SYNOPSIS

The thesis entitled "**ION EXCHANGE RESIN IN ORGANIC SYNTHESIS**" consists of two chapters and embodies accounts of Chapter 1 - A survey on the applications of some ion exchange resins in organic synthesis, Chapter 2 - Applications of cation exchange resins in organic synthesis, i.e. cyclisation reaction.

Chapter 1 includes the fundamental aspects pertaining to ion exchange resins like definition, types, fundamental requirements of useful resin, action of ion exchange resin, classification, structure, preparation and properties of polymers, concepts and characterisation of polymeric reagents and also resin parameters, advantages and disadvantages in the use of polymers. Significant applications of ion exchange resins in the field of organic synthesis are also summarised.

Chapter 2 deals with the use of cation exchange resins like commercially available Amberlite IR-120, Dowex 50W X8 100, Tulsion T-42 in cyclisation reactions. It includes the preparation of cation exchange resin and its use in cyclisation reactions i.e. condensation of phenols with β-keto esters. (Chart 1,2). Phenols and ester were condensed to corresponding substituted coumarins in high yields in presence of n-hexane solvent. In this synthesis production of environmentally harmful waste streams is minimised by the use of cation exchange resins. The effect of use of solvent and also cation exchange resin on

rate of reaction is also discussed. The rate of reaction was increased quite substantially in some cases, the yield too, being generally improved to some extent, when the reaction is carried out in presence of a non-polar polar solvent like n-hexane and Amberlite IR-120 (strong cation exchange resin gel type) resin.

The cation exchange resin can be used repeatedly since it can be regenerated to its initial activity by treating it with 10% hydrochloric acid. Thus, the isolated yields were determined after each regeneration by same procedure. The observations indicates that the cation exchange resins can be regenerated and reused.

It also describes the procedure for the activation of Amberlite IR-120 exchange resin and its applicability in the acid catalysed cyclisation reactions like synthesis of 2-quinolones, benzofuran-3-one, methyl uracil, anthraquinone and fluorescein. (Chart 3,4). We wish to report that cation exchange resin can affect cyclisation to give products in yields exceeding those obtained by the common metal chlorides and mineral acids. Thus, potentially the most important are sulphonic acid resins. These were shown to be as acidic as sulphuric acid and can be used continuously and could operate with good lifetime at temperature 100-200^{0} C. The main advantage is that they may be recovered and reused and they simplify the purification of final product.