OBJECTIVES & PLAN OF RESEARCH WORK
3.0 OBJECTIVES AND PLAN OF RESEARCH WORK

Since ancient times plants and plant derived products had play vital role in the prevention and treatment of diseases. Ancient literature also reveals description for such useful plants and their formulations. Heart diseases have posed a great challenge in front of us. Many plants and their formulations are mentioned in the literature for their therapeutic actions in the heart diseases. The literature survey of various plants and plant derived products as well as formulations indicate that the plant and its derived products will be useful for the treatment of heart diseases.

However after literature survey it was found out that very less detail data is available on the plants which are useful in the heart diseases. In order to understand the exact role of medicinal plant in heart disease, it was decided to select a plant which is indicated in ancient literature like Ayurveda for treatment of heart diseases. Survey indicates that the plant *Piper longum linn* is indicated for its use in the heart diseases. *Piper longum linn* along with other plants is used for variety of treatment and even in heart diseases. However very less data is available on the exact role of plant and its constituents in heart diseases. Hence roots of the plant *Piper longum linn* was selected for its detail investigation in heart diseases.
3.1 Objectives of the Present Research work

1. Selection of the plant material
2. Literature survey
3. Authentication of the plant material
4. Extraction using different solvents
5. Screening of cardiac activity of prepared extracts on isolated frog heart
6. Development of the suitable chromatographic method for the isolation of constituents for the active extract
7. Characterization and identification of the constituents by using different spectroscopic techniques as IR, NMR, 1H NMR, GC-MS
8. Pharmacological screening
   a. Acute Toxicity Study of the different extracts
   b. Screening of cardiac activity of isolated constituent on isolated frog heart
   c. Biochemical Study/Cardiac Enzyme Study
   d. Histopathological Study
   e. Antioxidant Study
9. Antibacterial activity of plant extract and isolated constituent
10. Formulation Development
   I) Complexation Study
      a. Selection of complexing agent
      b. Selection of complexation methods as Physical Mixture, kneaded method, coevaporation (solvent evaporation) and freeze drying (lyophilization)
      c. Formulation of complexes
      d. Characterization of complexes using different techniques as IR, DSC, XRD
      e. Evaluation of complexes
   II) Formulation and Evaluation of Tablet
      a) Selection of best complexes for formulation
      b) Formulation of tablet
      c) Evaluation of tablet
3.2 PLAN OF RESEARCH WORK

Selection of Plant and Literature Survey

Authentication and Standardization of plant Material

Phytochemical Screening of plant and Preparation of Plant extract

Acute Toxicity and Preliminary Screening of cardiac activity of plant extract

Development of Chromatographic method, Isolation and Characterization of constituents

Pharmacological studies

Cardiac Enzyme Study

Histopathological Study

Antioxidant Study

Antibacterial Study

Formulation Development

Cardiac Activity and Formulation Evaluation of Isolated Constituents of *Piper longum* linn
3.2.1 Plan of Work for Formulation Development

**FORMULATION DEVELOPMENT**

- Complexation Study
  - Complex formation by different Methods
    - Characterization of complexes
    - Evaluation of Complexes
  - Selection of Best Complexes
    - Formulation of Tablet
      - Evaluations of Tablet
        - Hardness
        - Uniformity of weight and thickness
        - Friability
        - Dissolution Profile