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## COMPARATIVE STUDY ON HEPATOPROTECTIVE ACTIVITY OF ALCOHOLIC EXTRACT FROM MOLLUGO PENTAPHYLLA AND MOLLUGO CERVIANA

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### ABSTRACT

The present study was aimed to investigate the comparative study on hepatoprotective activity of alcoholic extracts from *Mollugo pentaphylla* and *Mollugo cerviana* against carbon tetrachloride induced hepatotoxicity in rats. Most of the hepatotoxic chemicals damage liver cells mainly by inducing lipid peroxidation and other oxidative damages. Liver function was assessed by the determination of serum glutamate oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT), Alkaline phosphatase (ALP), Acyl carrier protein (ACP), bilirubin. The investigation reveals that the alcoholic extract of the *M. pentaphylla* and *M. cerviana* exhibiting a significant protective from liver damage in Carbon tetrachloride (CCl<sub>4</sub>) induced liver damage model. The present study involve of comparison of pharmacological activity of two plant species. Silymarin (25mg/kg) is used as positive control. The presence of flavonoid compound in both of the extract may be responsible for the significant hepatoprotective property.

**Key words:** Hepatoprotective Property, *Mollugo pentaphylla*, *Mollugo cerviana*.

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### INTRODUCTION

Liver is the most important organ which places a pivotal role in the detoxification and excretion of many endogenous and exogenous compounds. Therefore, any damage to the liver function by hepatotoxic agents will lead to many complications on one's health. Hepatotoxic agents damage liver mainly by lipid peroxidation and other oxidative agents. In absence of reliable liver protective drugs in modern medicine, there exists a challenge for pharmaceutical scientists to explore the potential of hepatoprotective activity in plants on the basis of traditional use (1, 2). There is a growing interest in the pharmacological evaluation of

various plants used in Indian traditional system of medicine. Historically plants have been used in folk medicine to treat various diseases and are rich natural sources of antioxidants. Many researchers have examined the effect of plants used traditionally by indigenous people to support liver function and treat disease of the liver. In most cases, research has confirmed traditional experiences by discovering the mechanisms and mode of action of these plants. Carbon tetrachloride (CCl<sub>4</sub>) was the first toxin which injures the cell by free radical mechanism. Carbon tetrachloride (CCl<sub>4</sub>) is lipid soluble so it can cross cell membranes and get distributed to all organs (3, 4). Traditional medicines are very effective in curing many liver diseases, among them *M. pentaphylla* and *M. cerviana* is traditionally used as medicines. The present study has been designed with an aim to compare the hepatoprotective activity of crude methanol extract of the plants. *Mollugo pentaphylla*

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(Fig-1), commonly known as *Mollugo stricta*, is a small genus of herbs distributed throughout the warmer regions of the world extending into Europe and North America. In folk medicine, *Mollugo pentaphylla* has been used as a anti cancer, antitoxic while a decoction of the roots is used to treat eye diseases. Herbal medicines derived from plant extracts are being increasingly utilized to treat a wide variety of clinical diseases. The present work attempt to evaluate the flavonoid rich alcoholic extract of *Mollugo pentaphylla* using  $CCl_4$  induced liver damage model in rats.



**Fig-1** *Mollugo pentaphylla*

*Mollugo cerviana* (fig-2) is a species of flowering plant known by the common name threadstem carpetweed. It can be found in many types of dry, sandy habitat types. It is an annual herb producing a thin, erect stem up to about 20 centimeters tall. The narrow, waxy leaves are up to 1.5 centimeters long, linear in shape, and arranged in whorls around the stem. Medicinally used for Reducing fever, as an antiseptic and stimulating the secretion of gastric juices (plant), gout and rheumatism (root), to relieve fevers (flowers and tender shoots). An infusion of the plant promotes lochial discharge and is considered a cure for gonorrhoea. The present work attempt to evaluate the flavonoid rich alcoholic extract of *Mollugo cerviana* using  $CCl_4$  induced liver damage model in rats.



**Fig-2** *Mollugo cerviana*

**MATERIALS AND METHODS****Preparation of Extract**

The dried and powdered whole plant was extracted with methanol for 48 hrs by using soxhlet apparatus. The extract was filtered and the filtrate was evaporated to dryness under reduced pressure using rotary evaporator to get semisolid mass and used for further investigation.

**Preliminary Phyto chemical Screening of the Methanolic Extract**

Preliminary phyto chemical screening of the crude methanolic extract was done by thin layer chromatography and the qualitative chemical tests was conducted for the detection of flavonoids, triterpenoids, saponins and tannins.

**Animals**

Adult Wister albino rats of either sex (200 – 250 gm) were procured for the study. They were kept under standard laboratory conditions and were fed with commercial rat pellets and drinking water ad libitum. The animals were fasted over night before performing the experiment. The experiment protocol was duly approved by Institutional Animal Ethics Committee. (Registration No. 265/ CPCSEA)

**Acute Toxicity Studies**

Acute toxicity study was carried out as “up and down” or “star case” method. The maximum non lethal dose was found to be 2000 mg / kg body weight; hence 1/10th of the dose was taken as an efficient dose (200 mg / kg body weight) (5). Results are shown in table-1.

**Induction of experimental hepatotoxicity**

Hepatotoxicity was induced in rats by injecting carbon tetrachloride intraperitoneally at a dose of 0.5ml/kg for 7 consecutive days (6).

**Hepatoprotective activity**

Animals were divided into four groups, consisting of six animals each. Group 1 served as solvent control, which received normal saline (10 ml/kg.). Group II received  $CCl_4$  (0.5ml/kg,) for 7 days. Group III received  $CCl_4$  (0.5 ml/kg,) and *Mollugo* plant extract (200 mg/kg), and Group IV received  $CCl_4$  and silymarin (25mg/kg) simultaneously for 7days (7).

**Assay of serum SGOT, SGPT, ACP, ALP, total bilirubin levels**

The collected blood was centrifuged at 2000 rpm for 15 min to separate the serum. The biochemical estimation was carried out using semi auto-analyser. The serum was then analysed for the biochemical parameters serum glutamate-oxaloacetate transaminase (SGOT), serumglutamate pyruvate transaminase (SGPT), alkaline phosphatase (ALP), carrier protein (ACP), Total bilirubin.

**Histopathological Studies****RESULTS AND DISCUSSION**

The preliminary phytochemical screening of whole plant of *Mollugo pentaphylla* and *Mollugo cerviana* revealed the presence of flavanoids, saponin, terpenoids and tannins. Rats treated with CCl<sub>4</sub> induce hepato cellular damage and increase the serum levels of SGOT, SGPT, ALP, ACP and bilirubin concentration, when compared with the controls (Table-1). The rats are treated with alcoholic extracts of *Mollugo pentaphylla* and *Mollugo cerviana* showed a significant reduction in all biochemical parameters elevated by CCl<sub>4</sub>.

**Table-1 Comparison of serum levels of *Mollugo pentaphylla* and *Mollugo cerviana***

Treatment	Mollugo pentaphylla					Mollugo cerviana				
	SGOT U/I	SGPT U/I	ALP IU/I	ACP U/L	Biliru bin	SGOT U/I	SGPT U/I	ALP IU/I	AST U/L	Bilir ubin
Control	97.3 ± 6.6	35.08± 2.2	15.92 ±1.2	10.5 ±0.9 8	0.39± 0.04	97.3±6. 6	35.08± 2.2	15.9 2±1. 2	52.04 ±3.28 4	0.39± 0.04
CCl <sub>4</sub> [0.5ml/kg]	186.7± 5.2	136.9± 7.6	98.3 ±4.3	38.6 ±2.2	0.89± 0.03	186.7± 5.2	136. ±7.6	98.3 ±4.3	1386. 24±2 9.10	0.89± 0.03
Alcohol extract[200 mg/kg]	117.31 ±5.2	64.31± 1.2	44.12 ±1.5	19.4 ±0.8 6	0.60± 0.02	138.2± 8.4	78.54± 2.3	49.2 5±2. 7	202.7 2±32. 40	0.66± 0.05
Silymarin[ 25mg/kg]	105.3± 3.5	49.4±2. 3	43.6 ±1.7	16.5 ±0.9 6	0.57± 0.02	105.3V 3.5	49.4±2. 3	43.6 ±1.7	51.25 ±1.52	0.57± 0.02

Results indicated that the plant of *Mollugo cerviana* and *Mollugo pentaphylla* provides significant protection against the toxic effect of CCl<sub>4</sub> on liver. In CCl<sub>4</sub> induced toxic hepatitis, toxicity begins with the changes in endoplasmic reticulum, which results in the loss of metabolic enzymes located in the intracellular structures. The toxic metabolite CCl<sub>4</sub> radical produced by microsomal oxidase system, binds covalently to the macromolecule and causes peroxidation degradation of lipid membranes of the adipose tissues. The blood samples of the treated group animals showed drastic increase in the levels of serum total bilirubin, SGOT, SGPT, AST and ALP. On the contrary, the total protein level was decreased as compared to the control. Accumulation of higher concentration of bilirubin and lower level of total protein confirms the depth and intensity of liver damage. The rapid elevation in the levels of serum aspartate transaminase indicates the extent of liver necrosis. Standard drug, Silymarin used in the present study is a well known hepatoprotective compound. The hepatoprotective properties of silymarin have also been confirmed in clinical studies. Silymarin is a mixture of flavonolignans, primarily consisting of silybin, silydianin and silychristin<sup>14</sup>. It is reported to have marked protective effect on the plasma membrane of hepatocytes. Administration of methanolic extracts of *Mollugo cerviana* and *Mollugo pentaphylla* showed recovery against the

toxic effects of CCl<sub>4</sub> of shown in the Table-1. When compare the hepato protective activity of alcoholic extract of the two plants, *Mollugo cerviana* have more potent activity than the *Mollugo pentaphylla*.

**CONCLUSION**

The effect of 200 mg alcoholic extract of *Mollugo pentaphylla* and *Mollugo cerviana* in preventing CCl<sub>4</sub> induced hepatotoxicity as reflected in the serum biochemical parameters and percentage of hepatocytes viability does not seem to be drastic and as effective as standard drug, Silymarin, it points to a favourable disposition toward recovery among all the parameters. The study clearly demonstrated that the plant extracts exhibited potent hepatoprotective activity against carbon tetrachloride induced hepatic damage in rats. This may be due to its antioxidant and free radical scavenging properties. The Hepatoprotective activity of the alcoholic extract of *Mollugo pentaphylla* and *Mollugo cerviana* revealed that the *Mollugo cerviana* have more potent activity than the *Mollugo pentaphylla*.

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