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HEPATOPROTECTIVE ACTIVITY OF SOME MEDICINAL PLANT

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ABSTRACT

Liver has a pivotal role in secretion, metabolism and storage of food and that's why sometimes referred as the "great chemical factory" of the body depends of the liver to regulate, synthesis store and secrete many Important nutrients, proteins, chemicals and to purify and clear toxins or Unnecessary substance from the body. Study of crude drugs under pharmacognostical schemes involve in liver diseases. Method: Herbal tablet will be made using direct compression method. The plant used in herbal formulation cassia roxburghii and boerhavia diffusa extract was mixed with the excipient and compressed into tablets. Result:- To formulate a tablet dosage form with the help of herbal extract with good efficacy. Conclusion:- Newer medication and better facilities for treating liver disease. Hepatitis is a major problem in human due to various chemicals including therapeutic agents and other enviromental toxins and this can produce illnesses like jaundice which sometimes may lead to even death. Natural products are the best source of remedies for the treatment of diseases including hepatoprotectives.

Keywords:

Hepatoprotective, pharmacognostical, direct compression, secretion metabolism, cassia roxburghii, boerhaavia diffusa.

1. INTRODUCTION

Liver is a major metabolic organ affected by various chemical and toxins daily and identification of successful hepatoprotective agent will provide a useful tool for the hepatic disease. The body depends on the liver to regulate synthesis, store and secrete many important nutrients. Liver damage is always associated with cellular necrosis, increase in tissue lipid peroxidation and depletion in the tissue glutathione (GSH) levels. In addition serum levels of many biochemical markers like serum glutamate oxaloacetate transaminase (SGOT/ AST) triglycerides, cholesterol, bilirubin and alkaline phosphatase are elevated.

Metabolism biotransformation is a process of detoxification in which a substance is chemically modified into a less toxic form under the influence of enzymatic system. The capacity of the liver to carry out the several oxidative metabolisms is associated with the high cellular content of cytochrome P₄₅₀. As liver being the central organ of metabolism it is highly vulnerable target for injury from drugs and chemicals the manifestations of liver enzymes to fulminant hepatic failure.

1.1 MECHANISMS OF LIVER INJURY

- I. Oxidative injury
- II. Toxins, endotoxin and infectious agents
- III. Cholestatic liver disease
- IV. Immune- mediated mechanism
- V. Copper and iron

Herbal drugs for hepatoprotection

Medicinal plants and their formulations are used to treat liver disorders in ethno medicine practice as well as traditional system of medicine in India. There are about 600 commercial herbal formulations available in market all over the world, which are claimed to have hepatoprotective activity. More than 700 mono and poly-herbal hepatoprotective preparations from more than 100 plants are in clinical use in the form of decoction, tincture, tablets and capsules.

2. MATERIALS AND METHODS

Collection and identification of plant material

The seed of *Cassia roxburghii* (Family: Fabaceae) and second plant *Boerhaavia diffusa* (Family: Nyctaginaceae) were collected from rural area of Bilaspur District (C.G.). The plant

were identified by Dr. Ashwini Kumar Dixit, botany department, Guru Ghasidas Viswavidyalaya Koni Bilaspur (C.G.).

Processing of plant Specimens:

Both the plant specimens are thoroughly cut by sharp weapon washed by water to remove dirt particles and it is stored in shade dry conditions.

- Cassia roxburghii seeds were examined for their external appearance such as colour, odour, taste, shape and surface.
- Boerhaavia diffusa roots cut into pieces and dried immediately in suns stored in air tight containers.

Pharmacognostical studies:

Microscopical examination:

The macroscopic identify of medicinal plant material is based on the shape, size, colour, surface characteristics, texture, fracture and appearance of the cut surface. These features are useful in judging the material in its entirety.

Extraction method

Successive solvent extraction: the Soxhlet extraction is an automatic continues extraction using Soxhlet apparatus by following solvent system:

- Petroleum ether
- Chloroform
- Ethanol

Petroleum ether extract: The air dried seeds of cassia roxburghii and roots of boerhaavia diffusa (110gm) was extracted with 1-2 litter petroleum ether (60-80⁰C) until the extraction was completed. After completion of extraction the solvent was removed by distillation. Yellowish coloured residue obtained.

Chloroform extract: The air dried seeds of cassia roxburghii and roots of boerhaavia diffusa (110gm) was made into extracted with organic solvent chloroform (48ml) extraction was completed in (60-80⁰C) using Soxhlet apparatus. Yellowish colour was obtained.

Ethanol extract: the air dried seeds of cassia roxburghii and roots of boerhaavia diffusa (110gm) was extracted with (60-80⁰C) until 1-2 litter ethanol the extraction was completed.

After completion of extraction the solvent was removed by distillation brown coloured residue was obtained.

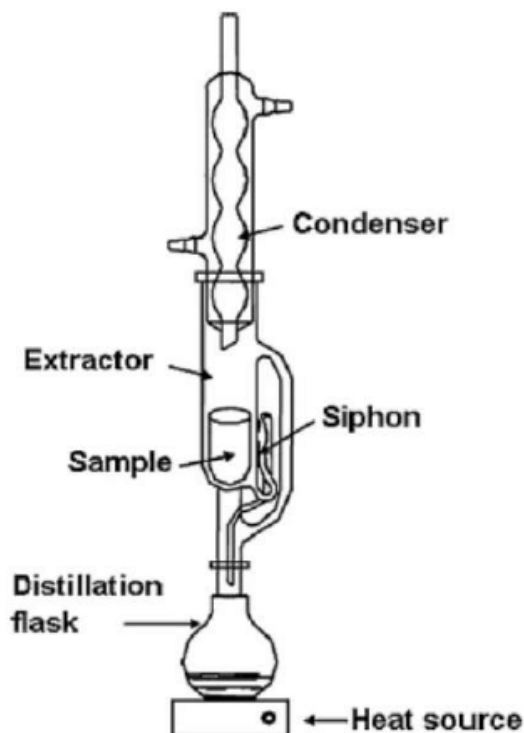


Fig: Soxhletion process

Preparation of herbal hepatoprotective formulation:

All the ingredients were mixed together except talc and magnesium stearate milled in a pestle mortar and sieved again through sieve number 80. The material was mixed with the acacia gum solution, which was added slowly.

Ingredients

- Aqueous plant extract
- Aqueous extract of *Phyllanthus amarus*
- Aqueous extract of *cassia occidentalis*
- Starch
- Talc
- Magnesium stearate
- Acacia gum
- Lactose

Power blends were compressed to 500mg tablet on hand rotating single punch tablet presses using 11X8mm punch set with appropriate compression.

Starch- As disintegrator

Talc- As lubricant

Magnesium stearate- As glidant

Acacia gum- As a binder

Lactose- As filler

3. Evaluation parameters Result

3.1 Pharmacognostic studies:

3.1.1 Macroscopical studies: organoleptic evaluation of cassia roxburghii (seed) the red cassia is a medium sized tree growing to 15-20m (49-66ft) tall with spreading, drooping branches .

3.1.2 Morphology Evaluation:

Colour: pale brown in colour

Odour: odourless

Taste: mucilaginous

Size: 8-12 inch long, less than 1 inch (2.5cm)in diameter

Shape: more or less spherical

Surface: Glossy and smooth

3.1.3 Macroscopical studies:

Organoleptic evaluation of Boerhaavia diffusa (root) boerhaavia diffusa is a perennial creeping weed, prostrate or ascending herb, up to 1m long or more, having spreading braches.

Colour: yellowish brown in colour

Odour: odourless

Taste: slightly bitter taste

Size: 15cm in length and up to 2 cm in diameter

Shape: cylindrical and longitudinally striated roots

Fracture: fibrous, powder colour is yellowish brown

3.2 Physiochemical analysis

Cassia roxburghii (seed)

Table 1 - (a) physiochemical analysis of cassia roxburghii (seed)

S.No.	Test	Result (%)
1.	Total Ash	2.8041
2.	Water- soluble Ash	1.6663
3.	Acid- insoluble Ash	0.4626
4.	Sulphated Ash	3.6375
5.	Loss on drying	8.7973

Table 2 - (b) physiochemical analysis of boerhaavia diffusa (root)

S.No.	Test	Result (%)
1.	Total Ash value	10.11
2.	Water-soluble extractive value	23.61
3.	Acid soluble Ash value	1.07
4	Alcohol soluble extract values	15.20
5.	Loss on drying at (105 ⁰ c)	5.50

3.3 Phytochemical Analysis :-**1. Cassia roxburghii (seed)****Table 3 - (a) phytochemical analysis of cassia roxburghii (seed)**

S.No.	Phytoconstituent	Petroleum Ether	Ethanol	Chloroform
1.	Alkaloids	-ve	+ve	-ve
2.	Flavonoids	-ve	-ve	-ve
3.	Glycoside	-ve	-ve	-ve
4.	Carbohydrates	-ve	-ve	-ve
5.	Triterpenoids	+ve	-ve	-ve
6.	Saponins	-ve	-ve	-ve

2. Boerhaavia diffusa (root)**Table 4 - (b) phytochemical analysis of boerhaavia diffusa (root)**

S.No.	Phytoconstituent	Petroleum Ether	Ethanol	Chloroform
1.	Alkaloids	+ve	+ve	+ve
2.	Flavonoids	+ve	+ve	+ve
3.	Glycoside	+ve	+ve	+ve
4.	Carbohydrates	+ve	+ve	-ve
5.	Tannins	+ve	-ve	+ve
6.	Saponins	+ve	+ve	+ve

Table 5 - Determination of solvent extractive value (Soxhletion process)

S. No.	Plant Name	Extracts (s)	Colour and Consistency	Average Extracts % Yield
1.	Cassia roxburghii	Petroleum Ether	Yellow	4.70%
	Boerhaavia diffusa	Petroleum Ether	Dark Brown	8.40%
2.	Cassia roxburghii	Alcohol	Yellow	2.80%
	Boerhaavia diffusa	Alcohol	Brown	7.45%
3.	Cassia roxburghii	Chloroform	Yellow	2.42%
	Boerhaavia diffusa	Chloroform	Light Brown	10.6%

3.4 Hepatoprotective of Herbal Drug Protection:**Table 6 - Hepatoprotective of Herbal Drug Formulation**

S. No.	Ingredients	Amount (mg) for one tablet				
		Tablet 1	Tablet 2	Tablet 3	Tablet 4	Tablet 5
1.	Plant extract	50	25	75	75	25
2.	Aqueous extract of Phyllanthus amarus	50	25	75	25	75
3.	Aqueous extract of cassia occidentalis	50	75	25	75	25
4.	Starch	20	20	20	20	20
5.	Talc	5	5	5	5	5
6.	Magnesium stearate	5	5	5	5	5
7.	Acacia gum	5	5	5	5	5
8.	Lactose	312	348	288	288	348

3.5 Hepatoprotective of Herbal Drug Formulation:**Table 7 – Evaluation of Herbal Hepatoprotective Formulation**

Parameter S	Hardness (kg/cm ²)	Thickness (mm ²)	%Weight Variation	% Friability	Disintegration Time
F1	5.96	4.1	603.88	0.55	11.20
F2	5.21	4.2	605.76	0.62	11.96
F3	5.91	4.0	606.9	0.71	12.06
F4	5.15	4.1	606.65	0.81	8.33
F5	5.4	4.5	604.50	0.94	8.01

4. CONCLUSION

Hepatotoxicity is a prime concern for patients as well as doctors, scientists and drug development agencies. However researcher have obtained several mechanisms and also effecting factors that might be used in diagnosis and determination of liver disease. From the present study, can be concluded that tablet is found to be hepatoprotective activity. This review article has reported cause of hepatic disease and hepatoprotection using herbal formulation. For the future prospect, screening of crude plant extracts and formulation of active hepatoprotective phytochemical compounds can increase possibility in disease treatment and cure.

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