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Bioanalytical Method: Determining pesticide residues in tomatoes and mushrooms by a bioactive membrane-based sensor, enzyme inhibition, and UV-Vis Spectrophotometry

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ABSTRACT

Pesticides play a vital part in crop production. The present study intends to develop a bioactive membrane-based sensor based on enzyme inhibition for determining pesticide residues. The absorbance (AU) of samples is determined by UV-Vis spectrophotometry. It also aims to study the stability of the enzyme extract at various concentrations. To immobilize the enzyme, different mediums like cellulose, chitosan, guar gum, and cellulose with guar gum are considered for finding an effective membrane. Findings reveal the efficiency of the biosensor in detecting the pesticide residues from tomatoes and mushrooms by finding tomatoes with 0.01M Malathion showed a high absorbance rate of 0.97, 20 times diluted Tyrosinase extract from mushrooms showed maximum absorption of 0.55, and aluminum oxide in tomatoes has explored an absorbance rate of 0.96 at 0.1M concentration. So, the aluminum oxide in tomatoes has explored a high absorbance rate. The LOD, LOQ, RSD, linear range and sensor recovery were obtained for different pesticides. The RSD (%), LOD, and LOQ for these pesticides are obtained at (1.155, 1.81, 2.09 mmol L^{-1}), (3.81, 5.973, 6.897 mmol L^{-1}), and (11.55, 18.8,