4. Scope and objectives

4.1. Scope

AD is becoming a worldwide problem and September 21st of every year had been declared as World’s Alzheimer’s day. In India, AD affects one in 20 for people over 60 years and one in 5 for people over 80 years; now about 37 million people affected and cost of treatment pegged at 1,47,000 million.\textsuperscript{150} There are two reasons mainly to develop new therapeutic agents for AD. First, within the next 20 years, the number of elderly population is going to double which would make India, the country with the largest number of elderly in the world and the number of people suffering from AD is going to be triple. And second, India is the capital for T2D which is the major risk factor that causes AD.

According to many researchers, peptides and proteins have become important targets in neuro-pharmaceutical drug design. GLP-1 is a peptide which has shown a novel approach for the treatment of AD by decreasing A\textbeta peptides and tau phosphorylation. Concentration of GLP-1 will be increased by the inhibition of DPP-4. Research on DPP-4 inhibitors for the treatment of T2D is in progress, but our investigations focus on natural DPP-4 inhibitors for the treatment of AD, which is a novel approach. The natural products used for this study are having potent anti-diabetic action and are available in various marketed herbal anti-diabetic formulations. Current research has the potential to bring out a novel bioactive extract that inhibits DPP-4 and that could be used for the treatment of AD with more beneficiary effects.

DPP-4 inhibitors decrease plaques content in AD by increasing the GLP-1 levels in the brain, at the same time the price of the drugs available as DPP-4 inhibitors are very expensive that a common man cannot afford. This is the right time to take a step ahead to improve the research on AD and discover a regimen for the treatment of
Alzheimer’s using natural products. Current research will give DPP-4 inhibitor from natural origin with low cost. All the available drugs for the treatment of AD are only meant to be symptomatic relief and are targeted to secondary pathways i.e., acetylcholinesterase inhibitors and NMDA antagonist. Present research will focus on anti-amyloid approach which is a novel approach and may have more chances to treat AD with definite mechanism.

4.2. Objectives

➢ *In vitro* evaluation of *P. marsupium, E. jambolana* and *G. sylvestre* on dipeptidyl peptidase-4 inhibition.

➢ *In silico* evaluation of *P. marsupium, E. jambolana* and *G. sylvestre* constituents on dipeptidyl peptidase-4 inhibition.

➢ To induce Alzheimer’s disease (plaques, tangles and neuro-inflammation) in rat model using intracerebroventricular injection of streptozotocin.

➢ To treat Alzheimer’s disease induced animals with potent herbal dipeptidyl peptidase-4 inhibitors.

➢ To determine the molecular mechanism of the herbal dipeptidyl peptidase-4 inhibitors in streptozotocin model of Alzheimer’s disease.