3. AIM OF PRESENT WORK

Dementia is a cluster of neurodegenerative disorder characterized by a progressive loss of memory and cognition. Age, stress, emotions are conditions that may lead to memory loss, amnesia, anxiety, high blood pressure, dementia or to more ominous threats like schizophrenia and Alzheimer’s Disease (AD).\textsuperscript{172}

The global dementia population is predicted to reach 81.1 million by 2040. Almost half of people with dementia (46\%) live in Asia, 30 percent in Europe, and 12 percent in North America. In India, the total prevalence of dementia per 1000 people is 33.6, of which AD constitutes approximately 54 and vascular dementia constitutes approximately 39, this prevalence is projected to increase four times by 2050.\textsuperscript{173}

The Canadian study of Health and Ageing (CSHA) reported that direct and indirect cost of care for each patient with dementia has been estimated to vary between 5 to 9 billion Canadian dollars per year at present. By the turn of the millennium, these figures may range from 7 to 13 billion Canadian dollars annually. To meet this challenge, both governments and the private sector will need to make major investments in terms of broadly based multidisciplinary research.\textsuperscript{174} The rapid increase in number of Dementia patients and the increase in cost of care of these patients urgently demands effective prevention and treatment. Hence dementing disorders are now recognized as being one of the most important challenges facing medicine in 21st century.

The etiology of dementia remains enigmatic yet there is evidence which indicates that defective energy metabolism, excitotoxicity, oxidative damage, cholinergic cellular damage and inflammatory cascades may be crucial factors.\textsuperscript{175} Several pharmacological strategies for the treatment of dementia are under active investigation. These include cholinergic therapy that is designed to increase cholinergic functions, anti-inflammatory agents, anti-oxidants and estrogen replacement therapy.\textsuperscript{176}
There are currently two classes of drug approved for the treatment of AD: the cholinesterase inhibitors like Donepezil, Rivastigmine and Galantamine, and the NMDA receptor antagonists like Memantine. Donepezil, Rivastigmine and Galantamine are licensed to be used for mild to moderate AD\textsuperscript{177} while Memantine for moderate to severe AD.\textsuperscript{178} In spite of absence of sufficient therapeutic effectiveness in mild and moderate dementia, these drugs are still considered as the first line of treatment for dementia.(AD).\textsuperscript{179} Two clinical trials showed no improvement of the cognitive deficit by using such drugs.\textsuperscript{180,181} The limited success of current treatment for dementia and related problems adds urgency to the search for effective therapy approaches. Searching for alternatives, many herbal products have been tested and employed in the treatment of dementia.\textsuperscript{182} Research reported that plants traditionally used in Ayurvedic medicine to boost mental abilities in old age have been found to have the same action as conventional drugs used in the treatment of dementia.\textsuperscript{183}

Thus, there is a need to systemically study and define the mechanisms for the treatment of dementic diseases in folk medicine around the world for centuries.

Literature survey revealed that whole plant extract of *Hybanthus enneaspermus* (Linn.) F.muell and *Cardiospermum halicacabum* Linn. are traditionally reported as tonic and in the treatment of nervous disorder respectively, these properties have not yet been scientifically evaluated. The present study was therefore, undertaken to evaluate and investigate more details in microscopical, phytochemical and pharmacological properties of these two plants.

The objectives of the study for aerial parts of *Hybanthus enneaspermus* (linn.) F.muell & *Cardiospermum halicacabum* Linn. are:

- To study morphology and microscopy of crude drugs.
- To study the extraction and standardization of crude drugs.
- To study the phytochemical investigation of crude extracts.
To isolate the phytoconstituents from the crude extracts and its structural characterization.

To elucidate the structure of isolated phytoconstituents by using various instruments like UV, IR, $^1$HNMR, $^{13}$NMR.

To study the evaluation of extract of plants for anti-dementic activity.

Plan of work for *Hybanthus enneaspermus* and *Cardiospermum halicacabum*

On the basis of ethanomedical /folklore information and literature survey, the arial parts of plant *Hybanthus enneaspermus* and *Cardiospermum halicacabum* were selected for the present investigation. The plan of work is as follows:-

1. **Pharmacognostical characteristic:**
   a. Organoleptic characteristics
   b. Microscopy
   c. Physicochemical parameters
      - Ash values
      - Extractive values
      - Loss on drying
2. Phytochemical investigations:

- Extraction methodology
- Characterization of extracts by chemical tests
- Identification of phytoconstituents by Thin layer chromatography
- Isolation of phytoconstituents by Column chromatography
- Characterization of isolated compound by using physical, chemical methods and Spectroscopic techniques
- Quantitation of phytoconstituents by HPTLC

3. Pharmacological screening:

A. Behavioral models

- Elevated plus maze method
- Passive shock avoidance paradigm
- Clonidine induced hypothermia

B. Neurotoxicity test

C. Estimation of brain cholinesterase