# ABSTRACT

An attempt to design imprinted polymers for the specific and selective recognition of Boc-L-tryptophan, Boc-L-phenylalanine and D-mandelic acid is presented in this thesis. Emphasis is given to the tailoring of imprinted polymers for these templates with maximum specificity and selectivity. Basic functional monomer 4-vinylpyridine (4-VP), which is an electrophilic monomer was utilized for the preparation of imprinted polymers for these templates with a carboxyl group in the molecule. Crosslinkers namely ethylene glycol dimethacrylate (EGDMA) and divinylbenzene (DVB) with widely varying degree of rigidity, flexibility and polarity were selected as crosslinking agents for evaluating the nature and degree of crosslinking and for optimizing the conditions for maximum specificity and selectivity of imprinted polymers. Spectroscopic methods such as Fourier-transform infra-red (FT-IR), UV-vis, NMR and fluorescence technique have been used for the investigation of interaction between template and functional monomer. Scanning electron microscopy gave the surface morphological differences between imprinted and non-imprinted polymers. The binding studies and the selectivity of the polymers were analyzed using UV-vis spectrophotometer. The polymer preparations were evaluated and compared with non-imprinted polymers for their ability to bind the print molecule which is a measure of the specificity of the imprinted system. The binding of other substrates similar in structure to the print molecule was also analyzed to monitor the selectivity of the imprinted system and the selectivity of the imprinted polymers was quantified as separation and selectivity factors. Significant cross reactivity was observed and the nature of the Scatchard plots was a direct indication of binding site heterogeneity. The nature and degree of crosslinking and other parameters like concentration of the template solution, mass of the polymer, solvent, time and the ratio between functional monomer and template which influences the binding of these imprinted polymers towards the print molecule were also investigated in an attempt to optimize the imprinted system. The ability of the L-enantiomer imprinted polymer to separate the D-enantiomer was investigated. The attempts made in this work led to the successful design of molecular imprinted polymers for the selected templates.

***Keywords:*** *Molecular imprinting, amino acid, specificity, selectivity, crosslinking, monomer - template ratio*