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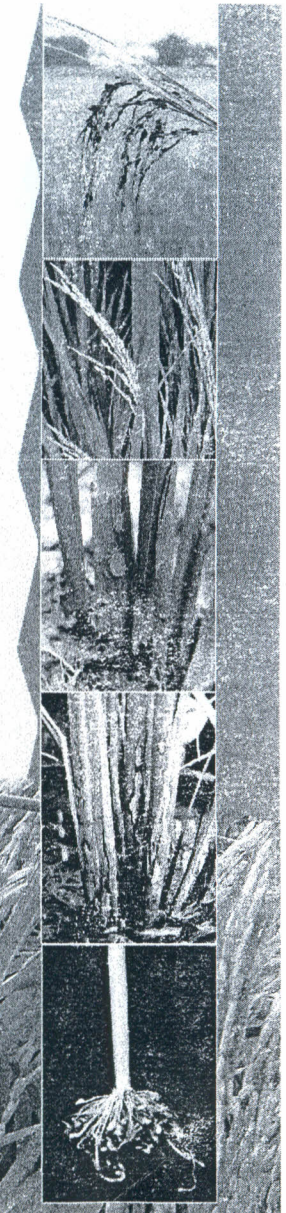

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Pesticide residue analysis in rice

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Despite the beneficial effects, there is genuine concern over the use of pesticides and its impact to non target organisms especially human being. This is because small amounts of pesticide residues may remain in the crops, either resulted from the direct use of pesticides on the crops or environmental contamination. It has been observed pesticide residue in human beings comes through food commodities.

The Codex Alimentarius has laid down the definitions of pesticide and pesticide residues. According to it "Pesticide" means any substance intended for preventing, destroying, attracting, repelling, or controlling any pest including unwanted species of plants or animals during the production, storage, transport, distribution and processing of food, agricultural commodities, or animal feeds or which may be administered to animals for the control of ectoparasites. The term includes substances intended for use as a plant growth regulator, defoliant, desiccant, fruit thinning agent, or sprouting inhibitor and substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport. The term normally excludes fertilizers, plant and animal nutrients, food additives and animal drugs. "Pesticide residue" means any specified substance in food, agricultural commodities, or animal feed resulting from the use of pesticide. The term includes any derivatives of a pesticide, such as conversion products, metabolites, reaction products, and impurities considered to be of toxicological significance.

Rice, a prevalent crop in South East Asia is attacked by number of pests due to favourable climatic conditions. There by rice consumes a huge quantity of pesticides to prevent/ recover from pest attack. In India, Central Insecticide Board and Registration Committee has recommended 90 pesticides or combination product for rice to tackle wide range of pest problem. India, consumes around 500 g a.i. ha^{-1} of pesticides, one of the lowest consumption compare to other countries. But pesticide poisoning as well as non-judicious use of pesticides are making a great havoc in environment and health. It is pertaining to know the concentration of pesticides present in different matrices after it has been discharged to the environment. Rice ecosystem is complex one, where pesticides distributed in different matrices depending upon the characteristics of pesticides, soil as well as weather pattern.

Distribution of pesticides

The release of pesticides into the environment may be followed by a very complex series of events which can transport the pesticide through the air or water, into the ground or even into living organisms. Pesticides which are sprayed can move through the air and may eventually end up in other parts of the environment, such as in soil or water. Pesticides which are applied directly to the soil may either washed off into nearby water bodies or may percolate to lower soil layers and groundwater. The application of pesticides directly to bodies of water for weed control, or indirectly as a result of leaching contaminates water. Pesticides are consumed by human being through contaminated food, water, etc. Bio-magnifications and bio-concentrations of pesticide have role in distribution of pesticides in food chain.

Steps in pesticide residue analysis

Pesticide residue analysis from any environmental matrices consists of following steps, namely sampling, extraction, clean up, measurement and interpretation (Fig.-1). The result of any