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EXPERIMENTAL EVALUATION OF *KAKOUDUMABAR PATRA* (Ficus hispida Linn) WITH SPECIAL REFERENCES TO IT'S HEPATOPROTECTIVE ACTIVITY

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ABSTRACT

Liver diseases are a major health problem worldwide, making it necessary to develop new molecules that help counteract or prevent such diseases. There is a lack of reliable hepatoprotective drugs in modern medicine to prevent and treat drug-induced liver damage. On account of this fact, investigations aiming to obtain natural and/or synthetic compounds possessing hepatoprotective activity have been undertaken. The development of new drugs consists of a variety of steps, ranging from the discovery of the pharmacological effects in cellular and animal models, to finally demonstrating their efficacy and safety in humans. Different models for assessment of the hepatoprotective activity in vitro, ex vivo, and in vivo can be found in the medical literature. The purpose of this review is to show the features, main advantages, and disadvantages of each of the models, the hepatotoxic agents most commonly used (CCl4, produce experimental liver damage that histological resembles viral hepatitis SGOT, SGPT, ALP, and serum bilirubin are most sensitive parameters) as well as the biochemical parameters useful to assess liver damage in the different models.

Keywords: *Kakoudumbar Patra*, *Yakrit*, Hepatic Injury, Hepatoprotective.

INTRODUCTION

Traditional medicine is the total of knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures that are used to maintain health as well as to prevent, diagnose, improve or treat physical and mental illnesses. Herbal treatments are the most popular form of traditional medicine. The World Health Organization (WHO) has laid emphasis on promoting the use of traditional medicine for health care. Hence, we see a focus on research on traditional and herbal medicine, especially in developing countries, with the individual as well as collaborative efforts by national research organizations. The liver performs the normal metabolic homeostasis of the body as well as biotransformation, detoxification, and excretion of many endogenous and exogenous compounds, including pharmaceutical and environmental chemicals. Drug-induced hepatotoxicity is a major cause of iatrogenic diseases, accounting for one in 600 to one in 3500 all hospital admissions. There is an acute necessity for reliable hepatoprotective drugs in modern medical practice. Plants and natural products have been used traditionally worldwide for the prevention and treatment of liver disease. Scientific research has supported the claims of the medicinal efficacy of several of these herbal compounds, as evidenced by the voluminous work on their hepatoprotective potentials. *Kakodumbara (*Ficus hispid), is a well-known medicinal plant, which grows wild in India. The drug is *kashaya, tiktha rasa, and sheeta virya*, indicated in liver disorders like hepatomegaly (*yakrit vriddi*), jaundice (*Kamala*), *shotha, Vrana*, etc. Hence the drug *Kakodumbara* is selected for the present study on the basis of references from classical texts.

NEED FOR THE STUDY: Liver plays an important role in the regulation of physiological and pathological conditions involved in several vital functions. Liver problems are still a worldwide problem. Jaundice and hepatitis are two major liver disorders for high mortality. Unfortunately, Synthetic drugs used in the treatment of liver diseases are inadequate, and sometimes they may cause serious side effects. In view of several undesirable side effects of synthetic agents, there is a growing focus to follow systemic research methodology and evaluate the scientific basis of the traditional herbal medicines that are claimed to possess hepato-protective activity in absence of reliable liver-protective. *Kakaudumbara* (Ficus hispida Linn.) has been claimed as one of the useful medicines for the treatment of *Kamala* among several drugs describes in *Ayurvedic* literature[1]**.** Hence an attempt will be made to give a scientific approach to the new hepato-protect drug from natural resources by using an experimental model.

REVIEW OF LITERATURE: *Kakaudumbara* is mainly effective in *Kapha, pitta, Varana, shvitara, khusta, Pandu, rakta vikara, and Kamala.* 1. It is also explained in the treatment of *yakrut Vruddhi* 2. It is explained in *vatadi Varga* 3 & 4 And relevant contemporary literature is taken from modern books.

OBJECTIVES OF THE STUDY: Pharmacognostical study of the leaf. Preliminary phytochemical analysis of *Kakaudumbara Patra*.

1) Pharmacognostical and Phytochemical study of *Kakodumbara Patra*.

2) To assess the hepatoprotective activity of *Kakodumbara patra*[2].

MATERIAL AND METHOD:

a) Literary research; b) Pharmacognostical study; c) Phytochemical study; d) Experimental study.

SOURCE OF DATA: Material and methods for the present study includes:

a) Literary source of data: The literature pertaining to the present study is screened through classical literature like *Kaiyadeva Nighantu Bhavprakash Nighantu,* and modern phytochemical books, various journal, and web sites[2].

b) Experimental source of data: This being an experimental study, the source of data will be the phytochemical analysis, laboratory investigation, and the experimental study on Albino rats [3].

METHODS OF COLLECTION OF DATA: For the present study the leaf of the drug was collected, dried, and coarsely powdered. The powder is subjected to exhaustive Extraction and preliminary phyto-

chemical analysis. The fractionated compounds will be subjected to hepatoprotective activity.

I-Grouping: The healthy adult albino rats of either sex weighing from 110 gm to 180 gm will be subjected to detailed examination and will be grouped into 3 groups of each 6 albino rats.

a) Trial Group treated with experimental drug (extract).

b) Control group treated with the non-standard drug. [3]

c) Observational group with vehicle only.

II-Monitoring: CCl4 produces experimental liver damage that histological resembles viral hepatitis. SGOT, SGPT, ALP, and serum bilirubin are the most sensitive parameters which are considered as the index for diagnosis of liver diseases. Treatment of rat with test drugs prior to challenge of carbon tetrachloride producing liver injury to a considerable extent which is reflected by the ability of the test drug to lower the elevated serum enzymes activity. The increased level of SGOT and SGPT in serum are monitored which indicates the cellular leakage and loss of fractional integrity of cell membrane in the liver.

III- Comparison: The collected data was analyzed in consultation with Biostatistician.

Study requirement: The study requires hepatoprotective activity on healthy albino rats by Lin and Lin et al method.

Pathological investigation:

Liver function Tests

ALT: alanine amino transferase (SGPT)

AST: aspartate amino transferase (SGOT)

Alkaline Phosphatase & Bilirubin [4].

ALT: Found primarily in hepatocytes released when cells are hurt or destroyed. Normal levels depend on the reference range which differs from lab to lab. Considered normal between 5-40U/L.

AST: Found in many sources including liver, heart, muscle, intestine, and pancreas. Not very specific for liver disease often follows ALT to a degree Elevated 2 or 3:1 (vs. ALT) in alcoholics

Normal range: 8--20 U/L.

Alkaline Phosphatase: Found in the liver (especially biliary tract), bones, intestines & Placenta.

Liver AP rises with an obstruction or infiltrative disease (i.e. stones or tumors).

Normal range: 20--70 U/L.

Bilirubin: Two primary sources.

Indirect (unconjugated): old red cells removed by the spleen sent to the liver add glucuronic acid, making these cells water-soluble for excretion; now called direct (or conjugated) bilirubin.

Normal range: less than 0.8 mg/dL.

Direct (conjugated): Total bilirubin includes both direct and indirect types Excreted in the bile, down the common bile duct, and into the small intestine. Normal range: 0.3 —1.0 mg/ dL[5].

Patterns of Abnormal: Elevations in ALT & AST only: suggests cellular injury.

Elevations in Alk Phos & Bilirubin suggests cholestasis or obstruction.

Mixed pattern: ALT, AST, AP & Bilirubin: probably the most common scenario.

DISCUSSION

The study was discussed with help of the following points: Review of literature: Review of *kakoudumbara*- 1. In *Charak Samhita Kakodumbara* described in *chikitsa sthana* in describing this drug in *tikatsakandain viman sathan* 81. In *Susruta Samhita Uttaratantra* this drug describes in the treatment of *panajirna* (alcoholic indigestion). *Susruta* describe this drug in *Chikitsasthan* in *Upakusha*, to drain out blood with the help of *patra* of this drug. Juice of this drug is also used for the treatment of elephantiasis by making ingestible alkali with Ash of some drug and decoction of *Madanphala* and *swaras* of *sukanasa*. This ingestible alkali is also used in *scrofula*, goiter, *grahani* disorder, loss of appetite, and all sort of poison. The treatment of *kustha*, punctured veins should be scraped with *Kakodumbara Patra*. 2. *Ashtanga Hrdayam*- It is described in *Kustha Chikitsadhya*. 3. *Bhavaprakash Nighantu* mentioned that fruit and *twak* of *kakoudumbara* are *Vamak*. This drug is used in *Yakruthvrudi*. 4. *Shaligram Nighantu* describe synonyms of *kakoudumbara.* 5. *Nighantu Aadarsh* explained the morphology *of kakoudumbara*, the flowers of this drug describe as *Guda Pushpa*. 6.

Madanpal Nighantu says that this drug mainly works in the healing process, *Kakodumbara* has the same *guna* as *gular, kakoudumbarika, phalgu, malayu, chitrabheshja* these are the *kavaris* name. 7. In *Dhanvantari Nighantu* the *twak* used in *Rakatvikara, vrana, shotha*. Fruit *kwath* and *mulatwakachurna* are used in *yakaruthvruddhi, arasha, kamala, agnimandhya, shivtra, khushta*. 8. *Raj Nighantu* mentioned thirteen synonyms of *kakoudumbara*. Ripe fruit is *amla* or *katu rasa*, and *Sheetala*. It is useful in skin diseases, *pitta*, or *rakatvikaranashka*. *Twak* is used in *atisar*. The Latin name of this drug is *Ficus oppositifolia*. *Raj nighantu* also mentioned useful part of *kakoudumbara* is *twak*, fruit, *Patra, and kshira*. 9. *Kaiyadeva Nigantu* described this drug in the Moraceae family. 10. *Priyanighantu* described synonyms *guna*, *Karama*, and *roghanta*. 11. *Hrudhdipak nigantu* describe in *dvipada varaga, siddhmantra* describe in *kaphapitaghan varaga.* 12. *Vangsene* describe this drug in *avabhahuka Vata vyadhi chikitsa* and *sarameya visha Chikitsa*. 13. *Sharangdhara* describe *kaoudumbara* used in *trushanomarichadihima Kalapana*. 14. *Shaligram Nighantu* describes synonyms of *Kakoudumbar*[8]. In "The Indian material medica" by Dr. K. M. Nadkarni describe the vernacular names of *kakoudumbara* with Sanskrit names, chemical composition, and useful parts are described, treatment of hepatic obstruction is given. 15. In *Dravyaguna Vijnan* this drug is describe in *Vata kula*. The regional names of this drug are described. 16. Review of silymarin: Silymarin a flavonolignan from the seeds of milk thistle' (Silybum marianum) has been widely used from ancient times because of its excellent hepatoprotective action. It is a mixture of mainly three flavonolignans, viz, silybin, silidianin, and silychristine, with silybin being the most active. Disease review: The brief study of liver anatomy, physiology, according to modern and *Ayurveda* science is described. How liver disease occurs according to *Ayurveda* and modern science described. Different chemicals that damage the liver are described [7].

Pharmacognostical Study: Macroscopic character of *kakoudumbara* shows greenin colour, slightly bitter taste. There was no any characteristic odour observed, Ovate oblong in shape Microscopically it showed the epidermis, trichome, spongy parenchyma cells, xylem, phloem, chollenchyma cells [11].

Phytochemical study: Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties. During the solubility test, the minimum residue was observed in ethyl alcohol which shows the drug is more soluble in ethyl alcohol. The pH of the drug was 7.8; it shows *kakoudumbara* is slightly alkaline Phytochemical analysis of *kakoudumbara patra* showed the presence of sterols, alkaloids, triterpenoids, carbohydrates, tannins, flavonoids, and saponins [12].

Experimental study: The methodology selected for this study is, Lin n Lin et al (1993). The objective parameter SGPT, SGOT, ALP, TB, DB, and histopathological observation was selected as it is more appropriate to know hepatoprotective action. The experimental study was carried out for evaluate of *kakoudumbrapatra* W.S.R to its hepatoprotective activity. The study was designed in three groups, each containing 6 albino rats. 1st group serves as Trial group (extract), 2nd group serves standard control (silymarin), and 3rd Observational group (normal saline). A blood sample was collected 72 hrs after CCl4 induction. The results were analysed and statistically interprete[13].

CONCLUSION

1. Kakoudumbar is an ideal drug which shows the property of Dravya sampannata which should be easily available throughout India.
2. In a Preliminary Phytochemical study the Trial drug shows the presence of Sterols, Tritrepenoids, Alkoids, carbohydrates, Saponins, Flavonoid, and Tannins.
3. Effect of Tikta, Kashaya rasa, sheet veerya, and Katu vipaka of kakoudumbara patra shows hepatoprotective effect.
4. Trial drug shows the equipotent hepatoprotective effect with the standard drug in Experimental study 6.

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