QUANTITATIVE AND QUALITATIVE ASSESSMENT OF PESTICIDE RESIDUES IN LARGE-SCALE VEGETABLE PLOTS SURROUNDING THE TEA PLANTATION

A PROJECT REPORT PRESENTED

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ABSTRACT

Vegetables grown in the Nuwara Eiliya region have a great demand. The availability of lands for vegetable cultivation is a major problem as most of the lands are under tea cultivation. Therefore marginal tea lands and some of the good tea lands have been converted for vegetable cultivation. Indiscriminate use of pesticides in vegetable cultivation could contaminate tea as tea fields are in close proximity to vegetable lands. This could tarnish the image of Sri Lankan tea in the world market. In addition to this, indiscriminate use of pesticides is a serious threat to the environment.
Therefore in this study an attempt was made to understand the effects of indiscriminate use of pesticide in large scale vegetable fields on nearby tea fields, made tea and on the environment in and around the vegetable fields.

Three large scale vegetable sites in the Nuwara Eliya area were selected for the study. Tea flush, made tea, vegetables, water and soil were analyzed for the selected pesticides namely, chlorpyrifos-ethyl, diazinon, fipronil and chlorfluazuron. Four analytical methods were tested for the suitability of residue analysis. Hexane: Acetone extraction followed by alumina clean up (method A) gave acceptable recovery levels for flush, made tea and cabbage for both single and multi-residue analysis of chlorpyrifos-ethyl. Method A yielded acceptable recovery levels for the analysis of diazinon in tea flush & cabbage. But for the analysis of diazinon in black tea extraction with ethyl acetate followed by Gel Permeation Chromatography (GPC) clean up (method B) was more suitable. Chlorfluazuron was recovered in acceptable levels by using method A in the analysis of flush and method B in the analysis of made tea and cabbage. Ethyl acetate extraction (method C) was more suitable for the analysis of chlorpyrifos-ethyl in water whereas cyclohexane: acetone extraction followed by florisil cleanup (method D) was more suitable for the analysis of chlorpyrifos-ethyl in soil.
The residue levels of chlorpyrifos-ethyl and diazinon found in made tea were below the Maximum Residue Levels (MRL's) specified by European Union (EU) indicating the use of chlorpyrifos-ethyl and diazinon in vegetable field is not a threat to the tea industry. However chlorpyrifos-ethyl and diazinon residue levels found in cabbage were above the MRL's specified by Sri Lanka Standards Institute (SLSI) and therefore it is important to apply the correct dosage of pesticide and also to follow proper pre-harvest intervals. Chlorfluazuron levels found in made tea was from 0.002ppm to 0.045ppm. Chlorpyrifos-ethyl and diazinon residue levels found in water were above the EU specified limits indicating a potential threat in using chlorpyrifos-ethyl and diazinon in vegetable cultivation to the environment.