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Importance of Phosphate Pesticides

Katta Eswar Srikanth

Department of Physics, DNR College, Bhimavaram, Andhra Pradesh-534202, India

Editorial Note

Since 1950 exponential rise in the population around the world increased the demand for food grains/crops with limited expansion of the agricultural land. Pesticides are widely used in agriculture without paying much heed to the consequences of its unregulated and indiscriminate use. Detection of pesticides and their degradation products in soil water and air at relevant levels have invoked public concern and are responsible for the adverse effects of pesticides to target and non-target organisms environmentally. The persistence, bioaccumulative, and toxic nature of agrochemical is responsible for different eco-toxicity. Some pesticides last as long as the environment (like DDT, chlordane). More specifically, the developing and agriculture-based countries like India consume much higher quantities of these chemicals. Organophosphate pesticides are the most widely used as one of the cheapest pesticides. Many active ingredients (chlorpyrifos and Malathion) that are potentially dangerous to health are routinely found in food, breast milk. An aquatic environment is often the final destination of many contaminants. European regulations also require the bioconcentration factor (BCF) values for registration of compounds for their safety management of concentration in water and the intern facilitates the daily intake of fish (European Commission Environment Directorate-General, 2007).

Bioconcentration is a hazard itself without acute or chronic toxicity. In environmental assessments of the aquatic compartment, the chemical property of interest in modeling fate and persistence of chemicals in the environment is bioconcentration factor (BCF). This indicates partitioning of compounds between organisms and the surrounding environment. Experimental determination of BCF is an expensive and time-consuming process. Much attention was given to the *in-silico* techniques like QSAR methodology which establish the relationship between molecular structures with molecular property statistically and these non-animal models are being adopted by different regulatory agencies (REACH; EC No 1907/2006) for filling up the data gaps for different ecotoxicological endpoints including BCF for compounds without value for specific endpoints. *In-silico* QSAR/QSPR models play a pivotal role in recent aspects to reduce the enormous cost to perform the BCF test according to OECD 305 guidelines as well as to fill the data gaps. Therefore, investigation BCF of pesticides is of utmost importance in recent scenarios.

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Address for Correspondence: *Katta Eswar Srikanth, Department of Physics, DNR College, Bhimavaram, Andhra Pradesh-534202, India, E-mail: eswarsrikanth.katta@gmail.com*

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