

Chapter -3 Aim and Objectives

Inflammatory diseases, including different types of rheumatic diseases, are a major health care problem worldwide. The majority of human population is affected by inflammation-related disorders. Though several agents are accessible to treat multiple inflammatory diseases, their prolonged use leads to serious adverse effects. Management of inflammatory diseases either with steroidal or non-steroidal drugs is a traditional clinical practice. The non-steroidal anti-inflammatory drugs (NSAIDs) inhibit early steps in the biosynthesis of prostaglandins through the inhibition of cyclooxygenase (COX). The NSAIDs are important drugs used to reduce untoward consequences of inflammation. ^[1] The chronic use of NSAIDs relates to cardiovascular, gastrointestinal, and renal toxicities. Similarly, the use of corticosteroids leads to hypertension, hyperglycaemia, osteoporosis, and growth arrest. Toxicity and recurrence of symptoms on discontinuation is a major problem related to currently available synthetic drugs. The development of safer anti-inflammatory agents remains to be a subject of great interest.

Development of anti-inflammatory drugs derived from natural sources is the rational and productive strategy towards the cure of inflammatory ailments. Natural products are safe, efficacious, biocompatible, and cost-effective alternatives to treat inflammatory diseases. Many countries like India, China, Brazil, and Sri Lanka have a rich heritage of using natural products in therapeutics as the traditional medicine since ancient time and also provide a time-tested safety of these plant-based medicines. Currently the experimental studies are demonstrating the molecular and pharmacological mechanisms accountable for their health benefits and therapeutic prospects. Integration of traditional knowledge and indigenous resources will assist the development of novel anti-inflammatory leads. Many scientific studies on plant species which has been used as folk medicine against the inflammation have established the recognition of natural products as potential anti-inflammatory drugs. The anti-inflammatory effects of phytoconstituents are exerted through their action on key regulatory molecules, including cyclooxygenase (COX), inducible nitric oxide synthase (iNOS), and cytokines.

3.1 Aim

The present work therefore aimed to evaluate and standardize the selected plant drugs such as *Rosa indica*, *Calotropis procera* and *Adhatoda vasica* for the claims made under traditional systems for their **anti-inflammatory activities** and prepare **polyherbal formulations**. It was observed that herbal formulations contain a number of constituents which have a very narrow therapeutic index. Thus, development of quality control methods and safety as well as efficacy studies are important for such multi-component therapies in the present scenario.

3.2 Objectives:

The present study is thus aimed at developing new standardization tools for assessment of safety, quality and efficacy for polyherbal formulation. The present study was planned in the following manner:

The specific objectives of the work undertaken were:

1. Preliminary pharmacognostical parameters
 - a) Collection and authentication of plant materials.
 - b) Physico-chemical analysis of extracts.
 - c) Qualitative and Quantitative Analysis of extracts
2. *In-silico* molecular docking studies of extracts.
3. *In-vitro* studies of extracts.
 - a) Cell viability study of extract by MTT Assay
 - b) Evaluation of anti-inflammatory activity of extracts by ELISA Test
4. Analytical Method development and validation for the quantitative analysis of active constituents of extracts.
5. Preparation and optimization of Gel and Spray formulations using Design of experiment.
6. Evaluation of the prepared Gel and Spray formulations
7. *In-vivo* studies for anti-inflammatory activity of developed formulations

3.3 References

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