

**DETERMINATION OF NEUROTOXIC PESTICIDE
RESIDUES IN VEGETABLES BY USING RAPID
BIOASSAY METHOD**

A dissertation submitted to the
Faculty of Animal Science and Export Agriculture
Uva Wellassa University
In partial fulfillment of the requirements for the award of
Bachelor of Science in Export Agriculture

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2018

ABSTRACT

Pesticide residues in vegetables are determined by expensive and time consuming laboratory techniques. An experiment was conducted to develop a rapid and cost effective protocol for the analysis of pesticide residues in vegetables through Rapid Bioassay of Pesticides Residues (RBPR) method. RBPR is a method that integrates with acetyl cholinesterase (AChE) test to screen the residues of AChE inhibiting neurotoxic pesticides. In this study, 48 vegetable samples (30 non-organic from Kandy central market in Sri Lanka and 18 organics from home gardens) including cabbage, bean, and carrot were tested for pesticide residues of carbosulfan, diazinon and profenofos using RBPR. AChE was extracted from melon flies (*Bactrocera cucurbitae*) brain using standard protocol and its inhibition was tested. The inhibition of AChE was assessed by determining the reductions of absorbance in contaminated sample after a fixed reaction period. Calibration curves were developed for each pesticide separately and used for vegetable sample testing. Inhibition of AChE by vegetable extracts was analysed. The highest residue levels of carbosulfan, diazinon and profenofos were found in cabbage (0.00-0.53, 0.00-0.44 and 0.00-0.58 ppm, respectively) and the lowest values were recorded in carrot (0.00-0.15, 0.00-0.29 and 0.00-0.21 ppm, respectively) although the difference was not significant ($p > 0.05$) among vegetables. No pesticide residues were detected in organic samples. Moreover, the cost of sample testing was approximately Rs. 450.00 per sample. This bioassay technique can be used for initial screening of neurotoxic pesticide residues in vegetables as rapid and cost effective technique.

Keywords: Acetyl-cholinesterase, Neurotoxic insecticide, Rapid bio assay method, Vegetables