A MODEL STUDY ON APPLICABILITY OF ELECTROCHEMICAL METHOD FOR DETECTION OF PROPANIL, IN ENVIRONMENTAL ANALYSIS

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Pesticide pollution has become a great hazard to both physical environment and biosphere. Available monitoring methods such as gas chromatography and spectrophotometry have become limited, as they are very expensive and complicated. Electrochemical methods may prove to be suitable alternatives, due to their simplicity and inexpensiveness; however applicability of such methods in real situations is still in question. In this study that possibility was investigated, using Propanil, a widely used organochlorine herbicide used in rice cultivation.

Amperometric experiments with standard solutions of propanil using Fe (III) TPPCl modified carbon electrodes in 3:1 CH_3CN: H_2O medium, resulted in smooth amperograms used to construct working curves. The soil leached effluent water was collected from a model rice bed prepared in a polytunnel, after application of propanil to the soil. The water samples collected at different time intervals, 0.00, 0.50, 1.00, 2.00, 4.00, 6.00, 8.00 hours were tested amperometrically. The concentration of propanil at each test were, $6.5 \pm 0.06 \times 10^{-3}$, $5.2 \pm 0.05 \times 10^{-3}$, $3.4 \pm 0.05 \times 10^{-3}$, $1.5 \pm 0.05 \times 10^{-3}$, $7.5 \pm 0.07 \times 10^{-4}$, $3.5 \pm 0.09 \times 10^{-4}$, $3.2 \pm 0.09 \times 10^{-4}$ respectively. No detectable levels of propanil were found in samples obtain after 8 hrs.

A pre-concentration step was coupled to enhance the sensitivity of detection. A volume of 1L standard solution of propanil at 1.0×10^{-6} mol/ L concentration, prepared in water was passed through a column packed with silica gel 60 (230- 400 mesh), flow rate of 5 cm^3/ min, flushed with 100 cm^3 solution of 5% ethanol: acetone, which was later evaporated to a dry residue, which was dissolved in 2 cm^3 of 3:1 CH_3CN: H_2O solution, tested amperometrically. In comparison to the zero response observed, prior to applying pre-concentration step a measurable signal was obtained for the pre-concentrated sample

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