Role of the Aqueous Extract of Origanum majorana Leaves on Liver Enzymes and Serum Proteins in Male Rabbits

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Abstract **Marjoram is characterized by containing compounds that are characterized by their antioxidant activity, such as Phenolic substances, especially phenolic acids, Carvacrol, Thymol, and flavonoids are among the most The active compound in antioxidants is hydroquinone, which was used as a sensorVital for cholesterol Hydroquinone derivatives have also revealed activities against lymphocytic leukemia .As for the other components of the marjoram plant they are tannins, alkaloids, saboniat, and terpenoids. (Terpenoids), Phenol Trip. This study aimed to investigate the antioxidant effects of an aqueous extract of Origanum majorana leaves on hematological parameters, liver enzymes, and serum proteins in rabbits. From 1 September, 2024, to 3 January 2025, at the University of Al-Zahrawi's Faculty of Medical Laboratory Technique. where the rabbits used in the experiment were housed in special cages. Twelve rabbits were divided into two groups, G1 receiving water and protein pellets as a control group and G2 receiving Origanum Majorana 150 mg/kg. The findings indicate that Origanum majorana has no discernible impact on the number of red blood cells and packed cell volume. Although Origanum Majorana significantly increases hemoglobin concentration and white blood cell count, The measures of total protein concentration, albumin concentration and globulin concentration. On other hand there is significant decrease effect of Origanum Majorana on Alanine transaminase concentration and Aspartate transaminase concentration. In calculate that Origanum Majoran has effective role in enhancement of immunity by increase white blood cell counts and has antioxidant effect by decrease liver enzymes and increase of liver proteins.**

Keywords **—** Origanum Majorana , blood parameters, liver enzymes, liver proteins.

INTRODUCTION

Origanum majorana, the marjoram plant, is a member of the Lamiaceae family and has been utilized in traditional medicine since ancient times (1). The plant is indigenous to North Africa and Southwest Asia in the Mediterranean and Asian areas. It is grown in numerous countries, including Egypt, the United States, France, Greece, and Hungary, especially in southern Europe (2). The plant is native to various Mediterranean nations and possesses potent antibacterial and antifungal properties. worms, viruses, and parasites (3). Numerous studies have shown the antifungal, antibacterial and antioxidant activities of marjoram species (4). Marjoram is an aromatic plant whose extract showed strong activity against Gram-positive bacteria. Many studies have shown antifungal, antibacterial and antioxidant activities of various species of marjoram (5).

The most significant active ingredients found in marjoram plants are phenolic compounds, particularly phenolic acids and flavonoids. Flavonoids and substances like carvacrol that are known for their antioxidant properties Additionally identified are tannin, carvacrol, and thymol (6). Antioxidant powerhouse polyphenol rosmarinic acid Patients turned to using the marjoram plant as an alternative to pharmacological medicines for oxidation (7). The research aims to know the effect of Origanum majorana on blood parameter, liver enzymes and liver proteins.

MATERIALS AND MTHODS

Materials and Chemical

The animals were dosed prophylactically with an internal, hepatic, and intestinal antihelmintic drug Albendazol 3% and Ivermectin 0.1 ml / rabbit were injected under the skin to prevent internal and external worms. And they were injected with Amprolium at a dose of for four days, 0.6 milliliters per liter of drinking water There is no toxicity associated with the dose used to prevent coccidiosis (8).

The aqueous extract of marjoram leaves was prepared based on previous studies The method (9) is as follows:

1- Weigh 1 kg of plant leaf powder and add it to 10 liters of distilled water (ratio 10:1(Using the steeping method (cold extraction method) for 72 hours.

2-The mixture was placed on a hot plate using a magnetic stirrer to mix well for 4 hours at a temperature of (25-30)°C.

3- Then filter the mixture using filter

4-The solvent was then removed using a rotary evaporator until it dried Completely dissolve the solution and obtain a very viscous vegetable with a dark brown-black color.

5-The resulting plant extract was weighed, the extract was divided into sections and stored in glass bottles Dark, tightly sealed, at a temperature of 4°C.

6-The extract was used within a period not exceeding three months from the time of its preparation

Study Area

From 1 September, 2024, to 3 January 2025, the experiment was carried out at the University College of Al-Zahrawi's Faculty of Medical Laboratory Technique.

Study Design

Twelve male rabbits local(hybrid) breeds weight (1-1.5) kg with age (6-11) months divided into two groups into special cages, all animals were examined to ensure that they were free of injuries and deformities before The experiment started G1 treat with water and pellets this group use as control and G2 treated with Organium marjoram extract 150 mg/kg.

blood examinations.

At the beginning and end of the experiment, three milliliters of blood were extracted directly from the heart of each experimental animal. Anticoagulant-containing tubes were used for blood parameters. Laboratory tests involved collecting blood in gel tubes, and centrifuging the tubes 3000 times for 20 minutes to separate the serum.

Complete blood count (CBC)

The measurement was carried out automatically after a blood sample was collected and put into the Urit-2900 device.

Albumin, total protein (TP), aspartate aminotransferase (AST), and alanine aminotransferase (ALT).

The measurement was carried out automatically after a serum sample was collected and put into the DC-40-Mindray apparatus.

statistical evaluation.

Least significant differences (LSD) were used in the statistical analysis of the experiment's data using the SAS (Statistical Analysis System, version 9.1). Mean ± standard errors were used to express the results, and $P < 0.05$ was deemed statistically significant (10).

RESULT AND DISCUSSION

The results were collecting as the effect of Origanum Majorana on liver enzyme, liver proteins and hematological parameters in local rabbit.

Table 1 showed the effect of Origanum Majorana on blood parameters Red blood cells count(cell/ml*10^6), packed cell volume (%) , hemoglobin concentration (g/dl) and white blood cells count(cell/ml*10^3). Showed there is no significant differences in RBCs counts and PCV in all periods and between groups. While there is significant increase in the WBCs and Hb concentration in different periods between groups.

Parameters in Group	Mean ± SE		L.S.D Values
	1st day	After 60th day	
RBCs of G1	5.93 ± 0.17 Aa	5.79 ± 0.04 Aa	0.85
RBCs of G2	5.98 ± 0.35 Aa	6.05 ± 0.09 Aa	
PCV of G1	39.75 ± 1.16 Aa	38.10 ± 1.33 Aa	9.42
PCV OF G2	41.80 ± 1.77 Aa	40.00 ± 0.54 Aa	
Hb of G1	13.54 ± 0.22 Aa	.1377 ± 0.12 Ab	0.44
Hb of G2	13.20 ± 0.57 Ba	14.30 ± 0.30 Aa	
WBCs of G1	3.33 ± 0.44 Aa	3.35 ± 0.33 Ab	0.75
WBCs of G2	3.92 ± 0.52 Ab	5.19 ± 0.89 Aa	

Significant differences between periods for each group are indicated by capital letters, whereas significant differences between periods (N = 6) for each group are indicated by small letters.

Table 2 showed the Effect of Origanum Majorana on liver enzymes (ALT) (IU) and (AST) (IU).And liver proteins (TP) (IU), Albumin (g/dl) and globulin concentration (g/dl). showed there is significant decrease in liver enzymes and significant increase in liver proteins in different periods between group

Parameters in Group	Mean ± SE		L.S.D Values
	1st day	After 60th day	
ALT of G1	96.25 ± 5.32 Aa	97 .00 ± 2.15 Aa	4.33
ALT of G2	89.80 ± 3.88 Ab	78.80 ± 4.48 Bb	
AST of G1	88. 00 ±4.15 Aa	89.25 ± 5.45 Aa	7.89
AST of G2	94 .00 ± 5.41 Aa	67.80± 9.32 Bb	
TP of G1	4.60 ± 0.42 Aa	4.50 ± 0.31 Ab	0.96
TP of G2	5.30 ± 0.37 Aa	6.22 ± 0.18 Aa	
Albumin of G1	2.08 ± 0.16 Aa	2.02 ± 0.07 Ab	0.46
Albumin of G2	1.88 ± 0.07 Ba	2.64 ± 0.11 Aa	
Globulin of G1	2.58 ± 0.53 Aa	2.50 ± 0.32 Ab	0.98
Globulin of G2	3.42 ± 0.31 Aa	3.58 ± 0.29 Aa	

Significant differences between periods for each group are indicated by capital letters, whereas significant differences

between periods (N = 6) for each group are indicated by small letters.

Discussion

Hematological and biochemical parameters in rabbits can be influenced by numerous factors, including diet, health status and environmental conditions (11). We discovered that Origanum majorana had an impact on the blood parameters in our investigation. (complete count) by increasing hemoglobin and white blood cell counts; the higher WBC number may be linked to thymol, the active ingredient in OM that boosts the immune response (12). Origanum majorana's beneficial effects on blood hematology also included an increase in hemoglobin levels. The higher iron content of OM, which is thought to be a necessary nutrient for hemoglobin production, may be the cause of its beneficial effects on Hb (13). The findings concur with (14,15). However, Origanum majorana has an effect on liver proteins and enzymes by increasing liver protein (total protein, albumin, and globulin) and decreasing liver enzymes (AST and ALT). Numerous phytochemicals with antioxidant properties found in plants have been shown to reduce the effects of oxidative stress agents in vitro (16). Antioxidants help stop oxidation, which can damage cells and hasten the aging process. Antioxidants may strengthen the immune system and reduce the risk of infections, cancer, and heart disease. Vitamins, minerals, and other compounds are examples of antioxidants found in food (17). These outcomes could be explained by the antioxidants in marjoram, which significantly aided liver regeneration (18). These findings concur with (19,20,21). It was discovered that Origanum majorana reduced liver enzymes. Marjoram's antioxidant qualities, which are linked to its polyphenolic compounds like flavonoids and phenolic acids, probably have a significant impact on scavenging reactive oxygen species and improving cellular repair processes (22).

CONCLUSION

Because Origanum Majorana has a strong effect on boosting immunity by increasing white blood cells, it is crucial to use antioxidant herbal remedies like this one to improve liver function, blood formation, and immunity. Additionally, Origanum majorana has elevated liver proteins (total protein, albumin, and globulin) and Hb, .On the other hand, Origanum majorana has lower levels of the liver enzymes ALT and AST.

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N/A

Conflict of Interest

The authors declare no conflict of interest.

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