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ANTIOXIDANT POTENTIAL OF THE WHOLE PLANT EXTRACT OF *MOLLUGO PENTAPHYLLA* LINN. ON ETHANOL INDUCED LIVER DAMAGE

R. Valarmathi*[1], A. Rajendran [2], S. Akilandeswari [1] and K. Tejaswi [1]

Department of Environmental and Herbal Science, Tamil University [1], Thanjavur, Tamil Nadu, India
Department of Botany, Bharathiyar University [2], Coimbatore, Tamil Nadu, India

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Correspondence to Author:

R.Valarmathi (M. Pharm., Ph. D.,)

Assistant Professor, Periyar College of Pharmaceutical Sciences, K. Sathanoor Road, Tiruchirappalli- 620 021, Tamil Nadu, India

ABSTRACT

The potential antioxidant effect ethanol induced liver damage was investigated using crude methanolic extract of the whole plant of *Mollugo pentaphylla* Linn. The standard drug used was ascorbic acid mg / kg/day. Serum cholesterol, triglycerides aspartate amino transferase (AST) and alanine amino transferase (ALT) levels were measured as antioxidant indicators. There was a significant reduction in the elevated serum enzymes, triglycerides and total cholesterol levels. The histopathologial studies revealed that the liver cells undergoing hydrobic and fatty changes indicating hepato cellular damage in the case of ethanol administration while extract treated animals showed mostly normal hepatocytes and mild hydrobic changes. Hence the study concluded that the plant exhibits antioxidant property.

INTRODUCTION: The paradox of aerobic life is that the vital air is also a lethal toxin. The cost of fuel- efficient aerobic catabolism is oxidative damage to the bio molecules which is caused by the over production of free radicals / reactive oxygen species (ROS), which leads to 'oxidative stress' [1].

Antioxidants are compounds that can delay or prevent cellular oxidation damage caused by free radicals. They have the ability to transform ROS into stable and harmless compounds or by scavenging ROS with a redox based mechanism [2].

The medicinal value of plants have assumed an important dimension in the past few decades owing largely due to the discovery as a rich source of antioxidants that combat oxidative stress through their redox active secondary metabolites [3].

In the present study, *Mollugo pentaphylla* Linn commonly known as Itch flower (Syn. *Mollugo stricta*). It is belongs to the family, Aizoaceae. It has immense medicinal value for curing various ailments which is extensively used in tribal and ayurvedic medicine for the treatment of various diseases such as fever, rheumatism, skin diseases [4-6].

We therefore, examined the effect of antioxidant potential of the plant extract.

Materials Plant material and extraction: The plant material was collected and authenticated by Dr. V. Chelladurai, Department of Botany, Central Siddha Research Unit, Tirunelveli. Shade dried whole plant was extracted with methanol for 48 hrs by using soxhlet apparatus. The extract was filtered and concentrated to dry mass by using vacuum distillation.

Animals: Wistar albino rats of either sex (150-200 gms) were obtained from king Institute, Chennai. They were kept under standard laboratory conditions and were fed with commercial rat pellets and drinking water *ad*

libitum. The Animals Ethics Committee of the Institute cleared the experimental protocols.

Methods [7-8]: All the animals were divided into four groups of six each. Group 1 was kept as normal control. Group 2 was treated as negative control, which was administered with ethanol 18% v/v at a dose of 7g/kg/day for 45 days. Group 3 was treated with ethanol at the same dose and alcoholic extract 200mg/kg/day for 45 days. Group 4 was administered with ethanol at the same dose and ascorbic acid 31.5 mg/kg/day for 45 days. After the experimental period is over, the animals were fasted overnight. Then they were anaesthetized with diethyl ether. They were sacrificed by cervical dislocation. Blood and tissues were collected in ice-cold containers for various estimations.

Estimation of Serum Total Cholesterol and Triglycerides level: The separated serum was analyzed using auto analyzer for the following biochemical markers such as AST, ALT [9], total cholesterol [10] and triglycerides [11].

Liver Histopathology: Forty five days following treatment, liver tissue was fixed in 10% neutral formalin and embedded in paraffin and the slides were stained with haemotoxy and eosin. The sections were examined microscopically for the evaluation of histopathological changes.

Antioxidant property by TLC Method [12]: *Mollugo pentaphylla* extract was solubilized in methanol and subjected to TLC on 20x20 cm glass plates precoated with silica gel-G. The developing solvents used were chloroform: methanol (9:1 v/v) for flavonoids. The locations of the spots were marked under UV light. β-carotene- linoleate (a mixture of β- carotene in 30 ml of $CHC1_3$ and 2ml of purified linoleic acid in 60 ml of 95 % ethanol) was sprayed uniformly on the plates and exposed to daylight for about 4 hrs. The background was bleached and the spots which contained the flavonoids compound retained the yellow color which is indicative of antioxidant activity.

Statistical Analysis: Values were expressed as mean ± SEM. Data were analyzed by one way analysis of variance (ANOVA) followed by Dunnett's test [13]. Values below $P<0.05$ are considered to the significant.

RESULTS: The data of serum analysis (**Table 1**) showed a significant increase in AST, ALT, total cholesterol and triglycerides levels in group 2 as compared to group1. In group 3 after treatment with alcoholic extract, the levels of AST, ALT, cholesterol and triglycerides were significantly reduces as compared to group 2, In group 4 when the animals were treated with an antioxidant Ascorbic acid the animals showed significant reduction in the elevated levels of AST, ALT, cholesterol and triglycerides as compared to group 2.

TABLE 1: EFFECT OF *MOLLUGO PENTAPHYLLA* ON ETHANOL INDUCED LIPID PEROXIDATION

Treatment	Total Cholesterol (µg/ml)	Triglycerides (µg/ml)	AST (µg/ml)	ALT (µg/ml)
G1 (Normal)	44.30±0.86	62.20±0.48	158±0.52	60±2.36
G2 (Negative Control)	63.±22*	80.32±0.76*	482±1.18*	166±1.16*
G3 (Alcoholic Extract)	54.56±2.36*	72.04±3.8*	214±3.16*	56±3.82*
G4 (Ethanol)	48.68±1.38*	66.04±1.64*	212±3.32*	51±2.16*

Value Mean ± SE, N=6, *P<0.05

Histopathological Study: The normal tissue samples from group 1 showed liver parenchyma with hepatocytes. In group 2, the sections showed liver parenchyma with hepatocytes showing hydrophobic change and marked fatty change, indicates hepato cellular damage. Liver parenchyma with hepatocytes appears normal in group 3. Group 4, the animals treated with ascorbic acid the sections showed normal hepatocytes.

DISCUSSION: Liver participates in a variety of metabolic activities and contains a lot an enzyme. It could be injured by many toxicants, chemicals and drugs. In our study ethanol is uses as hepato toxicant. Ethanol induced oxidative stress appears to play a major role in mechanisms by which ethanol causes liver injury [14]. Though, many pathways have been suggested for ethanol induced oxidative stress one common pathway is that induction of CYPZEI [15].

As a result of this damage the serum levels of AST and ALT has risen. Moreover, oxidation of ethanol is associated with a number of metabolic disorders such as lactic acidosis and hyperlipidemia [16]. Varga *et al*., have proven that hyperlipidemia and elevated lipid peroxidation are interrelated [17].

The possible explanation could be the hyperlipidemic condition would stimulate the catabolic pathway via oxidative breakdown [18]. Increase in serum triglycerides in alcohol treated rats may be due to decreased activity of lipoprotein lipase which is involved in the uptake of triglyceride rich lipoprotein by extra hepatic tissue. Increased synthesis or decreased lipid deposition or both resulted in simultaneous accumulation of lipids in the blood and in the liver [19]. It is obvious that, ethanol induces hyperlipidemia and this causes hepatotoxicity by increasing the free radical formation of hepatic tissue.

The observed results may be due to these free radicals which cause denaturation of biological membranes by changing fluidity and permeability, in activation of membrane bound enzymes and receptors. When group 2 was administered with ethanol, serum parameters were elevated suggesting hepatotoxicity as results of high ethanol intake [20].

The results proved that the plant, *M. pentaphylla* reduced the elevated enzymes, cholesterol and triglycerides levels which indicate that the plant extract may be attributed to the antioxidant activity which may be due to the flavonoids present in the extract.

CONCLUSION: From the studies carried out it was concluded that the plant posses potent antioxidant. In future, further investigations may be carried out to isolate and elucidate the structure of flavonoids that may involve in the antioxidant activities.

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