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Comparative study of different analytical techniques available to detect organophosphates and organochlorides

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Statement of the Problem: Pesticides, which may be chemical or biological agents, are most commonly used as plant or crop protection product which protects the plant from damaging influences of weed and insects. Among the pesticides used, organophosphates are the most widely used. OP operates through inhibiting the enzyme acetyl cholinesterase. Most herbicides reach a destination other than target species, including non-target species, air, water and soil. OP has adverse effects on non-target organisms' species populations, water contamination and air pollution crop injury due to high application rates, wrong application timing or unfavorable environmental conditions. Over time, repeated application this increases pest resistance, while its effects on other species can facilitate the pest's resurgence.

Methodology & Theoretical Orientation: There are many laboratory based analytical methods which are commonly used for the determination of OP pesticides. These include gas chromatography, high-performance liquid chromatography (HPLC), capillary electrophoresis, mass spectrometry and thermospray-mass spectrometry. Biosensors are categorized according to the basic principles of signal transduction and bio-recognition elements. According to the transducing elements, biosensors can be classified into various types- electrochemical, optical, piezoelectric and thermal.

Findings: No product based on impedance-based biosensors has enjoyed widespread commercial success. The need for rapid and cost effective analytical methods for field analysis of organophosphates pesticides has developed many techniques in which few are bio-analytical in nature. These techniques are based on inhibition assay and immunoassay.

Conclusion & Significance: Although commonly used laboratory methods to detect and measure these OP pesticides can measure a wide variety of pesticides, they are typically expensive and time consuming. Laboratory based methods which often require turn-around times of several weeks are not amenable to remediation and bioremediation process monitoring where rapid analysis times are essential.

Biography

Khushboo Tripathi has specialized in Biotechnology, trained at SBL laboratories, recombinant DNA technology, SDS PAGE, ELISA, micropropagation, blotting technique and worked on a project titled "Marker assisted selection of rice breed (DNA MARKERS)" at Gandhi Krishi Vigyan Kendra, Bangalore. Her current area of research deals with the benefit of employing various proteins in agricultural sectors. Her passion to serve the society by bringing the development in rural and agricultural sector has been driving the interest to continue doing research for the benefit of mankind.

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