Chapter 2

Need & Objectives

Obstacles are things a person sees when he takes his eyes off his goal.

- E. Joseph Cussman
2 NEEDS AND OBJECTIVES

2.1 NEEDS FOR STUDY

Liver, the key organ of metabolism and excretion is constantly endowed with the task of detoxification of xenobiotics, environmental pollutants and chemotherapeutic agents. Thus, disorders associated with this organ are numerous and varied. While curative agents has not yet been found in modern medicine. The most common hepatic disorders are viral hepatitis, non-alcoholic fatty liver disease (NAFLD), drug-induced hepatotoxicity, and alcoholic fatty liver disease (ALD). The current usage of corticosteroids and immunosuppressive agents only brought about symptomatic relief. Furthermore their usage is associated with risk of relapses and dangerous side effects. On the other hand, Ayurveda, and indigenous system of medicine in India, has a long tradition of treating liver disorders with plant drugs.

In India, it was reported that about 1% of the population was infected with hepatitis C and 2-4% with hepatitis B virus. NAFLD is the most prevalent liver disease, affecting up to 24% of patients in the general population and up to 74% of those with obesity. The prevalence of this disease is likely to continue to rise, paralleling the increasing global prevalence of diabetes and obesity. Drugs that damage the liver account for 9.5% of all suspected adverse drug reactions (ADRs), are the main cause of fatal ADRs and are the most common reason for withdrawal of drugs from the market. Accurate estimate for the incidence and prevalence of alcohol induced liver disease are not available, because many individuals with alcohol-induced liver disease are asymptomatic. In the year 1997, the death rate from alcohol-induced liver disease in USA was 3.8 per 100,000, which corresponds to 40% of death from cirrhosis or 28% of all death from liver disease. Although, liver has a
tremendous ability of regeneration, acute liver illnesses often leads to serious chronic
squeals such as, chronic hepatitis, cirrhosis and even carcinoma.

No effective measures are available for the treatment of liver disease in
modern medicine so far. Herbal drugs, used in Indian systems of medicine, are
however claimed to be effective and safe in such ailments. These are more often used
in combination\textsuperscript{65}.

Numbers of medicinal preparations have been advocated in traditional systems
of medicine, especially in Ayurveda for treating liver disorders. In addition usage of
many folk remedies mainly plant products is also quiet common throughout India\textsuperscript{66}.

Polyherbal preparations are products from medicinal plants. These are
considered safe since they are natural in origin. Herbal formulations that have reached
widespread acceptability as therapeutic agents in India include noortropics,
antidiabetics, hepatoprotective agents and lipid lowering agents. Pharmacological
effects of many plants have been studied in various laboratories in India\textsuperscript{67}.

Hence by considering the above aspects, the present study is designed for the
development and evaluation of polyherbal formulations for effective management of
liver diseases using some of the indigenous plants.

2.2 OBJECTIVES OF THE STUDY

- To develop a polyherbal formulation using indigenous plants medicinal
  without or with negligible side effects, unlike the commonly used potent
  allopathic hepatoprotective drugs.
- To standardize the developed formulation by using physical and chemical
  methods.
- To carry out the pharmacological screening for hepatoprotective activity of
  developed formulation.
2.3 PLAN OF WORK

The proposed study was carried out as per the plan which is given below;

A. Literature review

B. Pharmacognostical studies

- Collection of plant materials.
- Identification and Authentication of selected plants.
- Botanical information of the selected plants.
- Processing of specific parts of plants selected for the study.
- Standardization of selected plants material according to WHO guideline.

C. Phytochemical studies

- Extraction of raw material as per the literature.
- Phytochemical analysis of different extracts.
- Standardization of selected plants extracts according to WHO guideline.
- Marker based standardization of of the selected plants extracts using HPTLC.

D. Screening of all Extracts for Anti-oxidant and hepatoprotective activity

- Estimation of total phenolic contents & DPPH free radical Antioxidant activity
- Acute toxicity studies of different extracts.
- CCl₄ induced hepatotoxicity activity.

E. Formulation development using active extracts

Develop three polyherbal Tablet formulations (HF₁, HF₂ and HF₃) from the active extract showing significant activity during screening.

- Assessment of physiochemical properties of herbal extracts and their relevance to the final formulation.
- Conversion of raw materials to powder form by using suitable excipients.
Chapter - 2

Need and Objectives

- Compatibility studies of the herbal extracts with potential excipients by HPTLC.

- Preformulation studies for powder

- Development of tablet formulation by direct compression.

F. Evaluation of the tablet formulation.

- Physical evaluation- Friability, weight variation, disintegration time, thickness, hardness, heavy metal and microbial analysis.

- Chemical evaluation – Estimation of drug content and HPTLC fingerprinting of prepared herbal formulations.

G. Pharmacological evaluation.

- Determining the potency of the formulation by using *in-vivo* Carbon tetrachloride induced hepatotoxicity model.

H. Stability Studies

- Developed herbal formulations (HF₁, HF₂ and HF₃) with hepatoprotective activity were subjected to stability testing to assess the effect of storage at different temperature and humidity.