2.1 OBJECTIVES OF THE STUDY

Plants have been used as food, fodder and medicines since the beginning of human civilization. It is the main source of medicine in developing countries. In modern medicine about 70% of the drugs are directly or indirectly derived from plants. The plants naturally synthesis secondary metabolites like alkaloids, flavonoids, tannins, glycosides, mineral oils and also contains minerals and vitamins which possesses medicinal properties. They serve as therapeutic agents as well as important raw materials for the manufacturer of traditional and modern medicine.

Traditional medicines and the plant have been adopted in different cultures and regions without the parallel advance in standards and methods for evaluation. So the standard method is need to develop for evaluation of plant material is essential for their quality and purity.

The safety, effectiveness and quality of herbal plants are very essential. It depends on number of their active natural constituents. Herbal materials are collected from wild plant populations and cultivated medicinal plants. The expanding herbal product market could drive over-harvesting of plants and threaten biodiversity. Poorly managed collection and cultivation practices could lead to the extinction of endangered plant species and destruction of natural resources. So, the demand on the plant materials are possible to adulterate or substitution. So, efforts are needed to preserve the plant and knowledge by evaluating their identification such as morphological, microscopical nature and various physiochemical standards to avoid the duplication.
Increased patient awareness about safe usage as well as more knowledge about the plant is important and it is also necessary to ascertain the pharmacological effectiveness. The pharmacological validation as Indian medicine is very limited and large number of plants used in folklore with enormous potential have not been validated for their activity.

Antimicrobial resistance is a global problem. Emergence of multidrug resistance has limited to therapeutic options, Hence monitoring resistance is of paramount importance. Monitoring of antimicrobial resistance will help to review the current status of antimicrobial resistance locally, nationally and globally and helpful in minimizing the consequence of drug resistance.

Antioxidants are microconstituents of diet that are involved in the structural maintenance of DNA and cell and their repair. They are involved in protection of DNA cell membrane against oxidative damage, including that induced by xenobiotics or carcinogenic agents. Diets rich in vegetables and fruits protect against oxidative damage. It is biologically possible that diet rich in antioxidants protect against liver damage, diabetes and cancer.

In view of importance of pharmacological activity attributed to the Decalepis hamiltonii and non-availability of work, the following multidisciplinary approaches are initiated with following objectives to resolve the conditions prevalent in pharmacognostical studies, phytochemical characterization and pharmacological activities of Decalepis hamiltonii.
Pharmacognostical studies

Morphological characterization of root of Decalepis hamiltonii.

Identification of variability's of anatomical studies of cortex, secondary xylem, secondary phloem and powder microscopic observation of Decalepis hamiltonii root.

Physiochemical analysis like determination of pH, ash content, moisture content and extractive values.

Phytochemical analysis and characterization

Preliminary phytochemical analysis of various extracts (petroleum ether, benzene, chloroform, ethyl acetate, acetone, methanol, ethanol and aqueous extract) of Decalepis hamiltonii root was carried out for the analysis of presence of alkaloids, flavonoids, saponins, steroids, glycosides, phenols, thiols and resins by using method adopted in similar surveys.

Screening for the presence of phytochemical constituents (lipophilic compounds, hydrophilic compounds and flavonoids and sesquiterpene lactones) in root of Decalepis hamiltonii using High Performance Thin Layer Chromatography (HPTLC).

Phytochemical characterization of methanolic extract of Decalepis hamiltonii root by Gas Chromatography – Mass Spectrometry (GC-MS).

Antibacterial activity

In the present study, antibacterial activity of various extracts of Decalepis hamiltonii root was investigated.
To determine the Zone of inhibition of various extracts of Decalepis hamiltonii root and standard drug (against several Gram positive bacteria (Escherichia coli, Klebsiella pneumonia, Salmonella typhi, Proteus mirabilis, Vibrio cholera, Shigella sonnie, Serritia sp) and Gram negative bacteria (Staphylococcus aureus and Bacillus subtilis) by disc diffusion method.

It hopes that this study would leads to the establishment of some compounds that could be used to formulate new and more potent antimicrobial drugs of natural sources.

Hepatoprotective activity

To evaluate the hepatoprotective activity of methanolic extract of root of Decalepis hamiltonii against acetaminophen induced hepatic injury in rats. The following parameters were studied.

Serum marker enzymes like aspartate transaminase, alanine transaminase and alkaline phosphatase were assayed.

The lipid peroxidative indices of end products were measured in the form of TBARS.

Changes in the activities of enzymatic antioxidants like SOD, CAT and GPx.

Changes in the levels of non-enzymatic antioxidants GSH and vitamins C.

Alteration in the levels of serum protein, hepatic protein and serum bilirubin were studied.

The morphological changes of liver like fatty changes, lymphocytes inflammation or cell necrosis was evaluated by histopathological studies.
Antidiabetic activity

To evaluate the antidiabetic activity of methanolic extract of root of Decalepis hamiltonii in normal and alloxan induced diabetic rats. The following studies were conducted.

Oral glucose tolerance test.

Hypoglycemic activity of methanolic extract of Decalepis hamiltonii of normal rats.

Hypoglycemic activity of methanolic extract of Decalepis hamiltonii of alloxan induced diabetic rats. The following parameters were studied.

Blood glucose levels by oxidase method.

Serum marker enzymes like aspartate transaminase and alanine transaminase were assayed.

Serum lipids like total cholesterol and triglyceride level was estimated.

Liver glycogen content was assayed.

The morphological changes of β-cell granulation of pancreatic islets of langerhans were evaluated by histopathological studies.

Antitumor activity

To screen the antitumor activity of methanolic extract of root of Decalepis hamiltonii in Dalton’s Lymphoma Ascites (DLA) bearing mice. The following studies were conducted.
Short term in vitro anticancer activity by using Daltons Lymphoma Ascites cells.

In vitro cytotoxicity activity by MTT assay method using two types of cell lines like Vero cell line and A549 cell line.

In vivo anticancer activity by using Daltons Lymphoma Ascites cells. The anti-tumor activity was measured in DLA bearing mice by the following parameters,

- Percentage increase in life span (% ILS).
- Mean survival time (MST).
- Hematological parameters like hemoglobin content, red blood cells and white blood cells.
- Assay of enzymatic activities like aspartate transaminase, alanine transaminase and determination of total protein was done.

Therefore this attempt was made to reduce the issues in the existing literature and offers immense scope for researchers engaged in validation of the traditional claims and development of safe and effective herbal drug for various activities.