PREFACE

The great interest evinced among organotin chemists for the study of organotin carboxylates may be attributed to two major factors. Firstly, the great variety of structural possibilities encountered among compounds of this class, which are predominantly polymeric with bridging bidentate carboxyl groups besides some stray cases of monomeric molecules having unidentate or bidentate chelating carboxyl groups, stimulates attempts to synthesise monomeric tri- and di-organotin carboxylates in solid phase. Secondly, the biocidal properties of the organotin carboxylates and the consequent application to the pest control, ecology problems, veterinary medicine, human medicine and merine antifouling agents etc. are the reasons for an unusual increase in production of these types of compounds in recent years. Both these factors are also interconnected to some extent because it has been suggested recently that the structure of the organotin carboxylates is significantly connected with their practical application.

In an attempt to prepare organotin carboxylates which would have monomeric structure both in solid and solution phases, we selected the phenoxyacetic acid and it's substituted derivatives as the ligands.We hoped that the Lewis basicity of the phenoxy oxygen atom would be sufficient for formation of intramolecular co-ordinate bond with the organotin residue leading to monomeric species in preference to the normally observed polymeric ones.

Although this particular objective and our aspiration could not be realised in full, yet in this course of our detailed and systematic work, we have been able to synthesise tri- and di-organotin aryloxyacetates having very interesting structural features as well as very significant biocidal characteristics.

The work presented in this thesis is divided into four chapters.

In Chapter - I, a brief review of organotin carboxylates with reference to their methods of preparation, physical and chemical properties, biological characteristics and structures (including major instrumental methods for determining the structures) have been discussed.

In Chapter - II, a short review of the phenoxyalkanoic acids and their metal complexes have been presented.

In Chapter - III, we have described preparation of a large number of tri- and di-organotin (IV) aryloxyacetates. The structures of the compounds in solid state and in solution have been deduced from IR, NMR (^{13}C, ^{17}O and ^{119}Sn), ^{119m}Sn Mössbauer and UV spectral data. In solid state, the triorganotin (IV) compounds form polymeric chains with bidentate bridging carboxyl groups. In non-coordinating solvents, these compounds are present as pseudo-tetrahedral molecules, whereas in a co-ordinating solvent they form complexes with

one solvent molecule, the central tin atom exhibiting the trans-trigonally bipyramidal coordination. The diorganotin (IV) compounds form, both in solid state and in non-coordinating solvents, monomeric molecules containing bidentate asymmetrically chelated carboxyl groups. In coordinating solvent, they form complexes with octahedral coordination around the tin atom.

In Chapter - IV, a few studies for evaluating the biological properties of the organotin derivatives have been presented. It has been found that organostannylation increases the biocidal properties of the parent carboxylic acids significantly. It also appears that the biocidal activities of the organotin component and the carboxylic acid substrate are mutually complemented resulting in the much enhanced activity of the organotin aryloxyacetates.