Summary

Nearly 10% of the World’s biodiversity is found in India, a megabiodiversity centre. Indian medicinal flora constitutes a total of 18,000 plants. About 7,500 plants are used as ethnomedicine India harbours 140 endemic genera. About 77 species are endemic. Among them Holostemma adakodien, commonly called as Adakodien is a laticiferous medicinal climber, belonging to the family sclepiadaceae, is in the border of extinction.

The distribution of the adakodien has diminished, because of some environmental and human activities. Now there is acute scarcity of this plant. So it is considered vulnerable and included in the red list of medicinal plants of South India. Seed setting and natural dispersal of this plant is checked by herbivores. So it should be conserved by any means.

Recent advancement in modern biological research is the bioprospecting of traditional medicines. To study the genetic diversity of the best choice of the day is DNA markers. In order to explore the variations among H.adakodien the plant was collected from six different sites and the growth variations among them were studied using markers. Keeping these as the back ground, the present study was done to study the bioactivity of Holostemma adakodien extracts through various bioassays to confirm the taxonomic status of the adakodien through DNA markers and to design a protocol for the conservation of this plant through micropropagation.

In the first chapter bioactive profile studies, such as antibacterial, ichthyotoxicity, brine shrimp lethality and antifungal assays were done with various extracts of different parts of the plant. Root, Stem and leaf of the plant were extracted with
different solvents such as methanol, N-butyl alcohol and actone. Their inhibitory action against eight common bacterial pathogens (Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Salmonella paratyphi, Staphylococcus aureus, Bacillus subtilis, Enterococcus faecalis and Streptococcus pyogenes) well diffusion technique. Methanolic extracts of the stem was highly antibacterial against most of the bacterial stains under study.

Genetic variation assessment of H.adakodien is dealt with the second chapter. The test plant was collected from six different sites. They were given HAKR, HAKV, HADC, HABC and HAMN. Using DNA based markers such as RAPD, RFLP and DNA sequence, the genetic variation among them were studied. Cladograms were constructed with UPGMA analysis. The obtained results clearly indicates the existence of two important lines of evolution, HAKR, HADC and HABC evolved from one line and HAKM, HAMP and HANM evolved through the other. Among the samples of the first line HAKR and HADC showed more similar sequence than HABC. Likewise in the second line, HAKM and HAMP were so similar. There is more variation in the sequence of HANM when compared to HAKM and HAMP.

In the third chapter, conservation of this endemic and endangered medicinal plant was tried through tools of biotechnology. For that, in vitro conservation, in MS medium supplemented with growth regulators was tried. The influence of growth promoters on callus induction, shoot and root regeneration was worked out. The investigation revealed that, for the establishment of callus, MS medium augmented with the combination of NAA and Kinetin (1.00+2.00mg/l) proved good and the callus was compact in nature and creamy yellow in colour. MS medium supplemented with the combination of BA (Benzyladamine) 2.00mg/l and IAA (Indole Acetic Acid),
1.00mg/l was found to be good for shoot regeneration. MS medium fortified with BA 2.00mg/l and IAA 1.00mg/l showed maximum number of shoot regeneration. MS medium supplemented with IBA (Indole Butyric Acid) 1.5mg/l was found good for root induction. Addition of 30gm/l of sucrose to MS medium proved good for multiple shoot formation.

The present investigation clearly revealed the facts such as the methanolic extract of the *H. adakodien* stem was highly inhibitory than that of the root and the leaf. N-butyl alcohol proved to be a good solvent. To conserve this valuable, rare plant through micropropagation, MS medium supplemented with BA,2.00mg/l+IAA 1mg/l+sucrose 30mg/l+ IBA 1.5mg/l could be promptly used, which inturn would make the plant to flourish.