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Abstract

Molecularly imprinted polymers (MIPs) for phosmet insecticide were synthesized by batch polymerization. The affinity of functional monomers to phosmet was tested using an original method involving an electrochemical biosensor based on acetylcholinesterase inhibition. It was demonstrated that association of phosmet with appropriate functional monomers resulted in a decrease of enzyme inhibition. Using this method, it was shown that N,N-methylenebis(acrylamide) displayed the highest interactions with phosmet using DMSO as solvent. These results were in good accordance with those obtained by conventional computational modeling. Molecularly imprinted polymers (MIPs) and non-imprinted polymers (NIPs) were synthesized and adsorption isotherms were studied to describe their interaction with phosmet. Freundlich isotherm was able to fit phosmet adsorption on MIPs with good agreement (R^2 = 0.9). The pre-exponential factor K_F determined for MIPs was 1.439 $mg^{(1-N)}.g^{-1}.L^N$, more that 10 times higher than for NIPs (0.125 $mg^{(1-N)}.g^{-1}.L^N$, indicating an increase of binding sites number and average affinity.