



EFFECTS OF *MATRICARIA CHAMOMILLA* FLOWER AQUEOUS EXTRACT ON SOME HEMATOLOGICAL, BIOCHEMICAL PARAMETERS AND CARCASS TRAITS IN IRAQI LOCAL RABBITS

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Abstract

One of the challenges facing farmers is to ensure efficient integration of natural sources into animal feeds. This research was conducted to estimate the impact of *Matricaria chamomilla* (MC) flowers aqueous extract on the hematological and biochemical parameters as well as carcass traits in adult male rabbits. Twenty Iraqi local male rabbits growing rabbits have been divided randomly into two groups (10 rabbits per group). The Control group intubated normal saline without adding extract. Rabbits in the treatment group (T-group) was received 70% chamomile flowers extract orally. All rabbits were intubated daily for 60 days. MC flowers aqueous extract lead to significant increasing ($P<0.05$) in total RBCs, Hb content, Hematocrit ratio and WBCs; while platelet count displayed a significant decreasing ($P<0.05$) in treated group values in comparison with a control group. Moreover, Alanine aminotransferase (ALT), Aspartate transaminase (AST), Alkaline phosphatase activity (AP), serum urea and Creatinine concentrations revealed significant decreasing ($P<0.05$) in (T-group) in comparing with the control group. On the other hand, Total protein and Albumin give significant increment in their values at (T-group) while Globulin values did not change statistically. Lipid profile tests: Total Cholesterol (TC), Triacylglycerol (TAG), Low-Density Lipoprotein (LDL) and Very Low-Density Lipoprotein Cholesterol (VLDL) concentrations revealed meaningful decreasing ($P<0.05$) in (T group) values, while significant increasing ($P<0.05$) in High-Density Lipoprotein (HDL) in comparison with the control group. All carcass traits: Long carcass, Circumference hip carcass, Lumbar carcass circumference, Skin and Legs and Length of the rabbit carcass showed a significant increment ($P<0.05$) and improvement in (T-group) in comparison with control.

Keywords: *Matricaria chamomilla*, rabbit, physiological parameters, carcass quality

Introduction

Matricaria chamomilla L. generally knowing's Chamomile which has a place with family Asteraceae (Grieve and Leyel, 1994). Various types of Chamomile are diffused over Europe, North-west Asia, North America, North Africa and the calm districts of Asia, in Pakistan, it is known as babuna or piunphulli (Ahmad *et al.*, 2011). Chamomile is generally perceived and is progressively mainstream in western culture for its different restorative employments (Duke *et al.*, 2002). Since antiquated occasions and following the resources composed by Hippocrates, Galen, and Asclepius, its various parts like as blossoms, oil and roots have been utilized to treatment of an assortment of illnesses (Singh *et al.*, 2011). Additionally, Chamomile had an extremely ancient history of its therapeutic use in antiquated Egypt, Greece, and Rome (World Health Organization, 1999).

Phytochemical considers uncovered the nearness of alpha-bisabolol, cis-spiroethers sesquiterpenes, spathulenol, farnesene, furfural, cadinene, and proazulene (matricarin and matricin) as plant components (Mann and Staba, 1986; Schilcher *et al.*, 2005). Also, Chamomile has contain about 8% of flavone glycosides (apigenin 7-glycoside and its 6'-acetylated subordinate) and flavonoids (glucosides, luteolin, quercetin glycosides, and isohamnetin); 10% of adhesive polysaccharides; 0.3% choline and 0.1% coumarins. The nearness of chamomile's tannin has additionally been recognized at under 1% (Kunde and Isaac, 1980). Chamomile all in all plant has been utilized customarily in various structures for the treatment of different clinical grievances, for example, basic cold, bronchitis, gastrointestinal fits, epilepsy, hypertension, neuralgia, toothache, dysmenorrhea,

skin inflammation, impetigo, acid reflux, colic and looseness of the bowels (Issac, 1989). Its blossoms are likewise utilized as carminative and antipyretic, while its oil has been utilized in ailment, tooting, and colic (Duke *et al.*, 2002).

Many researches investigations showed that *Matricaria chamomilla* act as anti-inflammatory (Mazokopakis *et al.*, 2005), antispasmodic (Maschi *et al.*, 2008), antibacterial (Shikov *et al.*, 2008), digestive (Kato *et al.*, 2008), antioxidant and antidiabetic (Cemek *et al.*, 2008) activities. In several animal studies, anxiolytic (Amsterdam *et al.*, 2012), antimutagenic and cholesterol-lowering, wound healing (Jarrahi *et al.*, 2010). In an animal study, the extracts refrain from producing reactive oxygen species and protecting against hematological parameters (Jabri *et al.*, 2016) Thus, current research conducted to explain the physiological effects of aqueous *Matricaria chamomilla* extract in a dose of 70 mg/Kg B.W. on some hematological and biochemical parameters and carcass traits in male rabbits.

Materials and Methods

According to Harborn (1984); Chamomile flowers dried flowers were ground and extracted by using 70% distal water, the extract had been filtered and vaporized by using vacuum rotatory evaporator to yield extract. The experiment was performed at animal house of animal production department, Agriculture College/ Tikrit University. Twenty Iraqi local adult male rabbits weighing 1250-1500 grams were used in this study. Rabbits have been housed for three weeks for acclimation; then transported to controlled temperature and humidity in the study room in special cages under good hygienic conditions. Natural 12h light and 12h

dark cycle rhythmic photoperiod were applied to study animals. They were received a typical ad libitum feed and water throughout the study period. Rabbits were sectioned into two groups (ten rabbits in every group) as follows: Every day for 60 days; Control group (C) intubated orally normal saline while treated group (T) received *Matricaria chamomilla* (MC) aqueous extract orally at a dose of 70 mg/Kg B.W (Eddouks *et al.*, 2005). When the experimental period was ended and after overnight fasting. For hematological parameters, By heart puncture, blood samples were collected by using evacuated tubes containing EDTA anticoagulant. Serum was separated from coagulated blood by centrifugation at 5000 rpm for 10 minutes and stored at – 20 Co for studying the following biochemical parameters: Serum urea, Creatinine concentration. According to the Diamond enzyme kit (Palton and Crouch 1977; Henry, 1974), serum Aspartate aminotransferase (AST), serum Alanine aminotransferase (ALT) and Alkaline phosphatase activity (AP) using an enzymatic kit (Reitman and Frankel 1975; Belfield and Goldberg 1971). Total proteins were estimated by using the Biuret method as described Doumas (1975), serum albumin gm/dl was estimated by albumin kit (Young, 1995) and serum globulin concentration g/dl was estimated indirectly by measuring of albumin in serum and then it was subtracted from total protein. By using enzymatic assay kit, determination of serum total cholesterol (TC) concentration (Ellefson and Garaway 1976), Triacylglycerol (TAG) (Rojkin *et al.*, 1974) High-Density Lipoprotein (HDL) concentration (Bucolo and David 1973), Low-Density Lipoprotein (LDL) concentration and Very Low-Density Lipoprotein (VLDL) concentration depending on Friedewald *et al.*, (1972). Blood with EDTA anticoagulant used for the hematological study. Estimation of hemoglobin (Hb) concentration was according to Van kampen and Zulstra (1961), WBCs count was according to Harris-young (1995),

RBCs count and hematocrit (PCV) using the technique of Rodak (1995). The total platelet count was according to Voigt (2000).

Carcass characteristics

Toward the finish of the analysis, five agent rabbits for each gathering were famished along eight hours before being euthanized to purge the food canal. At this period, continuous hydration was applied to forestall drying out and weight reduction. The willful extermination and body dismemberment systems depended on the World Bunny Science Affiliation (WRSA) suggestions portrayed by Blasco and Ouhayoun (1996). Once the animal was exsanguinated; long carcass, circumference hip carcass, Lumbar carcass circumference, skin with legs and length of the rabbit carcass were measured.

Statistical Analysis

For a comparison between different experimental groups analysis of variance, ANOVA was used. Duncan's various range test was used to distinguish the distinctions ($p < 0.05$) among various gathering implies (Daniel, 1974).

Results and Discussion

The results in (Table 1) revealed that 70 % aqueous extract of MC oral administration for eight weeks on blood picture revealed significant increasing ($P < 0.05$) in red RBCs count, whereas; WBCs count, Hb concentration, HCT in their values with meaningful ($P < 0.05$) decrease in platelet count in comparing with the control group. RBC play an important role in the regulation of Hematocrit (volume of RBC in the blood), which corresponds with the perception that the level of HCT was comparably influenced by MC aqueous extract-treated group.

Table 1: Effect of *Matricaria chamomilla* aqueous extract on some hematological parameters in male rabbits

Parameters Group	RBCs (X 10 ⁶)	Hb (gm./dl)	HCT (%)	PLT (X 10 ³)	WBCs (X 10 ³)
Control (C)	5.1 ± 0.21 B	13.9 ± 0.47 B	36.21 ± 2.37 B	1243.08 ± 2.1 A	6.12 ± 1.07 B
Treated (T)	6.9 ± 0.71 A	15.25 ± 1.24 A	38.1 ± 2.18 A	996.2 ± 2.03 B	8.18 ± 0.94 A

Values are revealed as mean ± SE, n=10

T: Rabbits received 70 mg / Kg B.W. of *Matricaria chamomilla* flowers aqueous extract.

Capital letters denoted difference between treated group ($P < 0.05$) vs control.

Hematological investigation is utilized to screen conditions, for example, iron deficiency, disease, and aggravation. Thusly, in the current examination, our objective was to research the impact of MC blossom remove on various blood parameters of developing rabbits (Table 1). Both of the hematological parameters e.g., RBC count and Hb content, were significantly increased in rabbits received 70 mg/Kg B.W. of aqueous extract of *Matricaria chamomilla* flowers. RBC assumes an urgent role in the guideline of HCT (volume of RBC in the blood), which associates with the perception that the HCT level was correspondingly influenced by the MC remove treated gathering. The erythroprotective effects of Chamomile extract against oxidative stress, which induced because of metabolism processes may be due to its richness in biomolecules with significant antioxidant capacity such as phenolic compounds (Sebai *et al.*, 2015). In this study, *Matricaria chamomilla*

extract contained flavonoids that declined platelet count, which may be due to the inhibition of arachidonic acid metabolism by cyclooxygenase (Tapas, *et al.*, 2008). Flavonoids of *Matricaria chamomilla* extract were potent inhibitor for platelets aggregation, also *Matricaria chamomilla* ethanolic extract had an antioxidant effect (Namvaran–abbas -abed and Khayat-Nouri, 2011), and particularly MC had an anti-thrombotic effect. It was direct scavenging free radical by maintaining of endothelial prostacyclin and nitric oxide typical concentration (Gryglewski *et al.*, 1987).

WBC count at MC flowers extract-treated rabbits group was increased, which correlated with other measured parameters. Therefore, MC flowers extracts high dose results in both, reflected by the high number of WBC. Chamomile lead to inflammatory prostaglandin molecules releasing inhibition from leucocytes like that cyclooxygenase-2, or

COX-2 enzyme one of the inflammatory enzymes targeted by NSAIDs. Srivastava *et al.* (2009) concluded that chamomile tea drinking might helped in resisting of inflammatory conditions. Chamomile reduced inflammation, improved healing of all tissues around the wounds and stimulated of collagen protein production (Daneshfard *et al.*, 2020).

The results in (Table 2) revealed that oral administration of MC aqueous extract for eight weeks significantly decreasing ($P<0.05$) in the serum urea and creatinine concentration in comparing with the control group. A meaningful decreasing ($P<0.05$) in serum AST, ALT, and AP activity was recorded in MC treated animals.

Table 2: Effect of *Matricaria chamomilla* aqueous extract on some serum biochemical parameters in male rabbits.

Group	Parameters	Serum urea	Cr	AST	ALT	AP
Control (C)		91 ± 0.84 A	1.4 ± 0.57 A	34.2 ± 1.31 A	47 ± 1.02 A	62.7 ± 0.86 A
Treated (T)		75.7 ± 1.35 B	0.71 ± 0.84 B	23.19 ± 2.09 B	29.3 ± 1.44 B	48.5 ± 1.02 B

Values are revealed as mean ± SE, n=10

T: Rabbits received 70 mg / Kg B.W. of *Matricaria chamomilla* flowers aqueous extract.

Capital letters denoted difference between treated group ($P<0.05$) vs control.

Results in (Table 3); oral administration of *Matricaria chamomilla* (MC) aqueous extract caused a meaningful ($P<0.05$) increment in total serum protein in treated animals is comparing with control group with noticeable elevation ($P<0.05$) in serum albumin and no changes in globulin values.

Table 3: Effect of *Matricaria chamomilla* aqueous extract on total protein, albumin and globulin concentrations in serum (gm/dL) in male rabbits

Group	Parameters	TP	Albumin	Globulin
Control (C)		44.1 ± 0.97 B	23.92 ± 0.97 B	16.1 ± 0.82 A
Treated (T)		62.27 ± 1.18 A	31.05 ± 1.44 A	17.4 ± 1.72 A

Values are revealed as mean ± SE, n=10

T: Rabbits received 70 mg / Kg B.W. of *Matricaria chamomilla* flowers aqueous extract.

Capital letters denoted difference between treated group ($P<0.05$) vs control.

The decrease in serum level of urea and creatinine in animals treated with chamomile might be due to the antioxidant action of chamomile (Sampaio *et al.*, 2016). In the current research; the meaningful decreasing ($P<0.05$) of serum AST, ALT and AP action, the assay of these enzymes were important in the diagnosis of liver function and considered as a marker of liver dysfunction (Giannini *et al.*, 2005). The decrease of liver enzymes in animals that received chamomile indicates the hepatoprotective effect of chamomile (Franz *et al.*, 2005). The liver is an important organ for protein synthesis, so the increment in serum level of total protein, albumin and globulin indicates the hepatoprotective effect of *Matricaria chamomilla*

(Andreadou *et al.*, 2006). *Matricaria chamomilla* contains polyphenolic compounds that had benefited by several mechanisms including direct free radical quenching protection and regeneration of liver cells (Haghi *et al.*, 2014). Therefore, the flavonoids found in Chamomile flower accelerate the regeneration process and production of liver cells, which were responsible for protein synthesis (Srivastava *et al.*, 2010).

In Table 4 there was a meaningful decline ($P<0.05$) in serum TC, TAG, LDL and VLDL concentrations as comparing with the control group. There was a significant ($P<0.05$) increment in HDL in treated animals as compared with control group.

Table 4: Effect of *Matricaria chamomilla* aqueous extract on Serum lipid profile concentration (mg/dl) in male rabbits

Group	Parameters	TC	TAG	HDL	LDL	VLDL
Control (C)		72.3 ± 1.81 A	85.1 ± 2.05 A	28.3 ± 0.74 B	28.69 ± 1.09 A	18.4 ± 0.65 A
Treated (T)		66.9 ± 2.02 B	64.35 ± 2.19 B	34 ± 0.81 A	23.7 ± 1.48 B	12.9 ± 1.77 B

Values are revealed as mean ± SE, n=10

T: Rabbits received 70 mg / Kg B.W. of aqueous extract of *Matricaria chamomilla* flowers

Capital letters denoted difference between treated group ($P<0.05$) vs control

In the current research; there was a significant reducing in serum TC, TAG, LDL and VLDL with a significant increment in HDL concentration follows MC treatment indicating its hypolipidemic effect (Gupta and Misra, 2006)

which mention that chamomile flowers extract contains a high contentment of flavonoids (63.3 %) most of them are apigenin and total phenolic compounds (23.2 %), bioactive compounds announced acting as a oxidative factors

scavenger (Avallone et al., 2000). *Matricaria chamomilla* extract as a natural material, decreasing of blood cholesterol by two pathways by the presence of flavonoids that enhance the phosphorylation of HMG CoA reductase enzyme indirectly thus diminish endogenous cholesterol production. Also, *Matricaria chamomilla* extract appeared to protect LDL against oxidation and protected α tocopherol and another endogenous antioxidant in LDL from oxidation

(Rafraf et al., 2015), which might be valuable in reducing the antagonistic impacts related with low-density lipoprotein LDL cholesterol oxidation in atherosclerosis (Howrey et al., 2016). Besides, MC aqueous extract caused a significant elevation in serum HDL concentration that assume a significant role in plasma lipid transport of cholesterol from peripheral cells to the liver for discharge and catabolism (Nargesi et al., 2018) indicating its anti-atherosclerotic effect.

Table 5: Effect of *Matricaria chamomilla* aqueous extract on carcass traits in male rabbits

Parameters Group	Long carcass (cm)	Circumference hip carcass (cm)	Lumbar carcass circumference (cm)	Skin (g) Legs (g)	Length of the rabbit carcass (cm)
Control (C)	52.4 ± 1.11 A	85.1 ± 1.75 A	21.07 ± 0.9 B	268.13 ± 4.11 A	15.16 ± 0.85 A
Treated (T)	58.9 ± 2.02 B	91.35 ± 1.1 B	24.38 ± 0.97 B	305.71 ± 3.27 B	19.8 ± 1.03 B

Values are revealed as mean ± SE, n=10

T: Rabbits received 70 mg / Kg B.W. of aqueous extract of *Matricaria chamomilla* flowers

Capital letters denoted difference between treated group (P<0.05) vs control.

The rabbit's carcass traits are presented in (Table 5); all traits recorded significant (P<0.05) improving in the chamomile treated group. This suggests that chamomile flower extract contains compounds that promote the growth of animals. It has been reported that plants such as chamomile can improve carcass quality in rabbits (Al-Kaisse, and Khalel, 2011). This may be due to active compounds that are presented in chamomile flowers. It could inhibit the excessive growth of a harmful intestinal microorganism, with the result may decidedly influence poultry wellbeing and efficiency (Mahmmod, 2013). This is in help with results acquired by Ali (2015) which his study showed the improvement and increase in the weights of most internal organs and morphological and carcass traits chamomile-fed hens because of the primary constituents of the herbs and essential oils which are answerable for the main part of the antimicrobial action. The chamomile flowers performed to improve thyroxin hormone action, which quickens the supplements metabolites and biochemical responses (Das, 2015).

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