

P R E F A C E

The present investigation carried out on Organotin Carboxylates is divided into the following five chapters:

Chapter 1 :

The first chapter of this dissertation deals with a brief overall literature survey relating to organotin compounds in general, specially highlighting the developments in the field of organotin carboxylates. Specific classes of compounds, related to the present investigation, have been reviewed in appropriate chapters.

Chapter 2 :

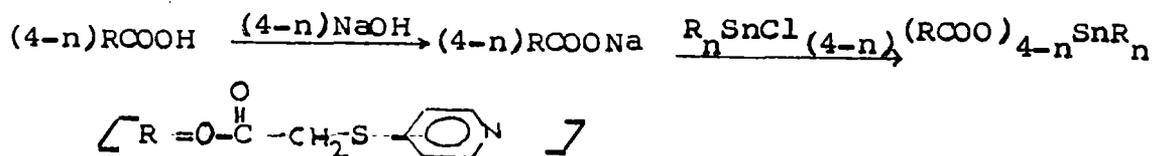
This chapter deals with the synthesis of first transition series metal complexes of (4-pyridyl thio) acetic acid and (2-pyrimidyl thio) acetic acid. The new complexes were synthesised to examine the binding mode of the two ligands with metals, the change in their biocidal activity upon complexation and to compare the structural aspects and biocidal properties of these transition metal complexes with the organotin (IV) complexes of the same. [The organotin (IV) (4-pyridyl thio) acetates will be discussed in third chapter .]

(IV)

The complexes were synthesised by stirring a mixture of metal chloride or sulphate solution and sodium salt of the ligand acid in methanol or ethanol-water mixture and are characterised on the basis of elemental analyses, Infrared spectra and magnetic moment. The complexes are probably the examples of low spin type having bidentate carboxylate as well as $\text{SO}_4^{=}$ groups in the coordination spheres.

Chapter 3:

This chapter describes the syntheses of organotin (IV) esters of (4-pyridyl thio) acetic acid. In addition to the -COO group, the ligand contains 'N' atom as well as 'S' atom as donors. The reactions were carried out using the following route:



The reactions were carried out in dry methanol, in appropriate ratios of reactants as detailed in relevant sections. All the new compounds were characterised and found to be air stable.

Fungicidal activity and phytotoxicity of these compounds have been discussed in this chapter.

Chapter 4 :

This chapter deals with the synthesis, characterisation and biocidal properties of the products from the reactions of phenyl thio hydantoic acid, $\text{Ph-N} = \overset{\text{NH}_2}{\underset{|}{\text{C}}}\text{-SCH}_2\text{COOH}$, with organotin (IV) oxides or hydroxides. Phenyl thio hydantoic acid did not bind the organotin group through the expected carboxylate moiety. Instead an entirely different series of organotin compounds containing Sn-S bond were obtained. On the basis of physical methods of analysis including X-ray crystallographic studies on two of the compounds, namely $\text{C}_3\text{Sn}(\text{SCH}_2\text{CONHPh})$ and $\text{Bu}_2\text{Sn}(\text{SCH}_2\text{CONHPh})_2$ the rearrangement of the ligand during the reaction with the loss of one 'N' atom has been confirmed and the tentative reaction sequences have been proposed.

Biocidal activity patterns are presented for a selection of the new compounds.

Chapter 5 :

The last chapter describes the syntheses of new organotin (IV) hydantoates. Syntheses of the compounds were done by heating under reflux the mixture of the respective organotin (IV) oxide or hydroxide and hydantoic acid in benzene and azeotropically distilling off the water

formed. The compounds have been characterised on the basis of elemental analyses, IR, NMR and X-ray crystallographic studies. The structure of $\left[\text{Ph}_3\text{SnOCOCH}_2\text{NHCOONH}_2 \right]$ is polymeric owing to the presence of bridging hydantoate ligands. And the structure of $\left[\text{Cy}_3\text{SnOCOCH}_2\text{NHCOONH}_2 \right]$ is the isolated, distorted tetrahedral arrangement.

The results of fungitoxicity and phytotoxicity studies have been presented in this chapter.