PREFACE

It is now well established that living cells have been endowed with biocatalytic function allowing them to be capable of either synthesizing complex biomolecules for energy store or utilize complex biomolecules for degradation with the purpose for energy release. The ability exhibited by the various cohorts of enzymes in the living world, enabling them to function at fixed temperature, pH and even pressure, bears a legendary testimony to the sophisticated designing abilities found in nature categorized as the phenomenon of evolution. Bountiful harvest of natural enzymes in varieties has already been accomplished in this world through the use of a handful of wet lab techniques. Commerce and industries have been built centered around the functional significance and utility of enzyme varieties. The rigid concept of an enzyme being only a protein has now given way to accept the discovery of the existence of catalytic polynucleotide sequences known as Ribozymes and DNAzymes. Supramolecular chemistry and protein engineering have expanded the boundaries of enzymology to include induction of catalytic processes into the immunoglobulin structures generating synthetic antibody based catalytic phenomenon, called Abzymes. Need based search for specific types of catalytic processes had also identified the existence of high temperature stable enzymes in microbial species that grew in the hot springs even at temperatures greater than 100^{o}C.

Similar to the discovery of restriction endonucleases from bacterial sources that came to be used as molecular scissors in gene modification technologies, the discovery and the use of thermostable enzymes found a place in industrial processes that required biocatalytic conversions at high temperature either as a specific need for product generation or as a specific tool for reducing operational costs. The prokaryotic monopoly of thermostability is now finding natural allies in the eukaryotic domain, specifically in the cells of the xerophytic plants like the thermostable eukaryotic xylose isomerase discovered for the first time and being reported here. This is the result of painstaking laboratory research carried out during the period 2002-2007 by this researcher. It is believed that this work will continue through a cascade of further discoveries related to the existence and function of the thermostable enzymes in the eukaryotic domain that will find use in commerce, industry and perhaps even in clinical medicine.