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Electroanalytical chemistry of Bispiribac Sodium

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Bispiribac sodium (sodium 2,6-bis[(4,6dimethoxypyrimidin-2-yl)oxy]Benzoate) is a post emergence pyrimidinyl oxybenzoic acid herbicide used to control grasses, sedge and broad - leaved weeds, especially Echinochloa spp in directly seeded rice. In this research preliminary electrochemical characterization was done using cyclic voltammetry and steady state amperometry.

Cyclic voltammetric experiments of 0.1 mol dm^{-3} Bispiribac sodium in water of 0.1 mol dm^{-3} NaCl showed a reduction peak at potential -0.506 V vs. the saturated calomel. Scan rate dependency studies at constant concentration of Bispiribac sodium yielded a straight line when log of the peak current (log ip) was plotted against the log of the scan rate (log □) with the slope of 0.56.The above cyclic voltametric characteristics indicate the irreversible electrochemistry of Bispiribac sodium and the slope of 0.56 for the plot of log ip vs. log v supports the fact that electrochemistry of the bispirsbac sodium is diffusion controlled. pH dependency of Bispiribac sodium reduction was showed that at acidic medium (pH 3, 4) it forms a white precipitate and at higher pH's (greater than pH 7) it undergoes electrochemical reduction.

The optimum operational potential for the amperometric experiments was found to be -0.506 V with respect to saturated calomel reference electrode and amperometric measurements at the above potential showed there is a rapid reduction with the sequential addition of Bispiribac sodium at bare glassy carbon electrode.

ATR-FTIR (Attenuated Total Reflection Fourier Transformation Infrared Spectroscopy) analysis before and after the electrochemical reduction showed that the peak around 3300 cm^{-1} is shifted to 3500cm^{-1}after the electrochemical reduction and there are no significant changes in other functional groups. Therefore it can be suggested that the peak lies at 3500 cm^{-1} is characteristic to the carboxylic group and it has reduced electrochemically.

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