SUMMARY

Acute toxicities of the organophosphorus pesticides malathion and methyl parathion were carried out for the period of 96 h. The animals used for toxicity tests were the prawns, Macrobrachium kisneri; the snails, Bellamya bengalensis and the fish, Labeo rohita. Acute toxicity tests revealed that the prawns were the most sensitive species to the pesticides malathion and methyl parathion among the three animals tested. The snails exhibited intermediate sensitivity and the fish showed minimum sensitivity to these pesticides. It was also observed that the animals showed variation in sensitivity to both these pesticides. Methyl parathion is found to be more toxic than malathion to all the three aquatic animals tested.

In the second set of experiments, fishes were kept in sublethal concentration of pesticides (1 ppm malathion and 0.5 ppm Methyl parathion) in static water model ecosystem, over a period of 28 days to study the accumulation, biodegradation of pesticides in aquatic ecosystem and oxygen consumption.

Residues of malathion and methyl parathion in
water, soil, plant and the animals, *Bellamya bengalensis* and *Labeo rohita* were determined colorimetrically after 1 hour, 7, 14, 21 and 28 days exposure by the modified method of Getz and Watts (1964), as given by Jain et al. (1974).

Accumulation studies revealed that malathion degrades faster in all the components of freshwater ecosystem than methyl parathion. Both pesticides have short life in water and soil. However, the methyl parathion was found to be more stable in water than malathion. Both the pesticides degraded faster in soil than in water, which may probably be due to the presence of microbes in soil. Hence the accumulation of both the pesticides in soil was found to be less than in water.

Accumulation of both the pesticides studied was found to be more in fishes and snails than in aquatic plant, *Vallisneria*. The results also showed that the rate of degradation of both the pesticides in the fish, *Labeo rohita* was higher than in the snail, *Bellamya bengalensis*. This might be due to difference in physiological activities of the snail and the fish. The rate of the degradation of both the pesticides in snail, *Bellamya bengalensis* was found to be slow.
Therefore, these pesticides are seem to be more toxic to the snails than to the fish. More accumulation of both the pesticides in fish body was observed. It may be due to direct contact of the gills with water. The quantity of residues of pesticides in animal tissues depends on their concentration in water and the volume of such water passed over the gills.

Biodegradation of pesticides in the snail, *Bellamya bengalensis* and the fish, *Labeo rohita* was studied by thin layer chromatography. Both the pesticides malathion and methyl parathion degraded into different metabolites in the various tissues. Maximum number of metabolites of both the pesticides were observed in the hepatopancreas of the snail, *Bellamya bengalensis* and the liver of the fish, *Labeo rohita*. The results indicate that detoxification of pesticides takes place in these tissues. However a less number of metabolites were observed in kidney of these animals, indicating the disposal of water soluble metabolites through kidney.

The snails and the fishes exposed to sublethal concentration of methyl parathion resulted into an occurrence of one metabolite in their kidney even after 28 days exposure but in case of malathion exposed animals the metabolites
were not detected in kidneys after 28 days. These results indicate that methyl parathion is more toxic than malathion.

The metabolites malaoxon and methyl paraoxon of malathion and methyl parathion respectively were found to be more toxic than their parent forms. The malathion and methyl parathion were degraded in to their less toxic metabolites in aquatic ecosystem. The difference in the number of metabolites and the variations in the accumulation of the pesticides and their metabolites in different tissues of the snail, *Bellamya bengalensis* and the fish, *Labeo rohita* may be due to the functional differences of various tissues, their capacity to detoxify the pesticide, amount of enzyme acetylcholinesterase and the total fat content of the tissue.

Oxygen consumption in the snail, *Bellamya bengalensis* and the fish, *Labeo rohita* exposed to sublethal concentrations of the pesticides malathion and methyl parathion was inversely proportional to the amount of residue accumulated in their tissues. However, the pesticide methyl parathion due to its high toxic activity and more level of persistence in biological systems under average conditions may create potential hazards to aquatic animals, humanbeings and other higher forms of life.