SUMMARY

Thermophilic amylase enzyme activity is discovered in the Xerophytic species *Cereus pterogonus* and *Opuntia vulgaris*. The ability to produce sufficient quantity of thermophilic enzymes will find industrial and commercial use for these enzymes and will augment the economics of the enzyme industry. Isolation, purification and characterization of the thermophilic amylases from the two species studied has already established a method of choice for the production of these enzymes employing conventional techniques for protein precipitation and column chromatographies. Enzyme activity in relation to molecular size was determined using the SDS-PAGE method. Immunological studies included generation of polyclonal anti amylase antibodies in rabbit and employing it for determining immune complex formation with the thermophilic amylase species and for cross reactivity studies between them. Structure function studies involved employing denaturation kinetic methods, Fluorescent Spectroscopy and Differential Scanning Calorimetry. Conformational changes in the enzyme structure and phase differences during denaturation of the enzyme species were detected through these techniques. Thermodynamic
contributions during denaturation were calculated using denaturation rate constants, estimation of activation energy by Arrhenius plots and using the DSC technique. Investigations for determining these thermophilic amylase gene sizes and sequence using PCR technique met with difficulties. The generation of a 450 bp PCR band is being used as a probe towards this goal. Primer designing directed to conserved sequence domains of selected amylase genes was carried out using standard Bioinformatic investigative tools. Results of all these studies are presented in the thesis.