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Effect of Crude Plant Extracts on Some Liver Enzymes in Mice Exposed to Ethanol

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Abstract

The aim of this a study was to evaluate the possible effects of the Methanolic and aqueous extracts decreased the liver enzymes (ALP, SGPT and SGOT) to the normal level after the its values by the treatment with ethanol liquid diet. The level of GOT, GPT and ALP in animals treated with ethanol after 25 days were increased in comparison with control group, results showed that animals treated with Crude Plant Extracts caused decreased in liver enzymes activity to reach to normal level in comparison with control group.

Keywords: Crude Plant Extracts, GOT, GPT, ALP and ethanol liquid diet.

1. Introduction

Plants are an important source of medicine and this importance comes from their medical prevention of many diseases and its increase of the body's immunity. Even now, the World Health Organization reports that up to 80% of people will use herbal treatments as their primary source of medication. Medicinal plants contain chemical compounds with great interest for its physiological effect with medical activity. This is because they contain more than one active substance that Synergy naturally available in the plant, " the effect of active substance with the other " have a very important effect on the events of healing [1]. Different chemical constituents derived from plant crude extracts have been assigned pharmacological and medicinal properties. Chemical constituents with antioxidant function, in particular, can be present in large amounts in plants and are thought to be responsible for their protective effectiveness against a variety of degenerative diseases, including cancer, neurological and cardiovascular diseases [2], as well as pulmonary, urinary, skin, gastrointestinal, and liver disease [3].

Herbs are important in the treatment of a variety of liver disorders, as well as other disease-related processes [4]. The liver is a vital organ that regulates homeostasis in the body via a variety of functions. Toxic chemical and drug-induced caused by liver damage has been identified as a

toxicological problem. Natural products found in plants, such as flavonoids, terpenoids, and steroids, have gotten a lot of attention in recent years because of their wide range of medicinal properties, including antioxidant and hepatoprotective ability.

2. Materials and Methods

2.1 Plant samples collection and drying

M. piperita and O. basilicum were purchased from a local market and M. communis from a local garden in Holy city of Karbala, Iraq. Leaves were dried at room temperature with darkness and powdered by electrical grinder.

2.2 Preparation of leaf crude extracts

2.2.1 Alcoholic extracts

The powdered material (20 g) was mixed with 200 ml of methanol for 24 hrs at room temperature. The suspensions were then filtered by filter paper (whatman No.1) and ground at room temperature. The extracts were stored at -4 °C until being used[5].

2.2.2 Aqueous extracts

The powdered materials (20 g) were mixed with 400 ml of D.W for 24 hrs at room temperature. The crude extract then was evaporated at 60°C using oven and the resultant crude extract was collected and stored at -4 °C until being used[6].

2.3 Animals

One hundred female adults and fifty male adults were bought from the National Centre for Drugs Control and Research, Ministry of Health, Iraq, varying in age (8-12) weeks, and weighting (22-28) g. They were kept in plastic cages in a managed animal house containing hard wood chips for bedding at 25±2 C˚ ,4/10 hour's light/dark cycle in Biotechnology Research Center, Al-Nahrain University.

2.4 Liquid diet with ethanol

The composition of the modified liquid diet with ethanol was: cows' milk 925 ml, ethanol 25-75 ml, vitamin A 5000 IU and sucrose 17 g[7]. This mixture supplies 1000.7 kcal/l.

2.5 Experimental layout (in vivo)

One hundred adult of female and fifty adults of male mice were purchased from the National Center for Drug Control and Research, Ministry of Health, Iraq were used, their age was ranged (8-12) weeks and weighting (22-28) g. They were housed in plastic cages containing hard wood chips for

bedding in controlled animal house at 25±2 C˚ ,4/10 hour's light/dark cycle in Biotechnology Research Center, Al-Nahrain University.

Group 1: - Not treated animals (control).

Group 2: - Animals were fed of Ethanol liquid diet for 25 days.

Group 3: - Animals were fed of Ethanol liquid diet and administrated orally with methanolic extract of M. communis at a concentration 0.7 g/kg of body weight according to for 24 hrs[8].

Group 4: - Animals were fed of Ethanol liquid diet and administrated orally with aqueous extract of M. communis at a concentration 0.4 g/kg of body weight according to for 24 hrs[8].

Group 5: - Animals were fed of Ethanol liquid diet and administrated orally with methanolic extract of M. piperita at concentration 4 g/kg of body weight according to for 24 hrs[9].

Group 6: - Animals were fed of Ethanol liquid diet and administrated orally with aqueous extract of M. piperita at a concentration 4 g/kg of body weight according to for 24 hrs[9].

Group 7: - Animals were fed of Ethanol liquid diet and administrated orally with methanolic extract of O. bacilicum at a concentration 1.5 g/kg of body weight according to for 24 hrs[10].

Group 8: - Animals were fed of Ethanol liquid diet and administrated orally with aqueous extract of O. bacilicum at a concentration 1.5 g/kg of body weight according to for 24 hrs[10].

2.6 Measurement of Serum Glutamic Pyruvic Transaminse

Serum alanine aminotransferase (ALT) activities were measured colorimetrically according to the method of Reitman and Frankel using a commercial assay kit[11].

2.7 Measurement of Serum Glutamic Oxaloacetic Transaminse

Aspartate aminotransferase (AST) activities were measured colorimetrically according to the method of Reitman and Frankel using a commercial assay kit[11].

2.8 Measurement of Serum Alkaline Phosphatase

Data are analyzed using statistical software IBM (SPSS version 18). The values of the parameters investigated were given in terms of mean ± standard error and the variance analysis (ANOVA) was used to make variations between the means of all the parameters. Differences were considered statistically significant at $p<0.05$.

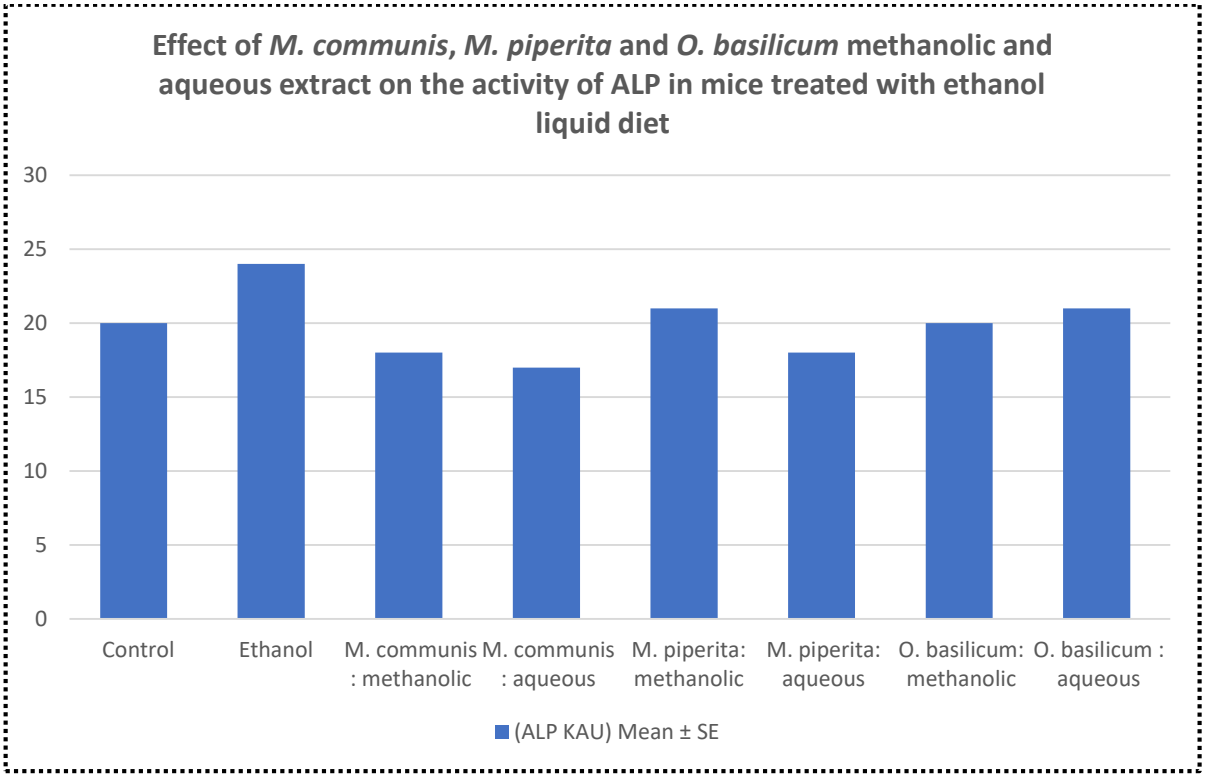
2.9 Statistical Analysis

One hundred adult of female and fifty adults of male mice were purchased from the National Center for Drug Control and Research, Ministry of Health, Iraq were used, their age was ranged (8-12) weeks and weighting (22-28) g. They were housed in plastic cages containing hard wood chips for bedding in controlled animal house at 25±2 C˚ ,4/10 hour's light/dark cycle in Biotechnology Research Center, Al-Nahrain University.

3. Results and Discussion

3.1 Effect of Crude Plant Extracts on Serum Alkaline Phosphatase (ALP) Activity

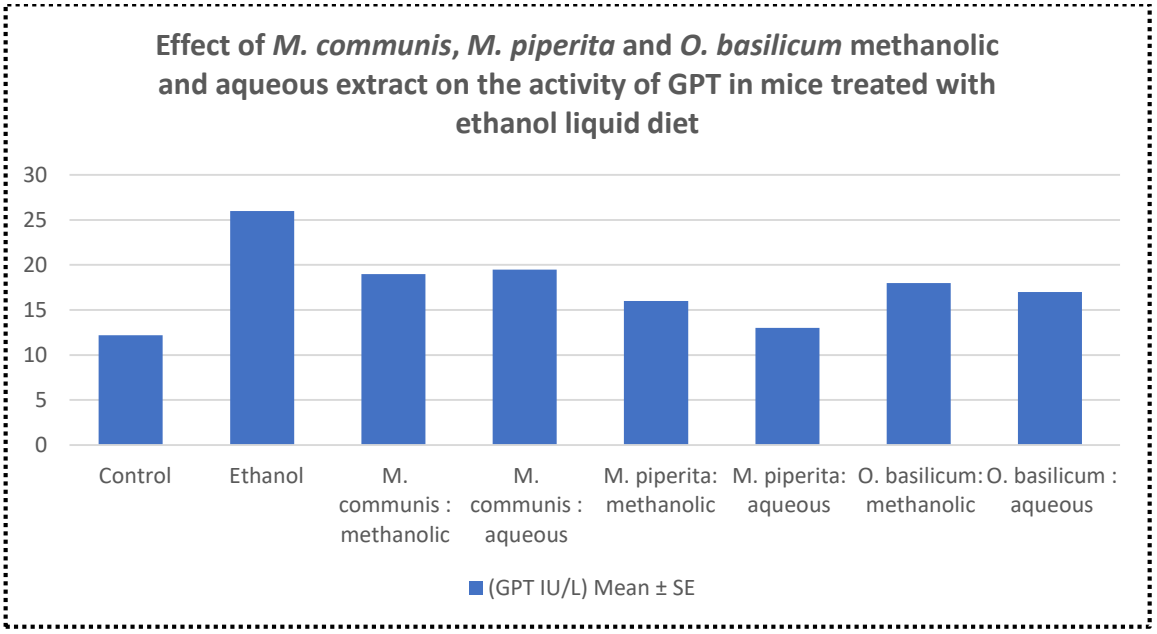
Results showed that the level of ALP in animals treated of ethanol liquid diet for 25 days that increase (24 ± 0.866) KAU in comparison with control group (20 ± 0.635) KAU, and When treated animal with methanolic and aqueous extracts led to decrease the level of ALP, and show no any effect of these extracts in positive control group except the aqueous extract of M. communis that increased.



The ethanol has a negative effect on liver because the metabolism of ethanol leads to the production of acetaldehyde material by the enzyme alcohol dehydrogenase which plays a main role as a toxic material and with harmful effects on the cellular composition of the liver cells and the hepatic damage occur[13], and when hepatic damage occur the level of ALT, AST, ALP and cholesterol were elevated in serum[14]. The hepatic damage is usually associated with elevated serum ALT, AST, ALP and cholesterol level[15].

3.2 Effect of Crude Plant Extracts on Serum Glutamic Pyruvic Transaminse (GPT) Activity

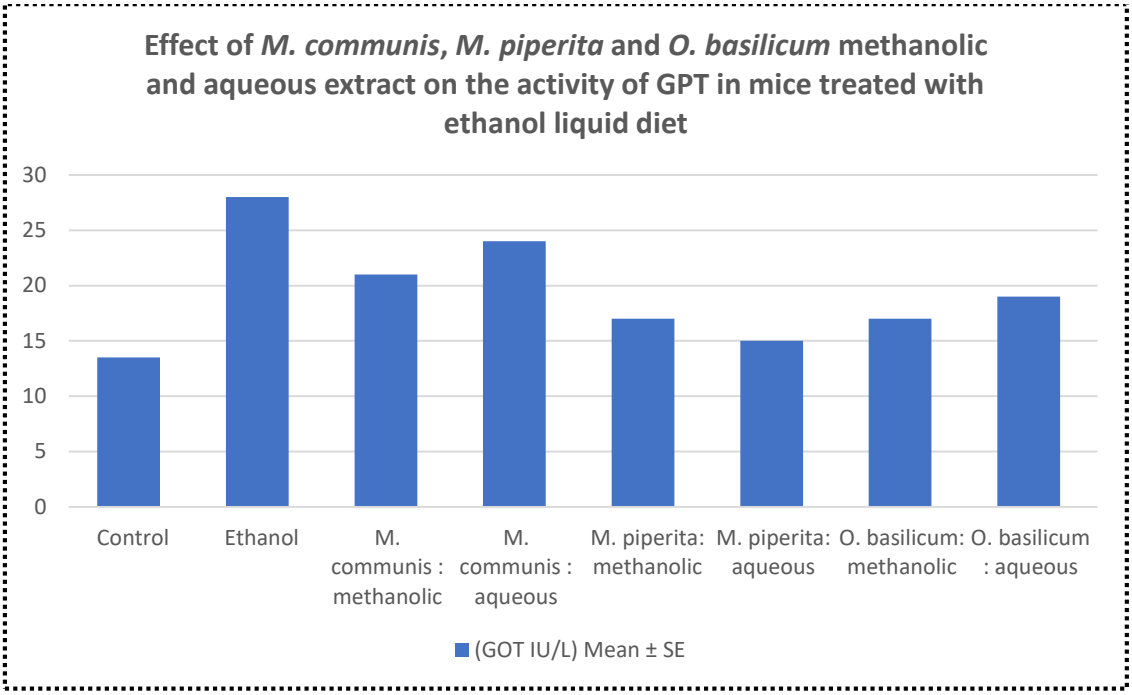
Results showed that animals treated with methanolic and aqueous extracts caused reduction in GPT, since it increased after treatment with ethanol for 25 days, and decreased when treated animals with the aqueous extract of M. piperita to normal level in comparison with control group. But in the positive control group, the GPT level was not affected after treatment with aqueous and methanolic extracts and this reflects the safety use of these extracts. At the same time, results showed no difference between the methanolic and aqueous extracts regarding GPT level in serum, indicating the presence of active compounds in both aqueous and methanolic extract.



The results above showed that animals treated with ethanol increased GPT and this consistent with the results of Flora et al. 16 who reported that some chemicals such as ethanol elevate blood SGOT and SGPT in rats it generates free radicals during metabolism in the liver cells leading to leakage of liver enzymes (GPT and GOT) to serum[17].

3.3 Effect of Crude Plant Extracts on Serum Glutamic Oxaloacetic Transaminase (GOT) Activity

Table (3-9) shows the level of GOT in animals treated with ethanol after 25 days which increased (28 ± 0.461) IU/L in comparison with control group (13.5 ± 0.288) IU/L. Results are in line with Flora et al., [17] who reported that some chemicals such as ethanol elevates blood SGOT and SGPT in rats it generates free radicals during metabolism in the liver cells leading to leakage of liver enzymes (GPT and GOT) to serum 17. When treated animal with methanolic and aqueous extract led to decrease the level of GOT, and show no any effect of these extracts in positive control group and this reflects the safety used.



6. Conclusions

The present study showed that Alcoholic and aqueous leaf extracts of M. communis , M. piperita and O. basilicum have significantly decreased Activity of ALP, GOT and GPT, as compared with previous mice fed of ethanol liquid diet

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