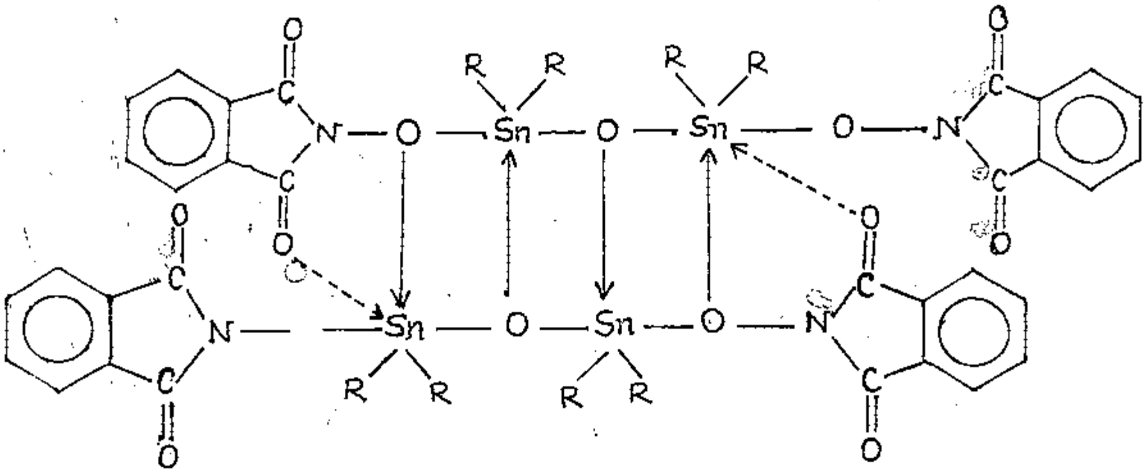
SUMMARY

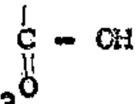
Organotin Chemistry during the last few decades has become very important for its diverse applications. Both from theoretical consideration and practical applications, organotin chemistry has assumed a very significant role in the study of organometallic chemistry.

The present investigation has been divided into three parts. The Part I of this investigation described the preparation and characterisation of few organotin derivatives of N-hydroxy phthalimide and N-hydroxy succinimide. A brief review of the earlier literature relevant to current investigations has been attempted in the beginning of each part of this thesis. As indicated earlier, the first part described the organotin derivatives of N-hydroxy, phthalimide and N-hydroxy succinimide. The triorganotin derivatives of these hydroxamic acids gave monomeric compounds, as indicated from their molecular weight. The elemental analyses and ^{1}H NMR spectral data indicate the molecular composition of these compounds as described later. The IR spectra together with ^{13}C NMR spectra suggest these compounds are of ester type. The carbonyl groups do not significantly coordinates with tin atom. The ^{119}Sn NMR spectra also support the tetra coordinating nature of tin atom in these compounds.

During the preparation of di organotin derivatives of the above mention hydroxamic acids, it was found the diorganotin moieties contain Sn-O-Sn bonds. Moreover, these compounds are probably polymeric in nature. The presence of Sn-O-Sn bond has been indicated from a band around 576 cm^{-1} in the infrared spectra. The elemental analyses and ^{1}H and ^{13} NMR spectra suggest the diorganotin derivatives of the following type, e.g.



The carbonyl groups may form intermolecular coordination of the tin atoms, making some tin atoms penta coordinate while some tin atoms are hexa coordinate. The contention has been supported by the ^{119}Sn NMR data e.g. in Tetrabutyl 1:3 di-N-hydroxy phthalimido distannoxane, there are two ^{119}Sn peaks at δ -164.46 and -218.87. Attempts have been made to discuss the structures of these type of diorganotin derivatives. The IR spectra and ^{13}C NMR spectra of these compounds probably exclude the possibility of intramolecular carbonyl coordination.

In the second part of these few organotin derivatives diphenyl glycolic acid have been prepared. It was not possible to prepare any triorganotin derivatives of diphenyl glycolic acid. When the reactions of tri organotin chloride were carried out with diphenyl glycolic acid under suitable conditions, only diorganotin derivatives could be obtained. Dimethyltin, dibutyl tin, di propyl tin, dibenzyl tin, diphenyl tin and dicyclohexyl tin derivatives of diphenyl glycolic acids have been prepared. These compounds have been characterised by elemental analyses, IR, NMR (^{1}H, ^{13}C, ^{119}Sn) spectra. The IR spectra indicate both the hydroxylic protons are replaced by organotin moieties. The shifting of carbonyl band indicates strong coordination from  $\underset{\underset{O}{\|}}{\overset{|}{C}} - OH$ group in addition of the replacement of the proton. The ^{13}C NMR spectra also support this contention. The ^{119}Sn spectra suggest the penta coordinating nature of tin in these compounds. But only in case of dimethyl tin derivative of diphenyl glycolic acid, elemental and spectral data suggest that two diphenyl glycolic acid molecule reacted with one molecule of dimethyl tin oxide giving Dimethyl tin bis (diphenyl glycolate). Carbonyl absorption band in the IR spectra is less shifted compared to other diorganotin derivative, suggesting no coordination from the $>C = O$ group of carboxylic acid. ^{119}Sn signal also indicates hexa coordinating tin atom. In absence of X-ray data, for which, there was no facility, the structures suggested may be considered somewhat tentative.

The third part of this dissertation described some preliminary results of fungicidal, seed germination studies and acaricidal properties of some of the compounds described in earlier part. It is well known that tri organotin compounds, particularly the tributyl and tri phenyl tin compounds show excellent fungicidal properties. Tri phenyl tin N-hydroxy succinimide and Tributyl tin N-hydroxy phthalimide have tested against two commercially important fungi, *Alternaria solani* and *Helminthosporium oryzae* . All these compounds showed excellent fungicidal properties against these two fungi. The ED_{95} values ranged between 0.69 - 1.90 µg/ml (72 hrs) for *Alternaria solani*, compared to Tributyl tin acetate which has ED_{95} value of 0.96 µg/ml (72 hrs). In case of *Helminthosporium oryzae* the ED_{95} values were 2.22 - 6.38 µg/ml (72 hrs) compared to Tributyltin acetate 0.96 µg/ml (72 hrs).

The effect of these compounds on the germination of rice seeds have also been studied on a preliminary scale.

The acaricidal properties of Tricyclohexyl tin N-hydroxy phthalimide. Tetra cyclohexyl 1:3 di N-hydroxy succinimido distannoxane, dicyclohexyl tin diphenyl glycolate were studied against some green mite. Compared to 'Plictran (active ingredient Tricyclohexyl tin hydroxide), these showed reduced acaricidal properties.