THE POTENTIAL ANTIOXIDANT BIOACTIVITY OF JASMINUM ELONGATUM EXTRACT AGAINST ACETAMINOPHEN INDUCED HEPATOTOXICITY IN MALE ALBINO RATS

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ABSTRACT:

The present study was envisaged to evaluate the antioxidant effect of methanolic extract of Jasminum elongatum (J. elongatum) extract against acetaminophen induced hepatic toxicities in male albino rats. Extracts of J. elongatum was given in doses of 100 mg/kg, 200mg/kg and 400 mg/kg for 7 d and toxicity was induced by acetaminophen (2 mg/kg) on Day 8. Silymarin (50 mg/kg) was used as reference standard. After 24 h of toxicity induction, blood samples were collected from retro-orbital plexsus and analyzed for antioxidant and serum parameters. Prior administration of J.elongatum extracts restored the elevated levels Malondialdehyde levels and increased the levels of Glutathione and Superoxide dis1mutase antioxidant parameters. The serum parameters also restored as compared to toxic group in dose dependent manner. The present study showed that extracts of J.elongatum possess hepatoprotective action against acetaminophen induced hepatotoxicity

Keywords: Polyherbal, Hepatoprotective, Serum markers, Histopathology

1. INTRODUCTION

The liver is an essential organ of the body, which regulates various physiological functions like synthesis, secretion, and metabolism of xenobiotics. In this process, liver is exposed to many free radicals which can be neutralized by endogenous antioxidants. But, if natural protective mechanism are saturated it will lead to liver fibrosis or cirrhosis[1]. Morbidity and mortality resulting from liver diseases is a major public health problem worldwide especially in developing countries.

Liver treatment by allopathic medicines like corticosteroids and immunosuppressive agents still a challenge as they suffer with several adverse effects. This has led to increased dependence on alternative system of medicine especially herbal drug therapy. Herbal medicines are now in great demand in the developing world for primary health care not because they are inexpensive but also for minimal side effects and easily availability in nature[2].

Jasminum elongatum is a shrub and traditionally powder of its twigs and leaves has been used as a hydragogue, febrifuge and in the treatment of dysentery, jaundice, diarrhoea and bellyache in China. The leaves and the stems of the plant contain some secoiridoid glucosides like jasamplexoside A, B and C along with10-hydroxyligstroside and jasminoside. The leaves also reported to contain jaslanceosides B and E., jasminoside, isojasminoside. The methanolic extract of the plant reported for analgesic and antidiarrhoea activities.[3] The objective of the present study is to scientifically validate traditional use of J. elongatum

2. MATERIALS AND METHODS

2.1 Collection and Preparation of Methanolic extract of J. elongatum

Plants of J.elongatum were collected from local gardens of Pune, Maharashtra, India. A specimen of the plant submitted to Botanical Survey of India (BSI), Pune and authenticated by the same. The dried twigs of the plant were powdered and extracted by cold maceration technique by using methanol as solvent. The process is continued for seven days with intermittent shaking and the last trace of the solvent was removed by Rota evaporator and finally dried in vacuum. The percentage yield of leaves of methanolic extract of J.elongatum (MEJE) was found to be 15.67%.

2.2 Preliminary Phytochemical Screening.

The preliminary phytochemical screening was done by following standard qualitative chemical methods[4]. The methanolic extract of J.elongatum screened for the presence of carbohydrates, alkaloids, triterpenoids, saponins, phenols, sterols and flavonoids.

2.3 Assessment of Hepatoprotective activity[5]

Healthy white male Wistar rats, body weight 180–200g were used in this study. All the animals were placed in clean polypropylene cages comprising of sterile paddy husk, which act as a bedding agent and fed with standard pellet diet and water ad libitum. The animals are maintained under standard conditions of temperature 24±2°C under 12 h light/dark cycles All experimental procedures were carried out according to Animal Ethics Committee Guidelines.

In the acetaminophen induced liver toxicity model, total thirty six animals were divided into six groups containing six animals in each group. Group I animals considered as normal and administered 2ml/kg p.o of gum acacia (2%) for 8 days. Group II considered as toxic and received 2% gum acacia p.o for seven days and single dose of acetaminophen (2mg/kg) p.o on 8th day. Group III administered with silymarin, as a standard drug (50mg/kg) p.o for seven days. Group IV-VI received plant doses 100mg/kg, 200mg/kg and 400mg/kg for seven days. Silymarin, acetaminophen and plant extract were dissolved in 2% gum acacia.

On the 8th day all the groups (III-VI) received acetaminophen (2mg/kg) except Group-I, after 24 hrs of induction of toxicity by acetaminophen blood samples were collected from the retrorbital plexsus. The collected blood is centrifuged at 2500 rpm for 15 min to separate serum which is used for analysis of biochemical parameters like SGPT, SGOPT, ALP and TB.

2.4 Measurement of GSH, SOD and MDA in liver homogenate

Livers were isolated and a homogenate was prepared by using 0.05M sodium phosphate buffer (pH 7.0), which further centrifuged to obtain supernatant liquid. This is used to determine oxidative stress markers like MDA, GSH and SOD[6].

3. RESULTS

3.1 Preliminary Phytochemical Analysis

Preliminary phytochemical analysis of powdered drug showed the presence of phytoconstituents like carbohydrates, phenols, flavonoids, triterpenoids and saponins.

3.2 Hepatoprotective assessment

The results obtained from the hepatoprotective study of methanolic extract of J.elongatum are summarized in Table 1. Biochemical parameters SGPT, SGOT, ALP and Total bilirubin are present at higher levels in wistar rats treated with acetaminophen (2mg/kg p.o) alone as compare to control group indicating development significant hepatotoxicity. Prior administration of methanolic extract of leaves of J.elongatum at doses 100mg/kg, 200mg/kg and 400mg/kg, caused a significant reduction in the values of SGPT, SGOT, ALP and TB almost comparable to that of silymarin.

3.3 Oxidative stress Analysis

The concentration of Malonaldehyde (MDA) significantly increased in the acetaminophen treated group along with reduced levels of antioxidants (GSH and SOD) compared to normal group, whereas there is significant decrease in MDA and increase in antioxidants (GSH and SOD) in methanolic extract of J.elongatum indicating the possible antioxidative mechanism (Table 2).

4. CONCLUSIONS:

Pretreatment of methanolic extract of J.elongatum attenuated the increased levels of biochemical parameters in dose dependent manner indicating that extract could maintain the functional and structural integrity of liver cell membrane against acetaminophen toxicity. Hepatoprotective effects were also apparent through the increased levels of antioxidant enzymes and decreased lipid peroxidation.

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Table 1: Effect of methanolic extract of J.elongatum on acetaminophen induced toxicity

Groups	AST(U/L)	ALT(U/L)	ALP(U/L)	TB(mg/dL)
Control	27.11±2.17	107.07±2.64	92.98±3.94	0.61±0.03
Toxic	109.62±1.95$^{\#}$	211.01±1.53$^{\#}$	169.34±2.01$^{\#}$	1.59±0.04$^{\#}$
Standard	81.42±1.29***	171.40±1.97***	122.34±2.19***	0.89±0.01***
MEJE (100 mg/kg)	100.71±2.06*	202.45±2.46*	158.40±3.31**	1.41±0.02*
MEJE (200 mg/kg)	97.73±3.45**	199.28±2.02**	148.33±1.93***	1.37±.0.09**
MEJE (400 mg/kg)	85.39±1.58***	170.70±2.22***	121.52±2.07***	1.02±0.07***

Table 2: Effect of methanolic extract of J.elongatum on MDA (nmole/mg of protein), GSH (nmole/mg of protein), SOD (unit/mg of protein)

Groups	MDA	GSH	SOD
Control	0.46±0.01	15.57±0.56	7.25±0.22
Toxic	1.77±0.02$^{\#}$	4.09±0.27$^{\#}$	2.16±0.30$^{\#}$
Standard	0.88±0.01***	11.48±0.88***	6.07±0.30***
MEJE (100mg/kg)	1.66±0.03	6.15±0.20	4.37±0.12
MEJE (200mg/kg)	1.59±0.33*	6.77±0.29	5.11±0.17
MEJE (400 mg/kg)	1.49±0.03*	7.86±0.22	5.86±0.08*

Values are the mean±SEM of six rats. Symbols represent statistical significance

# P<0.001 as compared to control group, *p<0.05 compared to acetaminophen intoxicated group,**P<0.01 as compared to acetaminophen intoxicated group.***P<0.001 as compared to acetaminophen intoxicated group using one way ANOVA followed by Bonferroni's multiple comparison test

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