



Research Article

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## ***Effect of Commiphora Molmol (Myrrh) on Total Leukocyte Count and Histological Alterations in Mice***

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### ABSTRACT

*Background: Commiphora molmol has been known as “myrrh” and it has been one of the common herbs consumed throughout the world especially in the Arabian countries.*

*Aim: to study the effect of Commiphora molmol on the total leukocyte count and histological alterations in liver and spleen of mice.*

*Materials and methods: Adult male mice (20 mice) were adapted in the basal diet in this study, then divided to two groups: The first group contained 10 mice and served as the control group, and the second group consisted of 10 mice and served as myrrh treated group in drinking water. The total leukocytes count was done. Liver and spleen paraffin sections were prepared and stained with H&E to determine the effect of treatments on these organs. The experiment took two weeks. All the experimental testes were done twice in time intervals of one week.*

*Results: myrrh dietary supplementation improved the cellular immune response by increasing the total leukocytes count in myrrh treated animals when compared to the non-treated animals. In the second group which received myrrh, the livers of the mice suspension showed more and/or less normal histological profile when compared to the first group (control group). Moreover, the microscopic investigation of the spleen of myrrh-cure mice, illustrated an increased density of lymphatic glands around the arterioles in the white pulp.*

*In conclusion, the results from this study demonstrated the effectiveness of myrrh as signs showing future success of immunological drugs, and further investigations should be done to show the benefits of this plant.*

**Keywords:** *Commiphora molmol, myrrh, total leukocytes count, histological alterations, liver, spleen, immune response.*

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### INTRODUCTION

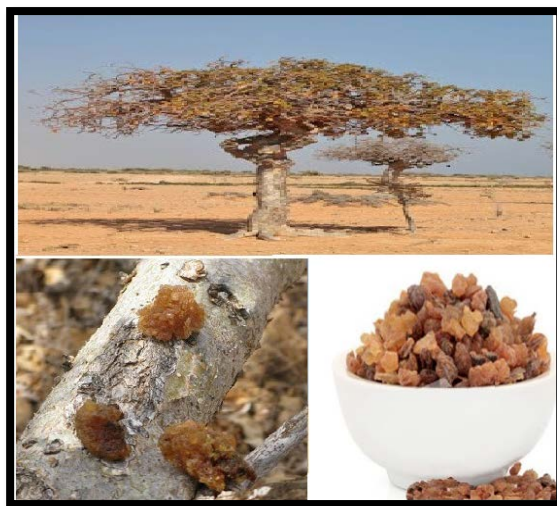
Commiphora molmol has been known as “myrrh” and it has been one of the common herbs consumed throughout the world especially in the Arabian countries [1].

Since ancient times, Myrrh has been applied to soothe pain and relieve sinusitis, gingivitis, periodontal disease and sore throat, and has long been used to intensify the body's natural immune defenses. Myrrh has been known as antibacterial, antiviral, anti-inflammatory and antifungal that fights infections of the lungs, skin and urinary and

intestinal tracts. Myrrh is also an appetite stimulant and natural deodorizer that can help to sweeten the breath. It can also help decrease swelling (inflammation) and kill bacteria [2, 3].

Myrrh has been used in case of mouth problems like soreness and swelling, gingivitis, loose teeth, cancer sores, bad breath, and chapped lips. It has also been applied topically for hemorrhoids, bedsores, wounds, abrasions, and boils. Myrrh has been added to foods and beverages, as a flavoring component and it has also been applied in manufacturing as a fragrance in incense, and in cosmetics as a fixative [4, 5].

Myrrh is a sap-like substance (resin). Myrrh resin is a natural gum that is obtained from trees that grow in East Africa, Arabia, and India. When a tree wound permeates through the bark, the tree bleeds a resin. Myrrh gum is a waxy material that coagulates quickly. After the harvest, the gum becomes hard, glossy, and it darkens deeply as it ages, and the white streaks emerge (fig. 1). Then, it can be used in its dried form or steamed to produce essential oils [6].



**Figure 1.** Myrrh tree and gum resin

It has been reported to have many pharmacological activities that involve antihypertensive, hypolipidemic, anti-infective, antiulcer and anticancer effects. It has also been reported to possess healing benefits during injuries. The number of leukocytes in normal animals was increased using Myrrh in the animals inflicted with skin wound or mild gastric ulcers induced by sodium chloride [2].

Although it is safe, Myrrh is safe to be used in small amounts, and people have been advised not to consume high amounts of myrrh which may cause severe heart irregularities, according to a study published in the journal of Phototherapy Research. Moreover, in the people who have sensitive skin, it may increase the allergic contact dermatitis [7].

Women who are pregnant and breast-feeding mothers should avoid taking myrrh by mouth as it may cause of miscarriage, and they should also avoid using myrrh because there is not enough information about the safety of using myrrh when breast-feeding [8].

#### **Aim of the work**

This study was designed to determine:

The effect of *Commiphora molmol* (myrrh) on total leukocyte count of mice.

The effect of *Commiphora molmol* (myrrh) on histological alterations in liver and spleen of mice.

## **MATERIALS AND METHODS**

### **1. Animal stock:**

20 adult albino male mice, aged 7–8 weeks and weighing 21–25gm were used. The animals were maintained under standard conditions of day and night at a temperature of  $25\pm 2^{\circ}\text{C}$  for two weeks for adaptation (according to standards ethical and scientific protocols described in the Guide for the Care and Use of Laboratory) before the experimental protocol was done (fig. 2).

### **2. Plant materials:**

Myrrh, *Commiphora molmol*, was purchased from commercial market in Riyadh city, Saudi Arabia. It has been thought that, the aerial sources of *Commiphora molmol* used in this study were collected from Farasan Island of Red Sea (Saudi Arabia) and traded in the market as myrrh resin. A suspension of the myrrh was prepared by mixing dry weigh of 500 mg of myrrh with 1 liter of water without addition of any suspending agent. Then, it was offered as drinking water to myrrh-treated-animals.



**Figure 2.** Animal stock

### 3. Experimental design:

- The number of 20 mice was randomly divided into two groups:
  - 1- The first group consisted of 10 mice and served as the control group. This group received normal food and plane drinking water.
  - 2- The second group consisted of 10 mice which served as myrrh treated group. This group received normal food and Myrrh suspension as drinking water.

All animals were group-housed (5 animals/cage).

- The total leukocytes count was done according to Wintrobe [9] as followed:

The whole blood was collected and diluted with a 3% acetic acid solution, which hemolyzed mature erythrocytes and facilitated leukocyte counting. The standard ratio of 1:20 was used for the dilution of leukocyte counts. The dilution was mixed well and incubated to permit lysis of the erythrocytes. After the incubation period, the dilution was mounted on a hemacytometer. The cells were allowed to settle, and then were counted in specific areas of the hemacytometer chamber under the microscope. Then the number of leukocytes was calculated (fig. 3).



**Figure 3.** Total leukocytes count and hemacytometer

- Liver and spleen paraffin sections were prepared and stained with H&E to determine the effect of treatments on these organs.
- Statistical Analysis was done.

The experiment took two weeks. All the experimental testes were done twice in time intervals of one week.

## RESULTS

### 1. Total leukocytes count:

Myrrh was taken in drinking water for two weeks which caused increasing the total count of leukocytes from base the line control. It was 30.5 for the myrrh treated group for the first week and 60.5 for the myrrh treated group for the second week when compared to the control group's value (28.5).

These results showed that myrrh was taken in drinking water excited the total leukocytes (Table 1).

**Table 1.** total leukocytes count

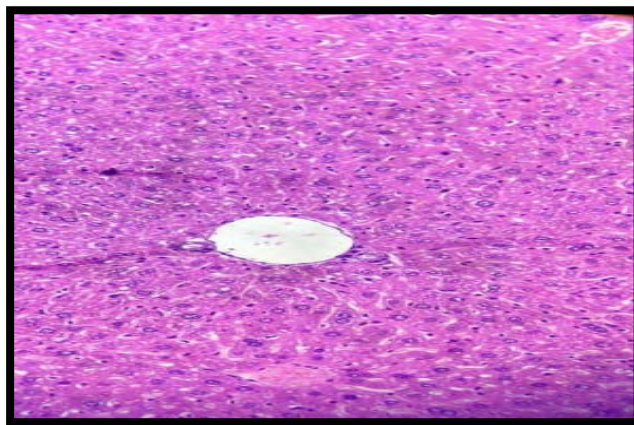
Total leukocytes count		
Control Group (First group)	Myrrh Group (Second group) First week	Myrrh Group (Second group) Second week
28.5	30.5	60.5

### 2. Histological findings

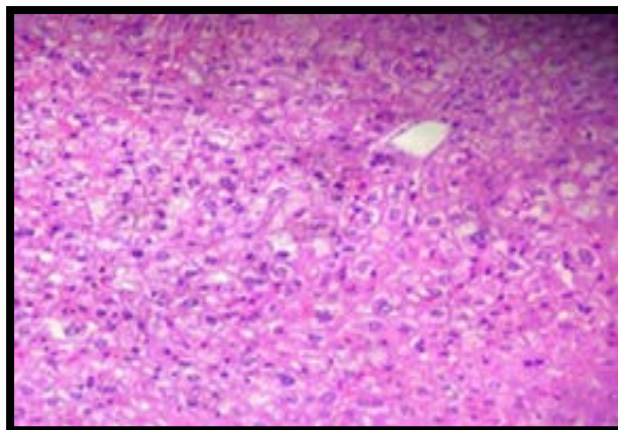
The microscopic examinations of the second group which received myrrh showed that the livers of the mice suspension showed more and/or less normal ultra-structural profile (Fig.4) comparing with that of the control group (Fig.5).

The microscopic examinations of the spleen of the second group (myrrh-treated animals) showed the greater size of lymphatic sheath was made around the arterioles (Fig.6) when compared to the control group (Fig.7). This finding might be due to an increase in the active lymphocytes proliferation within the sheaths.

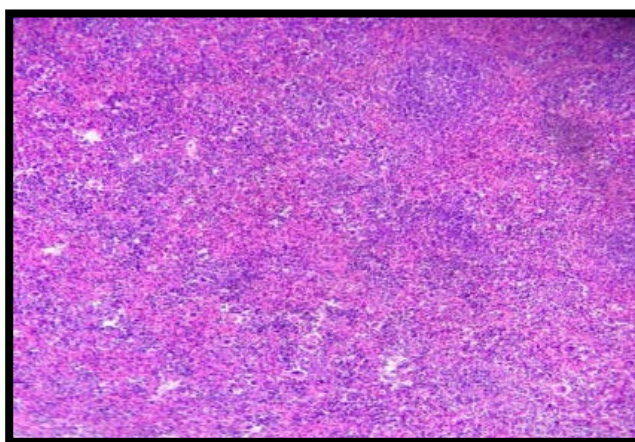
Also, it was clear that myrrh treated animals showed more active daily behavior than that of the control group. Control group seemed to be more quiet than the treated group which might be due to the effect of myrrh on the overall health of the treated animals



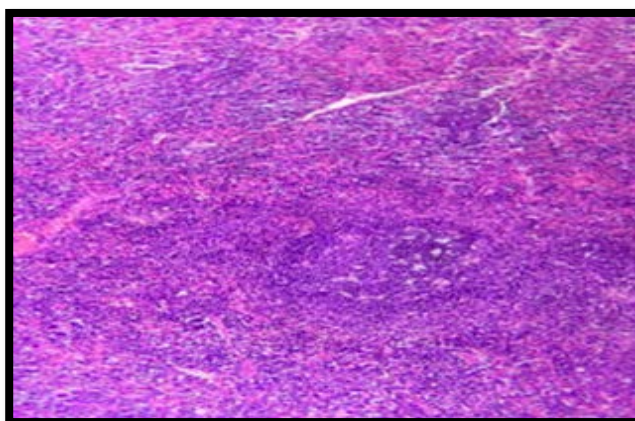
**Figure 4.** Light microscope of the liver of myrrh -treated rat, showing a more or less normal ultra-structural profile.  $\times 20$ .



**Figure 5.** Light microscope of the liver of control rat, showing s normal ultra-structural profile.  $\times 20$ .



**Figure 6.** Light microscope of the spleen of myrrh -treated rat. Note the increase in thickness of lymphatic sheath.  $\times 10$ .



**Figure 7.** Light microscope of the spleen of control rat. Note the normal thickness of lymphatic sheath.  $\times 10$

## DISCUSSION

Myrrh which was taken in drinking water for two weeks caused increasing the total count of leukocytes from the base line control. It was 30.5 for the myrrh treated group for the first week, and 60.5 for the myrrh treated group for the second week when compared to the control group value (28.5).

These results were in agreement with that of [1]. They found that daily administration of Commiphora molmol appeared to increase the number of leukocytes.

Leukocytes were elevated using Myrrh which included an antigenic-driven response and indicated some constituents of myrrh. The Myrrh helped to preserve activity of leukocytes reproduction throughout healing which implied that myrrh activated the late steps of both reproduction and discrimination pathways for leukocytes during effective phase of healing [10].

These findings might be due to the increase of the immune response in animals that were treated with myrrh.

Furthermore, the results of the microscopic examinations of the second group which received myrrh showed that the livers of the mice suspension showed more and/or less normal ultra-structural profile (Fig. 4) comparing with that of the control group (Fig. 5).

[11] and [12] studied the effect of the new drug as an antischistosomal (myrrh extract) on the mice's liver. They found that the livers of the animals treated with myrrh extract showed more and/or less about the histological profile compared with non-infected and non-treated groups. Whereas, the infection treated group showed the complete keeping of the hepatic architecture. Most of the hepatocytes appeared normal, and the network in the central part of the granulomas and also, in the portal typically a large one, appeared rarefied. The hepatic network was preserved and it significantly decreased in the number and size of granulomas, and a significant reduction in the collagen content deposition in the portal tracts and around the central veins was detected when compared to the infected non treated mice. Which meant that myrrh could be considered as a promising antischistosomal drug.

In the present study, the microscopic examinations of the spleen of the second group (myrrh-treated animals) showed an increase in the large volume of lymphatic sheath around the arterioles (Fig. 6) when compared to the control group (Fig. 7). This finding might be due to an increase in the active lymphocytes proliferation within the sheaths.

This finding was confirmed by Haffor [10]. He found that the microscopic investigations of the spleen of myrrh-treated mice with skin injury showed a large volume in lymphatic sheath around the arterioles (periarteriolar lymphoid sheath), which might be due to the large lymphocytes population density. It was clear that myrrh treated animals showed more active daily behavior than those of the control group. The control group seemed to be more quiet than the treated group which might be due to the effect of myrrh on the overall health of the treated animals. This might be due to Myrrh's large antimicrobial activity, which has been medicinally used in treating different diseases [13].

Also, it might be due to Commiphora molmol which was as a commercial product as an anti-inflammatory in wound healing [10].

From the obtained results, it could be concluded that myrrh could be considered as a promising immunological drug. Further studies are needed to clarify and explore its mode of action and safety for medicinal use and treatment.

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