Aims and Objectives
3.1 AIMS:
The aim of the present work was to carry out phytochemical and pharmacological investigation of selected plant for analgesic, anti-inflammatory and antiarthritic activity in animals. The medicinal plant was selected by carrying out literature survey of plant mentioned for the treatment of analgesic, anti-inflammatory and antiarthritic activity in traditional system of Indian medicine. Based on the literature survey plant *Cyathocline purpurea* (Buch-Ham ex D.Don) Kuntze Fam. Asteraceae was selected for the study.

3.2 OBJECTIVES:

3.2.1 Part A: (Analgesic, anti-inflammatory and antiarthritic activity of *Cyathocline purpurea* extracts)

1. To procure and authenticate the whole plant *Cyathocline purpurea*.
2. To prepare three extracts of *Cyathocline purpurea* of different polarity, petroleum ether extract of *Cyathocline purpurea* (PECP), methanolic extract of *Cyathocline purpurea* (MECP) and aqueous extract of *Cyathocline purpurea* (AECP).
3. To carry out preliminary qualitative phytochemical analysis of all the three extracts.
4. To carry out acute oral toxicity studies of all the three extracts as per Organization for Economic Co-operation and Development (OECD) guidelines no. 425 in mice.
5. To investigate analgesic activity of all the three extracts using hot-plate test and acetic acid induced writhing in mice.
6. To investigate anti-inflammatory activity of all the three extracts using carrageenan induced paw edema and cotton pellet induced granuloma model in rats.
7. To investigate antiarthritic activity of extract showing superior analgesic and anti-inflammatory activity using Freund’s Complete Adjuvant (FCA) induced arthritis model in rats.
3.2.2 Part B: (Isolation and characterization)

1. To perform liquid-solid separation chromatography of most active extract to prepare various fractions.
2. To investigate the anti-inflammatory activity of all the fractions by carrageenan induced paw edema in rats.
3. To fractionate most active fraction further by column chromatography and to collect different pools based on thin layer chromatography (TLC).
4. To investigate the anti-inflammatory activity of all the pools collected from column chromatography by carrageenan induced paw edema in rats.
5. To isolate compound by preparative TLC technique from most active pool.
6. To characterize the isolated compound by IR, $^1$H-NMR, $^{13}$C-NMR, DEPT and MS.
7. To determine structure of isolated compound.
8. To carry out docking studies of isolated compound on the active sites of TNF-alpha converting enzyme (TACE).

3.2.3 Part C: (Antiarthritic activity of isolated compound)

1. To evaluate the antiarthritic activity of isolated compound using FCA induced arthritis model in rats and to unravel its mechanism of action.