

Hepatoprotective Activity of *Leucas lavandulaefolia* Against Carbon tetrachloride-Induced Hepatic Damage In Rats

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Abstract

The aerial parts of *Leucas lavandulaefolia* Rees, family Labiatae was tested for hepatoprotective activity against CCl₄ in rats. The ethyl acetate extract of *Leucas lavandulaefolia* has shown significant activity, lowering the serum enzymes like SGOT and SGPT in rats intoxicated with CCl₄.

Keywords: *Leucas lavandulaefolia*, hepatoprotective, carbon tetrachloride

Introduction

Leucas lavandulaefolia Rees, family Labiatae is a herbaceous annual weed found in pastures and water land throughout the country. Plants are 30-60 cm. long; leaves are opposite, linear-lanceolate, entire or sparingly serrate[1]. Species of leucas are medicinally important and have been extensively used by rural people of Mithila region (Behar) in human and cattle ailments, such as cough, cold, fever, loss of appetite, skin disease, head ache, jaundice, snake bite and scorpion sting[2]. Phytochemical studies reveal the presence of Linifolioside and Flavonoids[3]. The present study was made to evaluate the effect of ethyl acetate extract of aerial parts of *L.lavandulaefolia* against CCl₄-induced hepatic damage in rats.

Materials and methods

The aerial parts of *L.lavandulaefolia* were collected from local areas of Mangalore district, Karnataka and were authenticated by Prof. Gopal Krishna Bhat, Department of Botany, Poorna Prajna college, Udupi. A voucher specimen has been preserved in our laboratory. The aerial parts of the plant were collected and sundried. The dried and powdered aerial parts of the plant (300gm) were extracted with ethyl acetate using soxhlet apparatus and concentrated *in-vacuo*. Approximately, 0.50g of dried ethyl acetate extract was obtained from 10 g of dried stem material. The extract was suspended in 5% gum acacia and used for studying hepatoprotective activity.

Male albino rats weighing between 150 and 175 g were used as animal models. The rats were divided into four groups, each group consisting of six animals. Hepatoprotective activity of *L.lavandulaefolia* was evaluated using CCl₄-induced model[4]. Group one was kept on normal diet and served as control, the second group received CCl₄ (1.25 ml/kg) by oral route, the third and fourth group received silymarin (100 mg/kg; po) and extract of *L.lavandulaefolia* (400 mg/kg; po) respectively once daily, for seven days. On the seventh day,

CCl₄ was given by oral route 30 min after the administration of silymarin and test drug. After 36h of CCl₄ administration, blood was collected and serum separated was analysed for various biochemical parameters

Biochemical parameters like serum glutamic oxaloacetic transaminase (SGOT) and serum glutamic pyruvate transaminase (SGPT) were determined by Reitman and Frankel method[5]. Serum alkaline phosphatase was determined by King and Kings method[6]. Malby and Evelyn method[7] was followed to estimate total bilirubin content.

The liver was examined grossly, weighed and stored in formalin 10% and were processed for paraffin embedding using the standard microtechnique[8]. A section of the liver (5µm) stained with aluohemotoxylin and eosin was observed microscopically for histological studies.

Results and discussion

The results of biochemical parameters revealed the elevation of enzyme level in CCl₄-treated group, indicating that CCl₄ induces damage to the liver (Table 1). Liver tissue rich in both transaminase increased in patients with acule hepatic diseases, SGPT which is slightly elevated by cardiac necrosis is a more specific indicator of liver disease[9]. A significant reduction ($P < 0.01$) was observed in SGPT, SGOT, ALP and total bilirubin levels in the groups treated with silymarin and ethyl acetate extract of *L. lavandulaefolia*. The enzyme levels were almost restored to the normal.

It was observed that the size of the liver was enlarged in CCl₄-intoxicated rats but it was normal in drug – treated groups. A significant reduction ($P < 0.001$) in liver weight supports this finding.

It was found that the extract decreased the CCl₄-induced elevated levels of the enzymes in group third and fourth, indicating the production of structural integrity of hepatocytic cell membrane or regeneration of damaged liver cells by the extract.

Histopathological examination of the liver section of the rats treated with toxicant showed intense centrilobular necrosis and vaculization. The rats treated with silymarin and extracts along with toxicants showed sign to considerable extent as evident from formation of normal hepatic cards and absence of necrosis and vacuoles.

Decrease in serum bilirubin after treatment with the extract in liver damage indicated the effectiveness of the extant in liver damage indicated the effectiveness of the extract in normal functional status of the liver. The phytochemical studies revealed the presence of flavonoids in ethyl acetate extract of *L.lavandulaefolia*; various flavonoids have been reported for their hepatoprotective activity[10]. The hepatoprotective effect of *L. lavandulaefolia* may be due to its flavonoid content.

Table 1. Effect of ethyl acetate extract of *L.lavandulaefolia* on CCl₄ treated rats

Design of treatment	Liver (wt/100g body wt)	Dose (mg/kg)	SGPT U/L	SGOT U/L	ALP U/L	Total Bil (mg %)
Control	3.5 ± 0.011	—	132.5 ± 1.99	45.3 ± 0.81	162.6 ± 3.29	0.72 ± 0.03
CCl ₄	6.6 ± 0.31	1.25 ml/kg	220.2 ± 4.5	345.5 ± 2.8	389.6 ± 18.25	2.12 ± 0.01
Silymarin + CCl ₄	3.9 ± 0.22*	100	135.0 ± 1.17**	82.2 ± 9.11*	216.6 ± 5.47**	0.9 ± 0.08*
Ethyl acetate extract + CCl ₄	4.4 ± 0.13*	400	115.2 ± 1.16*	68.0 ± 5.29*	290.6 ± 5.52*	0.82 ± 0.01

N = 6 animals in each group.

* $P < 0.001$; ** $P < 0.01$ when compared with control.

Values are expressed as mean ± SE.

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