Effective impact of myrrh (Commiphora myrrh) plant on improving liver function in hepatic rats.

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Abstract:

Plants have been the basis of amedicinal treatment since prehistoric times, and herbal medicine or herbal medicine is still widely practiced today. Modern medicine makes use of many plant-derived compounds as an essential raw material in the pharmaceutical industry., this exploratory study aims to see how different doses of Commiphora myrrh affect the liver function of carbon tetrachloride-intoxicated rats. Before the research, the rats were kept in a cage (animal home) for one week. The rats were categorized into two groups, with the first (n=6) given only food. As a negative control group, a 28-day baseline diet was used (C-ve). The Second group rats intoxicated Carbon Tetrachloride (n= 18 rats), 5%, 10% myrrh and control positive. The results indicated that Group 4(10% myrrh)recorded the best group for AST and Total protein of hepatointoxicated rats even when compared to (+)group while Group 3(5% myrrh) recorded the best group for ALT. of hepatointoxicated rats even when compared to control (+)group Additionally, All groups show significant differences in creatinine as compared to control (+) group. Myrrh is an herb that can be utilized in certain situations and under the direction of a physician. in the diets of individuals with liver disease.

Keywords: myrrh, liver functions, hepatoprotective, intoxicated Rats.

INTRODUCTION

The myrrh plant is a homogeneous mixture of resinous materials, gums، and volatile oil secreted by the stems of the elderberry. The average height of the myrrh tree is three meters, with thorny branches. The method of extracting myrrh from the stems is to cut the stalk of the tree, and this juice known as myrrh comes out of it. Its types: Myrrh Hijazi, Myrrh Roe African. It grows in the Kingdom of Saudi Arabia, Yemen, Oman, and Somalia. There are many types of myrrh, including (Myrrh Hijazi, Myrrh of African roe, the good type is the one that looks transparent and clean with a light brown color, while the bad one is the one in which black colors enter and it seems as if it contains sand. **Bo Cao et al. (2019).** Myrrh oil has the potential to be a commercially viable antibiotic that kills buffer cells and does not cause any development of resistance. This is a rare example of an antibiotic that can preferentially kill non-growing bacteria **Saeedi et al. (2003).** Several terpenoid components have been found to inhibit nitric oxide production in peritoneal macrophages that activate lipopolysaccharides. Here we review the structure of terpenoid components from frankincense and myrrh resins and evaluate their anti-inflammatory effects through their inhibitory activity on nitric oxide production **Bo Cao et al. (2019)**. The importance of myrrh extract and its association with anti-inflammatory and hyperlipidemia is clear as results indicate that (Myrrh) extract has a dose-dependent analgesic effect and potent anti-inflammatory and anti-hyperlipidemic activities. Myrrh reduces body weight gain and improves lipid profile in hyperlipidemia rats. These data confirm its traditional use for the treatment of painful and inflammatory conditions, obesity, and hyperlipidemia. Therefore, (myrrh) extract may be beneficial for hyperlipidemia patients who suffer from pain and inflammation **Zuzarte et al., 2011)**.Scientists have found that myrrh causes the production of many antioxidants and detoxifying proteins in the liver, kidneys, and brain. In particular, the team suggests that the anti-enzyme protein Nrf2 plays a key role in this defense process. In healthy mice treated with hyperammonemia, Nrf2 is activated

by high concentrations of oxygen free radicals and leads to the production of antioxidants, which protect cells from free radicals. Levels of Nrf2 and antioxidants were significantly lower in untreated hyperammonemia mice. Besides the elevation in Nrf2, treatment with C. molmol resin also reduced tumor necrosis factor-alpha (TNF-α), which is known to be elevated in the serum of patients with cirrhosis, a condition in which the liver is hardened due to hepatic tissue. **Mahmoud et al., 2017)**

Although the exact mechanism of treatment remains unclear, it may help mitigate the effects of liver disease.

THE PURPOSE OF THE STUDY:

The goal of this study was to see how varying levels of Commiphora myrrh affect the liver function of carbon tetrachloride-intoxicated rats

MATERIALS

Plant

The Myrrha family (Burseraceae), Genus (Commiphora.), and species (C. Myrrha) were obtained from a local market as dried material.

Diets

The Basic Diet

The basal diet had been produced according to the protocol described by Reeves et al (1993). It had 20% protein (casein), 4% corn oil, 10% sugar, 1% vitamin mixture, 2% choline chloride, 5% fibre (cellulose) and 3% salt mixture.

Table (1): The basal diet's composition.

Compounds	Amount
Protein	20%
Corn oil	4.7 %
Salt mixture	3.5 %
Vitamin mixture	1 %
Cellulose	5 %
Choline chloride	2 %
Sucrose	10%
Corn starch	Up to 100%

Source: Reeves et al., (1993).

Table (2): The salt mixture's composition (g/100 g).

Compounds	Amount
$CaCO_3$	600 mg
$K_2 HPO_4$	645 mg
$Ca\ HPO_{4.}\ 2H_2O$	150 mg
$MgSO_{4.2}H_2O$	204 mg
Nail	334 mg
$Fe\ (C_6H_5O_7)_{\ 2}6H_2O$	55 mg
Kl	1.6 mg
$MnSO_{4.}4H_2O$	10 mg
$Zncl_2$	0.5 mg
$Cu\ SO_{4.}\ 5H_2O$	0.06 mg

Source: (Hegsted et al., 1941)

Table (3): The vitamin mixture's composition.

Vitamin	Amount
Vitamin E	10 Iu
Vitamin K	0.50 Iu
Vitamin A	200 Iu
Thiamin	0.50 mg
Pyridoxine	1.00 mg
Niacin	4.00 mg
Calcium pantothenic acid	0.40 mg
Vitamin D	100 Iu
Choline chloride	200 mg
Folic acid	0.02 mg
Inositol	24 mg
Para-amino – benzoic acid	0.02 mg
Vitamin B12	2.00 µg
Biotin	0.02 mg

Source: (Campbell, 1963a, 1963b), (Hegsted et al., 1941), Reeves et al., (1993).

Experimental diet

Table (4): The composition of basal and Experimental diet:

Component (g)	Basal diet	Basal diet+5% myrrh	Basal diet+10% myrrh
Test ingredients	---	5	10
Casein	20	20	20
Corn oil	4.7	4.7	4.7
Mineral mix	3.5	3.5	3.5
Vitamin mix	1	1	1
Cellulose	5	5	5
Choline chloride	2	2	2
Sucrose	10	10	10
Corn starch	Up to 100	Up to 100	Up to 100

Carbon tetrachloride (Ccl4)

Carbon tetrachloride (Ccl4) was given to Cairo, Egypt, by the El-Gomhoria Company for Chemical Industries. They gave it to them in a 10% liquid solution. It was given out in white plastic water bottles that could hold one liter, as per (Passmore & Eastwood, 1986), and it was given out as a toxic substance ingredient for liver disease. It is diluted using paraffin oil obtained from the drugstore during the induction (Passmore & Eastwood, 1986).

Rats

At 14-16 weeks of age, twenty-four (24) adult male Sprague-Dawley rats weighing 150-160 g B.Wt. The animals were housed insanitary conditions in plastic cages with trainless metal roofing. For adaption, rats were given the basal diet for Seven days before the study. A smallmouth bottle connected with a metallic tube and a piece of plastic tubing at the mouth provided Ad libitum water. As previously indicated, rats were acclimatized on a 12-hour light/12-hour night condition for seven days before the beginning of the research to allow for acclimation.

METHODS

Preparation of plant

Myrrh dried plants were acquired from a local market in al Baha, Saudi Arabia. All plant ingredients were powdered in a mixer and stored in glass with a dark stopper vial in a cold, dry location until usage. All herbs and plants must be stored in a cold, dark and dry atmosphere, according to Russo (2001), to prevent the oxidation of their contents. Carbon tetrachloride (Ccl4) in 50% V/V paraffin oil (2ml / kg b. wt.) was given to 20 male albino rats subcutaneously twice a week for two weeks to cause chronic liver injury, as described by Jayasekhar et al., (1997). After the injection of Ccl4, blood was taken by a retro-orbital approach to check for liver disease and to evaluate liver function.

Rats are grouped and fed.

The study used 24 Sprague Dawley white male albino rats ranging between 150 – l60 grams. Each of the four groups contained six rats. The following are the rat groups:

- **Group (1):** In the negative control experiment, rats were fed a standard diet (control"-").
- **Group (2):** The control positive group (control "+") consisted of rats fed a standard diet and administered with carbon tetrachloride (CCl4).
- **Group (3)** was given a standard diet plus 5% **Myrrh**.
- **Group (4)** was given a standard diet plus 10% **Myrrh**.

Blood sampling

After the trial, rats were slaughtered under ether anesthesia (28 days). The retro-orbital approach was used to collect blood samples in a clean, dry centrifuge tube. They were allowed to coagulate at room temp before centrifuging for fifteen min at 1500 pm. Serum was obtained using a wash and dry syringe, placed in Wasserman tubes, and preserved at -10 °C until biochemical analysis. The livers, spleens, lungs, hearts, and kidneys of the rats were then separated and washed in saline before being weighed and dried. The weight values of the mentioned organs were calculated using the procedure outlined below. According to

Drury & Wallington (1967), organs were kept in formalin (10% V/V) before histological analysis.

Biological evaluation:

The feed efficiency ratio (FER), food intake (consumption), bodyweight gain percent (BWG percent), and feed efficiency ratio, according to Chapman D.G, (1959). We're going to use the following equation.

$$BWG\% = \frac{Final\ weight - Initial\ weight}{Initial\ weight} \times 100$$

$$FER = \frac{Gain\ in\ body\ weight\ (g\ /\ day)}{Food\ Intake (g\ /\ day)}$$

$$\text{The organs' relative weight} = \frac{\text{Organs weight}}{\text{Animal body weight}} \times 100$$

Biochemical analysis

The function of liver enzymes

The activity of aspartate aminotransferase (AST): The activity of the AST enzyme was determined using a spectrometer and specialized kits (BioMerieux) by the manufacturer's instructions Reitman and Frankel (1957). The activity of serum alanine aminotransferase (ALT): The colorimetric technique described was used to test the activity of the ALT enzyme. (Reitman and Frankel, 1957). The serum alkaline phosphatase (ALP) concentrations were determined using the Roy technique (1970), a colorimetric ALP assay. Serum total bilirubin was determined calorimetrically, as previously described by Doumas et al., (1973). Total cholesterol in serum was determined using a spectrophotometer calibrated to 578 nm (Ratliff & Adams, 1973).

Determination of triglycerides:

Jacobs & Van-Denmark, (1960) determined the triglyceride concentration by an enzymatic colorimetric technique. The determination of HDL was performed by (Jacobs & Van-Denmark, 1960). VLDL and LDL were determined using (Lee, 2009).

Analytical statistics

The data were analyzed statistically using the automated SPSS program (Statistic Program statistical software, SAS Institute, Sigmastat, Cary, NC). The impact of various treatments was established using a one-way ANOVA (variance analysis) test along with Duncan's multiple tests, with $p<0.05$ indicating statistical significance across groups (Snedecor and Cochran, 1967).

RESULTS

Effect of myrrh (Commiphora myrrh) on body weight gain%, feed intake and feed efficiency ratio (FER) of Hepatointoxicated rats.

- **Body Weight Gain % (BWG %):**

Table (٥) showed the effect of **myrrh (Commiphora myrrh)**on body weight gain % in hepatointoxicated result could be observed that the mean value of control (+) group was higher than control (-) group , being 43.289 ±0.3 & 50.006 ± 0.4 respectively which revealed significant difference with percent of decrease -15.52 % of control(-)group as compared to control (+) . All groups indicated significant differences as compared to control (+) group .The values were 44.203 ± 0.2 & 3٨.684 ±0.1 (٥ %and١٠ %**myrrh)** respectively .The percent of increase decrease were ±2.11&-10.64 % respectively for the aforementioned groups . Group 3 (5% myrrh) recorded . the best group for body weight Gain 5% **myrrh** when compared to control (+).

- **Feed intake (g):**

Table (5) showed the effect of **myrrh (Commiphora myrrh)** on feed intake in hepatointoxicated rats.It could be noticed that the mean value of control (+) group was lower than control (-) group , being 17.67 ± 0.8 & 18.25 ± 0.9 g respectively which revealed significant difference with percent of increase +3.28 % of control (-)

group as compared to control (+) .All groups indicated significant differences as compared to control (+) group .The values were 18.27±0.7&18.08 ±0.5g for 5% and 10 % **myrrh** respectively. Groups 1&3&4 showed nonsignificant differences between them. Group 3 (5%) recorded the best group for feed intake of hepatointoxicated rats even when compared to control (-)group.

- **Feed Efficiency Ratio (FER):**

Table (5) illustrate the effect of **myrrh (Commiphora myrrh)**on feed efficiency ratio in Hepatointoxicated rats.lt could be observed that the mean value of control (+) group was lower than control (-) group , being 0.033 ±0.0031 &0.055 ± 0.0028 respectively which indicated significant difference with percent of increase 66.67 of control(-)group as compared to control (+) .All groups show significant differences as compared to control (+) group .The values were 0.037 ± 0.0042 & 0.29 ±0.0014 for 5% and 10% **myrrh** respectively .The percent of increase were± 12.12&778.79 respectively for the abovementioned groups . Group 3 (5% **myrrh**) was the best group for feed efficiency ratio of Hepatointoxicated rats even when compared to control (±)group

Table (5): The effect of feeding different amounts of on myrrh(Commiphora myrrh) bodyweightgain(BWG), food intake (FI), and feed efficiency ratio(FER) in of Hepatointoxicated rats. Mean±SD

Parameters / Groups	Body Weight Gain		Feed Intake		Feed Efficiency Ratio (FER)	
	BWG %	% Change	Feed intake	% Change	FER	% Change
G1 Control (-ve)	50.006^{a}±0.4	-15.52	18.25^{a}±0.9	3.28	0.055^{b}±0.0028	66.67
G2 Control (+ve)	43.289^{e}±0.3		17.67^{b}±0.8		0.033^{d}±0.0031	
G3 5% myrrh	44.203^{b}±0.2	2.11	18.27^{a}±0.7	3.39	0.037^{c}±0.0042	12.12
G4 10% myrrh	38.684^{d}±0.1	-10.64	18.08^{a}±0.5	2.32	0.29^{a}±0.0014	778.79

The values represent arithmetic means and the standard error of the mean. Using a one-way ANOVA test means that distinct letters (a, b, c, d) in the same column differ substantially at $p \leq 0.05$, whereas those with the same letters are non-significant.

The impact of different concentrations of myrrh**(ommiphoraC myrrh) on the relative organ weight of Ccl4–intoxicated rats**

- **Liver weight(g):**

Table (6) show the effect of different concentrations of myrrh**(Commiphora myrrh)** on liver weight(g) in Hepatointoxicated rats.It could be noticed that the mean value of control (+) group was higher than control (-) group , being 6.7 ±1.4 &5.7± 1.5g respectively which illustrated significant difference with percent of decrease -14.93 % of control(-)group as' compared to control (+) .All groups show significant differences as compared to control (+) group .The values were 6.1 ±1.3 & 5.8 ±1.2g for Lemon grass powder and tea respectively .The percent of decrease were -8.96 & -13.43 % for groups 3,4 respectively. Groups 1&4 show nonsignificant differences between them. Numerically the best group recorded for group 4(10% myrrh) of Hepatointoxicated rats even when compared to control (+)group .

- **Kidneys weight(g):**

Table(6)show the effect of different concentrations of myrrh (**Commiphora** myrrh) on kidney weight(g) in Hepatointoxicated rats.lt could be noticed that the mean value of control (+) group was higher than control (-) group , being 1.6±0.3 &1.3± 0.4 g respectively which revealed significant difference with percent of decrease -18.75 % of control(-)group as compared to control (+) .All groups show significant differences as compared to control (+) group .The values were 1.3 ± 0.2 & 1.3 ±0.1 g for 5% and 10% myrrh respectively .The percent of decrease were -18.75 & -18.75% for groups 3,4 respectively. Groups 1,3& 4 show nonsignificant differences between them . The best kidney weight recorded for groups 3, 4(5% and 10 myrrh) of Hepatointoxicated rats even when compared to control (+) group.

- **Heart weight(g):**

Table (6) show the effect of different concentrations of myrrh(**Commiphora** myrrh) on heart weight(g) in Hepatointoxicated rats.lt could be revealed that the mean value of control (+) group was higher than control (-) group , being 0.8 ±0.04 &0.6 ± 0.05g respectively which noticed significant difference with percent of decrease -25% of control(-) group as compared to control (+) .All groups show significant differences as compared to control (+) group .The values were 0.7 ± 0.03 & 0.6 ±0.02 g for 5% and myrrh respectively .The percent of decrease were -12.5 & -25% for groups 3,4 respectively. Groups 1& 4 show nonsignificant differences between them . The best heart weight recorded 'for group 4(10% myrrh) of Hepatointoxicated rats even when compared to control (+).

- **Lungs weight(g):**

Table (6) show the effect of different concentrations of myrrh(**Commiphora** myrrh) on lungs weight(g) in Hepatointoxicated rats.lt could be revealed that the mean value of control (+) group was higher than control (-) group , being 1.6 ±0.9 &1.8±0.8g respectively which noticed significant difference with percent of decrease -11.11% of control(-)group as compared to control (±). All groups show significant differences as compared to control (±) group .The values were 1.7 ± 0.7 & 1.5 ±0.6g for 5% and 10% myrrh respectively .The percent of decrease were -5.56 & -16.67 % for groups 3,4 respectively. Groups 1& 3 show nonsignificant differences between them . The best lungs weight recorded for group 3(5% myrrh) of Hepatointoxicated rats even when compared to control (+)group .

- **Spleen weight(g):**

Table (6) show the effect of myrrh (**Commiphora** myrrh) on spleen weight(g) in Hepatointoxicated rats.lt could be noticed that the mean value of control (+) group was higher than control (-) group , being 0.7±0.05 & 0.5 ± 0.06 g respectively which revealed significant difference with percent of decrease -28.57% of control(-)group as compared to control (+) .All groups show significant differences as compared to control (+) group .The values were 0.6 ± 0.04 & 0.5 ±0.03g for group (5% and 10% myrrh) respectively .The percent of decrease were -14.29 & -28.57% for groups 3,4 respectively .Groups

1& 4 show nonsignificant differences between them . The best spleen weight recorded for group 4(10% myrrh) of Hepatointoxicated rats even when compared to control (+)group.

Table (6): The impact of different concentrations of myrrh**(Commiphora myrrh) on the relative organ weight of Ccl4–intoxicated rats.**

Parameters / Groups	liver		kidneys		Heart		Lungs		Spleen	
	Liver (g)	% Change	kidneys (g)	% Change	Heart (g)	% Change	Lungs (g)	% Change	Spleen (g)	% Change
G1 Control (-ve)	$5.7^{c}\pm1.5$	-14.93	$1.3^{b}\pm0.4$	-18.75	$0.6^{c}\pm0.05$	-25	$1.6^{ab}\pm0.9$	-11.11	$0.5^{c}\pm0.06$	-28.57
G2 Control (+ve)	$6.7^{a}\pm1.4$		$1.6^{a}\pm0.3$		$0.8^{a}\pm0.04$		$1.8^{a}\pm0.8$		$0.7^{a}\pm0.05$	
G3 .5% Myrrh	$6.1^{b}\pm1.3$	-8.96	$1.3^{b}\pm0.2$	-18.75	$0.7^{b}\pm0.03$	-12.5	$1.7^{ab}\pm0.7$	-5.56	$0.6^{b}\pm0.04$	-14.29
G4 . 10% Myrrh	$5.8^{c}\pm1.2$	-13.43	$1.3^{b}\pm0.1$	-18.75	$0.6^{c}\pm0.02$	-25	$1.5^{b}\pm0.6$	-16.67	$0.5^{c}\pm0.03$	-28.57

The values represent arithmetic means and standard error (±). Using a one-way ANOVA test means that distinct letters (a, b, c, d) in the same column differ substantially at $p\leq0.05$, whereas those with the same letters are non-significant.

Effect of myrrh(Commiphora myrr**h) on serum glucose of Hepatointoxicated rats**

- **Serum Glucose (mg/d'I).**

Table (7) show the effect of myrrh(**Commiphora** myrrh) on glucose in hepatointoxicated rats.It could be noticed that the mean value of control (+) group was higher than control (-) group , being 166 ±0.8 & 87 ±0.9 mg/dl respectively which illustrate significant difference with percent of decrease -47.59% of control(-)group as compared to control (+) . All groups show significant differences as compared to control (+) group .T he values were 93 ± 0.7 & 97 ±0.6 mg/dl for (5% and 10% myrrh) respectively .The percent of decrease were 43.98 & -41.57% for the abovementioned groups . Group 3(5% myrrh) recorde the best group for glucose of hepatointoxicated rats even when compared to control (+)group

Table (7): Effect of myrrh(Commiphora myrrh) **on serum glucose of Hepatointoxicated rats. (n=6 rats)**

Parameters / Groups	Glucose	
	mg/dl Mean±SD	% Change
G1 Control (-ve)	87d± 0.9	-47.59
G2 Control (+ve)	166a± 0.8	
G3 .5% Myrrh	93c± 0.7	-43.98
G4 . 10% Myrrh	97b±0.6	-41.57

The values represent arithmetic means and standard error (±). Using a one-way ANOVA test means that distinct letters (a, b, c, d) in the same column differ substantially at $p \leq 0.05$, whereas those with the same letters are non-significant.

Effect of myrrh (Commiphora myrrh) **on serum cholesterol, triglycerides and AI of Hepatointoxicated rats**

- **Total Cholesterol (mg/dl).**

Table (8) show the effect of myrrh(**Commiphora** myrrh) on total cholesterol in hepatointoxicated rats.It could be noticed that the mean value of control (+) group was higher than control (-) group , being 72 ±0.8 &45 ± 0.9 mg/dl respectively which illustrated significant difference with percent of decrease -37.5% of control(-) group as compared to control (+) . All groups show significant differences as compared to control (+) group .The values were 53.5 ± 0.7 & 56 ±0.6 mg/dl for)5% and 10% myrrh) respectively .The percent of decrease were -25.69 & -2%:22% for the abovementioned groups . Group 3'(5% myrrh)recorded the best group for total cholesterol of hepatointoxicated rats even when compared to control (±)group .

- **Triglycerides (mg/dl).**

Table (8) show the effect of myrrh (**Commiphora** myrrh) on triglycerides in hepatointoxicated rats.lt could be Revealed that the mean value of control (+) group was higher than control (-) group , being 62 ±0.8 &40 ± 0.9 mg/dl respectively which illustrated significant difference with percent of decrease -35.45% of control(-)group as compared to control (+) . All groups show significant differences as compared to control (+) group .The values were 48.3 ± 0.7 & 43.8 ±0.6 mg/dl for (5% and 10% myrrh) respectively .The

percent of decrease were -22.09 & -29.35 % for the abovementioned groups. . Group 4'(10% myrrh) recorded the best group for triglycerides of hepatointoxicated rats even when compared to control (±) group .

- **Very Low density lipoprotein cholesterol V LDL-c (mg / dl)**

Table (8) show the effect of myrrh (**Commiphora** myrrh) on AI in hepatointoxicated rats.lt could be observed that the mean value of control (+) group was higher than control (-) group , being 12.4 ±0.3 & 8 ± 0.4 mg/dl respectively which illustrated significant difference with percent of decrease -35.48% of control(-)group as compared to control (+) . All groups show significant differences as compared to control (+) group .The values were 9.66 ± 0.2 & 8.76 ±0.1 mg/dl for)5% and 10% myrrh) respectively .The percent of decrease were -22.09 & -29.36 % for the abovementioned groups . Group 4(10% myrrh) recorded the best group for AI. of hepatointoxicated rats even when compared to control(+) .

Table (8): Effect of myrrh (Commiphora myrrh) **on serum cholesterol, triglycerides and V LDL-c of Hepatointoxicated rats.**

Parameters / Groups	T . Cholesterol		Triglyceride		VLDL-c	
	mg/dl	% Change	mg/dl	% Change	mg/dl	% Change
G1 Control (-ve)	45d±0.9	-37.5	40d±0.9	-35.45	8d±0.4	-35.48
G2 Control (+ve)	72a±0.8		62a±0.8		12.4a±0.3	
G3 .5% Myrrh	53.5e±0.7	-25.6	48.3c±0.7	-22.09	9.66b±0.2	-22.09
G4 . 10% Myrrh	56b±0.6	-22.22	43.8b±0.6	-29.35	8.76c±0.1	-29.36

The values represent arithmetic means and standard error (±). Using a one-way ANOVA test means that distinct letters (a, b, c, d) in the same column differ substantially at $p \leq 0.05$, whereas those with the same letters are non-significant.

Effect of myrrh (Commiphora myrrh) on liver enzymes of Hepatointoxicated rats.

- **Serum AST(U/L).**

Table (9) show the effect of myrrh (**Commiphora** myrrh) on AST in hepatointoxicated rats.It could be noticed that the mean value of control (+) group was higher than control (-) group , being 265±0.8 & 118 ±0.9U/Lrespectively which illustrated significant difference with percent of decrease -55.47% of control(-)group as compared to control (+) . All groups show significant differences as compared to control (+) group .The values were 260 ± 0.7 & 243.5 ±0.6 U/L for (5% and 10% myrrh) respectively .The percent of decrease -1.89. -8.11% for the abovementioned groups . Group 4(10% myrrh)recorded the best group for AST of hepatointoxicated rats even when compared to (+)group

- **Serum ALT(U/L).**

Table (9) show the effect of myrrh (**Commiphora** myrrh) on ALT in hepatointoxicated rats. It could be noticed that the mean value of control (+) group was higher than control (-) group , being 68 ±1.3 & 30 ± 1.1 U/L respectively which illustrate significant "difference with percent of decrease -55.88% of control(-)group as compared to control (+) . All groups show significant differences as compared to control (+) group .The values were 49 ± 1.5 & 55 ±1.7 U/L for (5% and 10% myrrh) respectively .The percent of decrease were -27.94 & -19.12 %for the abovementioned groups. . Group 3(5% myrrh) recorded the best group for ALT. of hepatointoxicated rats even when compared to control (+)grou.

- **serum ALP(U/L)**

Table (9) show the effect of myrrh (**Commiphora** myrrh) on ALP in hepatointoxicated rats.It could be revealed that the mean value of control (+) group was higher than control (-) group , being 16 ±1.5 & 11 ± 1.3 U/L respectively which illustrated significant difference with percent of decrease -31.25% of control(-)group as compared to control (+) .All groups show significant differences as compared to control (+) group .The values were 13.7 ± 1.33 & 12 ±1.8 U/L for (5% and 10% myrrh) respectively .The percent of decrease were -14.38 & -25% for the abovementioned groups . Group 4(10% myrrh) recorded the best

group for ALP of hepatointoxicated rats even when compared to control (+)group

Table (9): Effect of myrrh (Commiphora myrrh) on liver enzymes of Hepatointoxicated rats.

Parameters / Groups	AST		ALT		ALP	
	(U/L)	% Change	(U/L)	% Change	(U/L)	% Change
G1 Control (-ve)	**118d±0.9**	**-55.47**	**30±1.1**	**-55.88**	11**b** ± 1.3	**-31.25**
G2 Control (+ve)	**265a±0.8**		**68a±1.3**		**16a±1.5**	
G3 .5% Myrrh	**260b±0.7**	**-1.89**	**49c±1.5**	**-27.94**	**13.7c±1.33**	**-14.38**
G4 . 10% Myrrh	**243.5c±0.6**	**-8.11**	**55b±1.7**	**-19.12**	**12b±1.8**	**-25**

(The abbreviation (U/L) * stands for the unit per liter. The values represent arithmetic means and standard error (±). Using a one-way ANOVA test means that distinct letters (a, b, c, d) in the same column differ substantially at $p \leq 0.05$, whereas those with the same letters are non-significant.

Effect of myrrh (Commiphora myrrh) **on serum albumin , globulin and total protein of Hepatointoxicated rats.**

- **Serum albumin s/d I.**

Table (10) show the effect of myrrh (**Commiphora** myrrh) on albumin in hepatointoxicated rats.lt could be revealed that the mean value of control (+) group was lower than control (-) group , being 2.9±0.8&3.6±0.9 g/dl respectively which illustrated significant difference with percent of increase +24.14% of control(-)group as compared to control (+) .All groups show significant differences as compared to control (+) group .The values were 3.3 ± 0.7 & 3.3 ±0.6 g/dl for (5% and 10% myrrh) respectively .The percent of increase were+ 13.79 & +13.79% for the abovementioned groups.Groups 3&4 show nonsignificant differences between them . Group3& 4(5% and 10 % myrrh)recorded the best group for albumin of hepatointoxicated rats even when compared to control (-)group .

- **Serum globulin s/d I.**

Table (10) show the effect of myrrh (**Commiphora** myrrh) on globulin in hepatointoxicated rats.lt could be revealed that the mean

value of control (+) group was lower than control (-) group , being 3.2±0.05 & 3.9±0.06 g/dl respectively which illustrated significant difference with percent of increase+ 21.88% of control (-) group as compared to control (+) .All groups show significant differences as compared to control (+) group .The values were 3.4±0.04 & 3.7 ±0.03 g/dl for (5% and 10% myrrh) respectively. percent of increase were+ 6.25 &+ 15.63% for the abovementioned groups . Group 4 (10% myrrh) recorded the best group for globulin of hepatointoxicated rats even when compared to control (-)group

- **Total protein s/dl.**

Table (10) show the effect of myrrh (**Commiphora** myrrh) on total protein in hepatointoxicated rats.lt could be revealed that the mean value of control (+) group was lower than control (-) group , being 6.1±1.4 & 7.5± 1.5 g/dl respectively which illustrated significant difference with percent of increase +22.95% of control(-)group as compared to control (+) .All groups show significant differences as compared to control (+) group .The values were 6.7 ± 1.3 & 7 ±1.2 g/dl for (5% and 10% myrrh) respectively .The percent of increase were 9.84 & 14.75% for the abovementioned groups . Group 4" (10% myrrh) recorded the best group for total protein of hepatointoxicated rats even when compared to control (-)group

Table (10): Effect of myrrh (Commiphora myrrh) **on serum albumin , globulin and total protein of Hepatointoxicated rats.**

Parameters / Groups	TP		Albumin		Globulin	
	g/dl	% Change	g/dl	% Change	g/dl	% Change
G1 Control (-ve)	**7.5a±1.5**	**22.95**	**3.6a±0.9**	**24.14**	**3.9a±0.06**	**21.88**
G2 Control (+ve)	**6.1d±1.4**		**2.9c±0.8**		**3.2d±0.05**	
G3 .5% Myrrh	**6.7c±1.3**	**9.84**	**3.3b±0.7**	**13.79**	**3.4c±0.04**	**6.25**
G4 . 10% Myrrh	**7 ±1.2**	**14.75**	**3.3b±0.6**	**13.79**	**3.7b±0.03**	**15.63**

The values represent arithmetic means and the standard error of the mean. Using a one-way ANOVA test means that distinct letters (a, b, c, d) in the same column differ substantially

at p0.05, whereas those with the same letters are non-significant (n=6 rats).

Effect of myrrh (oraCommiph myrrh) on serum kidney functions of Hepatointoxicated rats.

- **Uric acid mg/dl.**

Table (11) show the effect of myrrh (**Commiphora** myrrh) on uric acid in hepatointoxicated rats.lt could be revealed that the mean value of control (+) group was higher than control (-) group , being 2.1±0.04 & 1.0 ± 0.02 mg/dl respectively which illustrated significant difference with percent of decrease -52.381% of control(-)group as compared to control (+) .All groups show significant differences as compared to control (+) group .The values were 1.9 ± 0.06 & 1.8 ±0.075 mg/dl for)5% and 10% myrrh) respectively .The percent of decrease were -9.524 & -14.286% for the abovementioned groups . Group 4(10% myrrh)recorded the best group for uric acid of hepatointoxicated rats even when compared to control (+)group .

- **Urea nitrogen mg/dl. ■**

Table (11) show the effect of myrrh (**Commiphora** myrrh)on urea nitrogen in hepatointoxicated rats. lt be noticed that the mean value of control (+) group was higher than control (-) group , being 16±0.8 & 11± 0.9 mg/dl respectively which illustrated significant difference with percent of decrease -31.25 % of control(-)group as compared to control (±) . All groups show significant differences as compared to control (+) group . The values were 13.7 ± 0.7 & 12 ±0.6 mg/dl for (5% and 10% myrrh) respectively .The percent of decrease were -14.38 & -25% for the abovementioned groups 4(10% myrrh) recorded the best group for uric acid of hepatointoxicated rats even when compared to control (+)group .

- **Creatinine mg/dl.**

Table (11) show the effect of myrrh (**Commiphora** myrrh) on creatinine in hepatointoxicated rats. lt could be noticed that the mean value of control (+) group was higher than control (-) group , being 0.41 ±0.002 & 0.2±0.001 mg/dl respectively which illustrated significant difference with percent of decrease -51.22% of control(-)group as compared to control (+) . All groups show significant differences as compared to control (+) group .The values were 0.32±

0.005 & 0.3 ±0.004 mg/dl for (5% and 10% myrrh) respectively .The percent of decrease were -21.95 & -26.83 % for the abovementioned groups . Grpup 4(10% myrrh) recorded the best group for creatinine of hepatointoxicated rats even when compared to controt (+)group.

Effect of myrrh (Commiphora myrrh) on serum kidney functions of Hepatointoxicated rats.

Parameters / Groups	Creatinine		Uric Acid		Urea Nitrogen	
	mg/dl Mean±SD	% Change of control (+)	mg/dl Mean±SD	% Change of control (+)	mg/dl Mean±SD	% Change of control (+)
G1 Control (-ve)	**0.2^{d}±0.001**			**-52.381**	**11^{d}±0.9**	**-31.25**
G2 Control (+ve)	**0.41^{a}±0.002**		**2.1^{a}±0.04**		**16^{a}±0.8**	
G3 .5% Myrrh	**0.32^{b}±0.005**	**-21.95**	**1.9^{b}±0.06**	**-9.524**	**13.7^{b}±0.7**	**-14.38**
G4 . 10% Myrrh	**0.3^{c}±0.004**	**-26.83**	**1.8^{C}±0.075**	**-14.286**	**12^{c}±0.6**	**-25**

The values represent arithmetic means and the standard error of the mean. Using a one-way ANOVA test means that distinct letters (a, b, c, d) in the same column differ substantially at p0.05, whereas those with the same letters are non-significant (n=6 rats).

DISCUSSION

Myrrh is extracted from elderberry trees, as these trees are thorny shrubs or small trees that may reach three meters in length. Myrrh is characterized by its beautiful smell, so it is used in perfumes, mouthwashes and rinses. Myrrh was also used in the past in incense, and it was and is still used for therapeutic purposes as an astringent, antiseptic, antiparasitic, antispasmodic and menstruating agent. Studies have shown that myrrh lowers blood sugar levels in healthy people and diabetics. Myrrh works to treat many diseases that affect the human body. **Langhorst et al. (٢٠١٣).** Scientists have found that myrrh stimulated the body to produce several antioxidants and detoxifying proteins in the liver, kidneys, and brain. The research team suggests that the anti-inflammatory protein Nrf2 plays a key role in this defense

process. So, in both healthy and treated hyperammonemic rats, this protein is activated by a high concentration of oxygen free radicals, stimulating the production of antioxidants that protect cells from these free radicals. The levels of Nrf2 and antioxidants in the treated hyperammonemic rats were significantly lower.bacteria . Although the exact mechanism of myrrh treatment is still not clear, this substance can help mitigate the effects of liver disease **Mahmoud et al. (20١٧).** Myrrh helps the liver to expel the toxins that it stores, which negatively affects the health of the body, and weakens the ability of the liver to rid the body of toxins. Bitter also rids the liver of the triglycerides accumulated on the liver, and these fats are a high percentage of fructose that the body stores. **Sheir et al. (20٢٠)**. An extract of a mixture of plants containing myrrh has been shown to reduce the rate of gluconeogenesis in liver cells in rats. In addition, blood glucose levels were reduced from a mean of 16.7 mmol/L at baseline to 8.5 mmol/L. Levels were compared with phenformin-treated mice whose mean blood glucose levels were at baseline 15.1 mmol/L and a mean of 10.7 mmol/L after treatment. Myrrh may be of importance in the management of diabetes mellitus, although further clinical studies are necessary .**Massoud et al., 201٩)**.Scientists have found that myrrh causes the production of many antioxidants and detoxifying proteins in the liver, kidneys, and brain. In particular, the team suggests that the anti-enzyme protein Nrf2 plays a key role in this defense process. In healthy mice treated with hyperammonemia, Nrf2 is activated by high concentrations of oxygen free radicals and leads to the production of antioxidants, which protect cells from free radicals. Levels of Nrf2 and antioxidants were significantly lower in untreated hyperammonemia mice. Besides the elevation in Nrf2, treatment with C. molmol resin also reduced tumor necrosis factor-alpha (TNF-α), which is known to be elevated in the serum of patients with cirrhosis, a condition in which the liver is hardened due to hepatic tissue. **Mahmoud et al., 2017)**

An in vitro study of 2 sesquiterpenes derived from myrrh (furanodiene-6-one and methoxyfuranoguaia-9-ene-8-one)

discovered antibacterial activity against Pseudomonas aeruginosa (minimum inhibitory concentration [MIC] 1.4 mcg/mL), Staphylococcus aureus (MIC 0.18 mcg/mL), and Escherichia coli (MIC 2.8 mcg/mL). Additionally, these sesquiterpenes demonstrated antifungal activity against Candida albicans (MIC 1.4 mcg/mL). Local anesthetic activity was also noted in mammalian nerve cells. **Dolara et al., 2010).**

CONCLUSIONS AND RECOMMENDATIONS

The findings demonstrate that myrrh (**Commiphora** myrrh) has a good effect in improving the enzymatic liver in hepatic rats, with the improvement rate increasing in the 5% myrrh group because it was discovered to have a synergistic effect in protecting the liver tissues against toxicity by enhancing antioxidant defense capability. Patients so may utilize these extracts as a dietary supplement in polyherbal preparations. It could be recommended that:

- myrrh (**Commiphora** myrrh) recommended for hepatic patients.
- the various amount of myrrh, particularly that of 5% is useful to hepatic patient
- Various doses of myrrh may be recommended for decreasing gloucose blood levels LDL and atherogenic index readings.

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