S Y N O P S I S

Many underdeveloped and developing countries are facing acute food shortages due to the population explosion. Therefore, it is ironic that substantial amounts of foods are lost due to mite attack at various stages of production and storage. Plant protection measures are hopelessly inadequate in many of these countries. Development of new miticides and its application technique should be a continuing process. An ideal miticide among other properties should have high miticidal activity with minimal amount of phytotoxicity, as the plant mites are one of the serious pest and the miticide is to be applied to the plants. Moreover, it should not create any serious environmental problems. Organotin compounds in recent years are gaining increasing popularity in many countries as effective and suitable miticides.

In the current investigation, a short resume of the toxicology, environmental aspects and diverse biocidal application of organotin compounds in the fields of agriculture, wood preservation, anti fouling, mollusc control etc. have been given, which has been followed by a detailed account of organotin miticidal application along with a brief review on the control of both adult and eggs and resistance development of various mites with other classes of chemicals have been given.

Though the application of simple organotin compounds are fairly established, very little work has been done so far, regarding the biocidal properties of organotin co-ordination

compounds. The present investigation is an attempt to find the effect of coordination by some ligands with organotin moieties with respect to their biological activity.

The miticidal activity of a compound R_3SnX, would be maximum when R = cyclohexyltin or neophyltin. In the first part few organotin coordination compounds were prepared where R = Cyclohexyl and X = succinyl bis-N-phenyl hydroxamate, glutary bis-N-phenyl hydroxamate, oxalyl-bis-N-phenyl hydroxamate, N-hydroxy succinimide N-hydroxy phthalimide, 8-hydroxyquinoline (oxine), phthalimide.

In the second part the above mentioned compounds along with commercial organotin miticide 'Plictran' were screened for their contact-toxicities by Slide-Dip method against Tetranychus telarius, Oligonychus coffeae and Brevipalpus obovatus. The LC_{95} values indicated that for T. telarius Plictran was the most effective (LC_{95} = 22.37 μg/ml after 72 hours) and bis (Tricyclohexyltin) succinyl bis-N-phenyl hydroxamate, bis (Tricyclohexyltin) glutaryl bis-N-phenyl hydroxamate showed close toxicity (LC_{95} after 72 hours are 28.75 and 37.03 μg/ml respectively). Tricyclohexyltin diphenylcarbazone showed least toxicity with an LC_{95} value of 919.80 μg/ml. For O. coffeae, Plictran was the best in effectiveness but others like bis (Tricyclohexyltin) succinyl bis-N-phenyl hydroxamate, Tricyclohexyltin oxine, Tricyclohexyltin phthalimide also proved to be effective. In case of B. obovatus although the toxicities were less than the previous cases but again Plictran was the most

effective compound followed by bis (Tricyclohexyltin) succinyl bis-N-phenyl hydroxamate, Dicyclohexyltin oxalyl bis-N-phenyl hydroxamate. Other compounds showed moderate toxicities.

In third part the compounds were tested for their contact plus stomach toxicities against T. telrarius, O. coffae, B. obovatus, P. harti. In case of all genera Plictran proved to be the best, and bis (Tricyclohexyltin) succinyl bis-N-phenyl hydroxamate ranked second in effecitveness. Tricyclohexyltin diphenylcarbzone were very poor in activity in all the cases excepting against O. coffae where it showed moderate toxicity.

In the fourth part stomach toxicities were evaluated by exposing mites on the treated leaf surfaces. The LC_{95} values obtained after 72 hours indicated that the compounds had very poor stomach toxicities compared to contact and contact plus stomach toxicities. Although the LC_{95} values of T. telarius and O. coffae indicated their susceptibility but B. obovatus and P. harti gave comparatively high LC_{95} values for almost all the compounds.

As it is very important to kill the eggs of the mites along with their mobile stages to check reinfestation, the compounds were tried for their ovicidal activities in the last part against T. telarius and O. coffae. Almost all the compounds showed remarkable ovicidal activities from fourth to sixth day of the trreatment. Plictran showed best results in both the cases, but bis (Tricyclohexyltin) succinyl bis-N-phenyl hydroxamate, bis (Tricyclohexyltin) glutaryl bis-N-phenyl hydroxamate, Tricyclohexyltin oxine, Tricyclohexyltin phthalimide also showed comparable activity. The results have been summarised in Table - A & B.

Results so far obtained indicate that the coordination of ligands to the cyclohexyltin moieties may reduce the acaricidal activities, though in some cases, such reductions were marginal if we consider the percentage of tin in the compound. But in some cases, the coordination of ligands may reduce the acaricidal activities to a very marked extent. It is the nature of the organic ligand that possibly control the ultimate nature of biological activities of triorganotin compounds. So far it was not possible to suggest which type of ligands are likely to affect the biological activities of triorganotin compounds upto a very large extent.