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The Study of Hepatoprotective Activity in Alli Chooranam (*Nymphea nouchali burm.f)*

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Abstract: ***Background: Alli (Nymphea nouchali burm.f) belongs to family Nymphaeaceae has early history of traditional use, modern research has shown presence of medically active compounds such as tannins, flavonoids, nymphalin etc. Materials& methods: Ethanolic- water extract of powder of rhizome & flower evaluated for their hepato protective activity on carbon tetrachloride induced hepatotoxicity in rats. Observations: Hepato protective activity results revealed that animals pre - treated with trial drug at both doses 200 mg and 400mg significantly decreased the ALT, AST, ALP, total protein, total cholesterol. Histopathology showed that Alli (Nymphea nouchali burm.f) rhizome & flower extracts induced significant recovery from cellular damage compared to carbon tetrachloride induced group. The most significant activity was observed with Alli (Nymphea nouchali burm.f) rhizome & flower Hydroalcoholic extract at a dose of 400mg\kg. The hepatoprotective effect was statistically analyzed by ANNOVA & found to be significant. (p <0.05)***

Keywords: Alli, Nymphaea nouchali, Hepatoprotective, Siddha

1. Introduction

Liver has an important role in carbohydrate metabolism since it is responsible for the balance of glycogenesis & glycogenolysis. Hepatic injury is associated with alteration of these metabolic activities. Treatment of Diabetes is complex due to liver damage & hepato toxicity of oral hypoglycemic drugs. It is proved that N.nouchali hydroalcoholic seed extract has DDPH scavenging activity nitric oxide scavenging activity & lipid peroxidation inhibitory activity.

The Preparation and standardization of medicinal herbs are urgently need for future studies and therapies. The Alli (*Nymphea nouchali Bum, f*) large aquatic herb of the family Nymphaeaceae, commonly known as Water lily (Alli in Tamil).Aquatic perennial herb lactiferous rooted. Flowers bisexual floating & solitary. It is native to temporate & tropical Asia, Australia & tropical Africa. Siddha medicine recommended flower & rhizome of this plant has astringent & emollient action can be used in the treatment of Diabetes mellitus, urinary diseases, eye diseases& for healing ulcers. Although hepato protective activity of seeds of Alli (*Nymphea nouchali Bum, f*) have been reported, lack of sufficient literature on flower & rhizome. This study was focused on evaluating hepato protective activity of Ethanolic-water extract of powder of rhizome & flower of the plant.

2. Materials and Methods

2.1 Collection and Authentication of Plant

The flower & rhizome of Alli (*Nymphea nouchali Burm.f)* freshly collected from various places of Kerala. Identified and authenticated by the Medicinal Botanists at Government Siddha Medical College and Hospital, Palayamkottai. These herbal formulations purified according to the suitable procedure methods described in Siddha classical literature. The drug is dried and subjected to size reduction to get uniform coarse powder. The powdered material then subjected to excessive extraction using water & ethanol solvents in a Soxhlet extractor.

2.2 Collection and maintenance of experimental animals

Wistar albino rats (150-200 g) of either sex weighing were procured from animal housing facility of Cape labs Marthandam. The animals were housed in well ventilated large hygienic spacious cage and animals had 12 hours day and night schedule with temperature between 28 ±20C. The animals were allowed free access to standard laboratory pellets and drinking water *ad libitum*. The study has got the approval from the Institutional Animal Ethical Committee (IAEC) for the Purpose of Control and Supervision of Experiments on Animals.

2.3 Phytochemical analysis of the extracts

Qualitative phytochemical estimation the Alli (*Nymphea nouchali Burm.f*) showed the presence of tannins, Flavonoids, carbohydrate and Alkaloids

2.4 Evaluation of hepatoprotective activity

2.4.1 Carbon tetra chloride induced hepatotoxicity

In order to assess hepatoprotective action of plant extract in albino Wister rats, the rats were divided in to the following groups each containing six rats (n=6)

Group I & Group II were served as normal control & disease control respectively. Group III, IV & V corresponded to hydro ethanolic extract of Alli (*Nymphea nouchali Burm.f*) 200m\kg, 400mg\kg & standard drug Silymarin 100mg\kg respectively. Treatment lasted for 7 days & 7th day night all the animals were fasted for 12 hrs. Then all the animals except those in group I treated with 1ml of CCl_4 in liquid paraffin (1:1) 24 hrs after CCl_4 administration blood sample were collected by retro orbital plexus puncture for the estimation of biochemical parameters (SGOT, SGPT, ALP, ALT, total protein & Total cholesterol).

2.5 Statistical Analysis

The data obtained from the study were subjected to statistical analysis by one way ANOVA followed by Dunnet's test, and results were expressed in terms of Mean±SEM values. Statistical analysis was performed using INSTAT- V3 Software programme.

3. Results

3.1 Effect of hydro ethanolic extract of Alli (*Nymphea nouchali Burm.f*) on Carbontetra chloride induced hepatotoxicity

CCl4 treated animal showed significant elevation of serum biochemical parameter such as SGPT, SGOT, ALP, total protein and total cholesterol. The liver weight and the ratio of liver weight to body weight were increased compared with normal control group, and the pathological lesions of the liver were evident. Pre- treatment with silymarin-100 mg/kg p.o. and Extract of Alli (*Nymphea nouchali Burm.f*) at 200 mg/kg and 400 mg/kg p. o. for 7 days had produced significant protective effect on CCl 4 -induced hepatic damage by maintaining the morphological changes and normalizing the elevation of serum biochemical parameter and therefore inhibited the histopathological abnormalities caused by CCl4. Extract of Alli (*Nymphea nouchali Burm.f*) showed dose dependent protection against CCl4 induced hepatic damage.

Table 3.1 (a): Effect of Extract of Alli (*Nymphea nouchali Burm.f*) in serum biochemical parameter

Group	Total protein (g %)	Albu min (g/dl)	Total chole sterol (mg/ dl)	ALT (u/l)	AST (u/l)	AL P (mg%)
G1	7.19±0.47	4.70±0.35	4.61±4.39	74. 38±3.50	137.07±4. 40	102.39±4.02
GII	6.24±0.20	3.12±0.2	158.11±8.17	158.14±8. 88	216.23±8. 69	315.59±6.49
GIII	6.83±0.75	4.15±0.34	96.43±6.09	86. 03± 5.82	157.08±6. 53	218.96±5.42
G IV	6.10±0.35	3.99±0.33	108.12±7.12	106.03±6. 01	202.09±7. 39	197.77±6.03
G V	6.39±0.45	4.68±0.37	109.04±5.01	95. 61±5.70	198.16±9.41	160.89±6.75

G-I: Normal control, G-II: Disease control (CCl4), G-V: Silymarin (100 mg/kg) + CCl 4, G-III &IV: Extract of Alli (*Nymphea nouchali Burm.f*) doses (200 mg/kg & 400 mg/kg) + CCl4

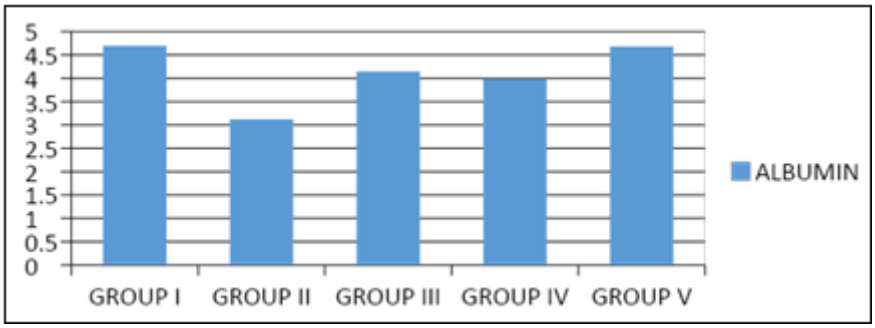

Figure 3.1 (a): Effect of Extract of Alli (*Nymphea nouchali Burm.f*) in Albumin

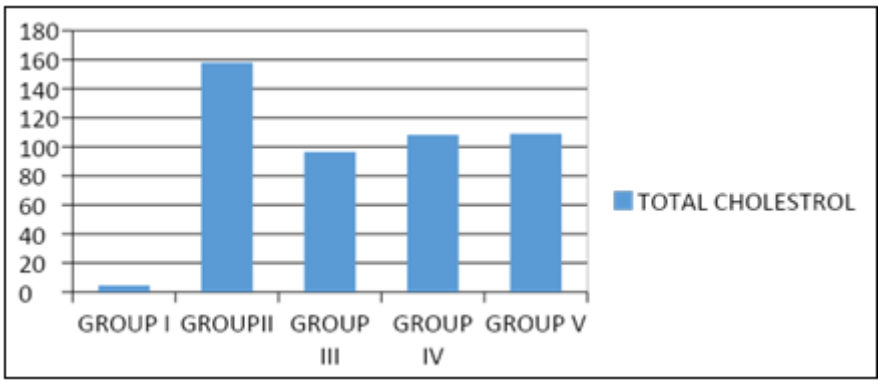

Figure 3.1 (b): Effect of Extract of Alli (*Nymphea nouchali Burm.f*) in Total cholesterol

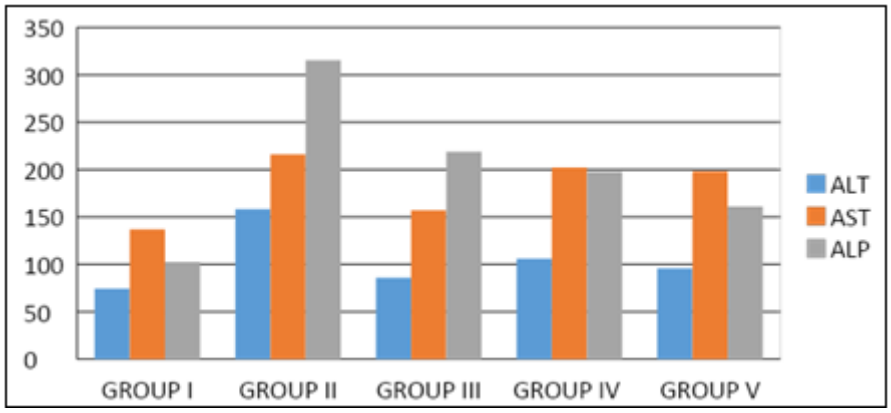

Figure 3.1 (c): Effect of Extract of Alli (*Nymphea nouchali Burm.f*) in ALT, AST, ALP

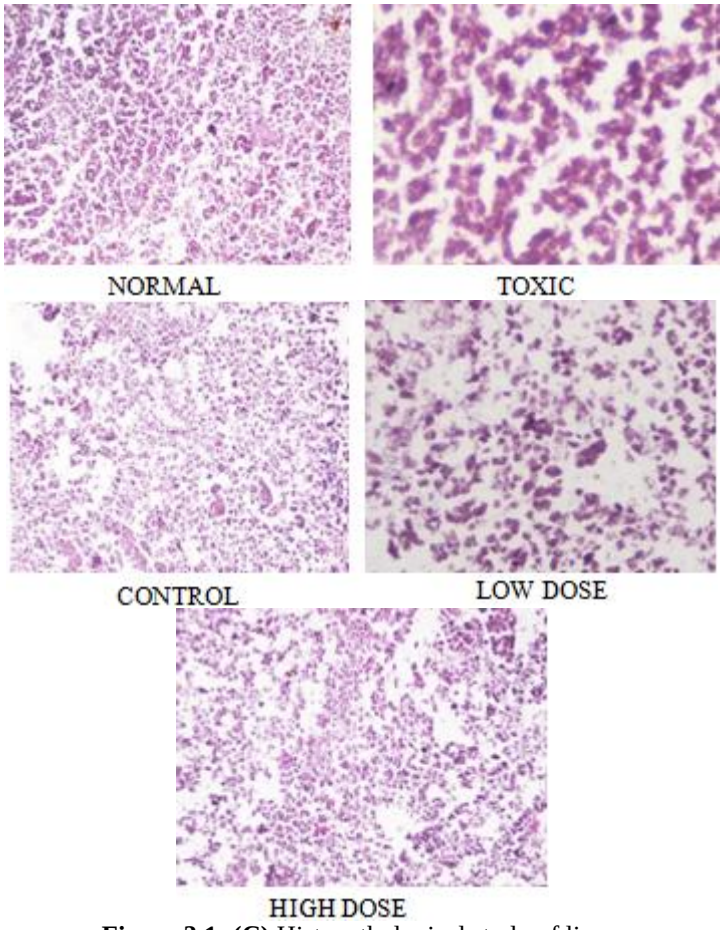

Figure 3.1: (C) Histopathological study of liver

4. Discussion

In the present study, CCl4 was employed as toxic agents and the protective role of Alli (*Nymphea nouchali Burm.f*) flower against the CCl4 induced hepatotoxicity was studied. The extent of toxicity was estimated by histopathological studies and biochemical enzyme markers like SGOT, SGPT, ALP and Serum Bilirubin levels total protein and total cholesterol etc. The hydroethanolic extracts of flower at dose of 400 mg/kg demonstrated a significant reduction in the serum enzymes. There is a cleavage of carbon tetrachloride leading to the formation of free radicals, which causes steatosis, centrilobular necrosis and cytoplasmic vacuolation were observed in toxic control group. But these pathological changes were moderately prevented by the trial drug treated group and standard group. trial drug extract of Alli (*Nymphea nouchali Burm.f*) 400 mg administered group also showed normal hepatic architecture with less infiltration of fat and absence of necrosis (Fig No.3.I.c). It is evident that the extract of Alli (*Nymphea nouchali Burm.f*) *caused* regeneration of liver parenchyma cells and treated hepatic cell damage due to CCL_4 toxicity.

5. Conclusion

The results of demonstrated study that Ethanolic- water extract of powder of rhizome & flower of the plant Alli (*Nymphea nouchali Burm.f*) possess hepatoprotective property due to the reduction in the serum enzymes levels & recovery of hepatocyte shapes. The hepatoprotective effect was statistically analyzed by ANNOVA & found to be significant.($p < 0.05$)

Further studies are required to identify isolate & characterize active principle responsible for the hepatoprotective activity of the plant.

6. Acknowledgements

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7. Conflict of interest

The author declares no conflict of interest in the present work

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