E2-56 Electroanalytical sensor for the detection of Grenade 5 EC (Cyhalothrin)

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Grenade 5 EC is an insecticide and used to control animal ectoparasites, especially *Boophilus microplus* on cattle. The active ingredient of Grenade is cyhalothrin (3 - (2 – chloro - 3, 3, 3 - trifluoro – 1 - propenyl) - 2, 2-dimethylcyclopropanecarboxylic acid cyano (3-phenoxyphenyl)methyl ester). Cyhalothrin is highly poisonous and the LD_{50} value is (orally in male rats) 243 mg/kg.

Cyclic voltammetric experiments conducted for 1.75×10^{-6} mol dm^{-3} of Grenade in an aqueous solution of 0.1 mol dm^{-3} NaCl (as an electrolyte) showed an oxidation peak at the potential +0.86 V at bare glassy carbon electrode versus saturated calomel electrode (potential was scanned from 0.0 to +1.0 V). The scan rate dependence study of constant concentration of Grenade (1.75×10^{-6} mol dm^{-3}) also yielded a straight line between log of the peak currents (log ip/mA) and the log of scan rate (log v/mV s^{-1}) with a slope of 0.47.

Amperometric experiments conducted at bare glassy carbon electrode with the sequential addition of 0.1 cm^3 of 0.4×10^{-3} mol dm^{-3} Grenade at the optimized potential of +1.0 V versus saturated calomel electrode interfered with the noise level. This problem could be overcome by applying a thin coating of non electroactive stearic acid (1% w/v in CH_2Cl_2) on the electrode surface (by dip coating) and consequently the noise level was reduced remarkably.

The linear dynamic range of the sensor for the detection of Grenade was 1.75×10^{-6} mol dm^{-3} - 13.6×10^{-6} mol dm^{-3}.

Financial assistance by NARESA (Research grant RG/96/C/02) is acknowledged.