

Electroanalytical Sensor for Pesticides

Pesticides are being used in large quantities to increase the agricultural productions. As a result, the soil and water bodies are contaminated by the residual pesticides which are harmful to the living things. In order to protect the environment the residual pesticides have to be either removed or the concentration should be lowered to the acceptable limits. The first step in the process of detoxification of pesticides in the environment is the sensing and determination of the concentration of pesticides. Chromatographic, Spectroscopic and Electroanalytical methods are available for the sensing and determination of pesticides.

The Electroanalytical method offers advantages over other methods in the following respects namely 1) low cost 2) short response time 3) better selectivity 4) better sensitivity 5) minimum solvents are required and 6) portable sensing instrument suitable for analysis in field condition.

Pesticide Analyser V 1.0



Pesticide analyzer has been designed and developed to carry out amperometric detection of pesticides of trace level concentration in micro molar units. The instrument is

comprised of two parts: an amperometric interface unit and a display unit. With suitable signal conditioning circuits, the instrument applies a required excitation potential (or sensor activation potential) to working electrode of the three electrode electrochemical pesticide sensor, and as its result, the sensor's output current which is very low in amplitude in the order of hundreds of nano amperes / micro amperes, is measured and displayed using the 3 1/2 digit display unit. The instrument with its amperometric interface unit accomplishes measurement of trace level cell current proportional to the pesticide concentration under controlled potential condition.

Any value of cell potential ranging between + 2 V and -2V, can be so chosen as to suit the type of pesticide selected for measurement, using the rear side potentiometer of the instrument. With the consistent real time experimental pesticide measurements, the instrument proves to be well with in its operational specifications.

Pesticide Analyser V 2.0



Pesticide analyzer V 2.0 has been designed and developed using ARM 7 processor based amperometric detection of pesticides of trace level concentration in micro molar units. With incorporation of suitable hardware and software sub-routines, the instrument renders the following advanced features:

- 1) Programmable Measurement time using the front panel key pad.
- 2) On-line display of V_{cell} , I_{cell} , Time_{started} and experimental Time.

3) On-line display of the I_d (Differential amperometric current at the end of amperometric measurements).

4) Display of concentration of pesticides.

Methylparathion, Parathion, Fenitrothion, Imidacloprid, HCH, Chlorpyrifos and Paraoxon have been tested using Glassy carbon modified electrodes on this sensing instrument.