. Anderso and J.D. Phillipson (2011). Herbal medicine: A guide for Health care professionals. The pharmaceutical press. London pp: 49-70.

Pinto, S.A., E. Bohland, P. Coelho Cde, M.S. Morgulis and L.V. Bonamin (2008). An animal model for the study of chamomilla in stress and depression: pilot study. *Homeopathy,* **97:** 141-4.

Roby, M.H., M.A. Sarhan, K.A. Selim and K.I. Khalel (2013). Antioxidant and antimicrobial activities of essential oil and extracts of fennel (*Foeniculum vulgare* L.) and chamomile (*Matricaria chamomilla L.*). *Ind. Crops Prod.,* **44:** 437-45.

Ragaa, H.M.S., A.A. Nahed, K.A. Sary, T.M. Zaghloul and M.A.G. Nagwa (2011). Nephroprotective Effect of Nigella sativa and *Matricaria chamomilla* in Cisplatin Induced Renal Injury. *International Journal of Clinical Medicine,* **2:** 185-195.

Sebai, H., M. Jabri, A. Souli, K. Rtibi, S. Selmi, O. Tebourbi, J. EL-Benna and M. Sakly (2014). Antidiarrheal and antioxidant activities of (*Matricaria recutita* L.) decoction extract in rats. *J. Ethnopharmacol.,* **152:** 327-32.

Singh, O., Z. Khanam, N. Misra and M. Srivastava (2011). Chamomile (*Matricaria chamomilla* L.): An overview, *Phcog. Rev.,* **5:** 82-95.

Soltani, M., M. Moghimian, H. Abtahi and M. Shokoohi (2017). The protective effect of *Matricaria chamomilla* extract on histological damage and oxidative stress induced by Torsion/Detorsion in adult rat ovary. *Int. J. Womens Health Reprod Sci.*

Srivastava, J.K., E. Shankar and S. Gupta (2010). Chamomile: a herbal medicine of the past with bright future. *Mol. Med. Rep.,* **3:** 895-901.

Srivastava, J.K., M. Pandey and S. Gupta (2009). Chamomile, a novel and selective Cox-2 inhibitor with anti-inflammatory activity. *Life Sci.,* **85:** 663-669.