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Screening of non-root vegetables for commonly used pesticides in the upcountry region in Sri Lanka

A G P Aravinna*, A M Mubarak, S Wickramaratne and D C Champika
Chemical & Microbiological Laboratory, Industrial Technology Institute, Colombo

Many farmers often use pesticides indiscriminately. They tend to use higher doses than what is usually recommended and do not pay attention to the limits on application during the pre harvesting period. This may be the main reason to detect the pesticide residues in vegetables. In the past, residue levels have occasionally been detected above the Maximum Residue Levels (MRL). In the study, residue levels of 14 pesticides which are commonly used in the up country area were determined in 300 samples including beans (51), leeks (129), cabbage (90) and lettuce (30). Samples were collected from agricultural instructional divisions of Nuwaraeliya, Kandapola, Lindula and Keppetipola in Nuwaraeliya and Welimada divisional secretariat divisions according to a statistical plan.

The samples were extracted by standard method and analyzed by GC/ECD, NPD & MSD and HPLC/DAD. The monitored pesticides and the ranges of their Limit of Quantification (LOQ, as mg kg^{-1}) for the selected crops are imidacloprid (0.02 - 0.04), carbofuran (0.08 - 0.1), carbaryl (0.02 - 0.04), carbosulfan (0.08 - 0.1), chlorpyrifos (0.004 - 0.01), fipronil (0.008 - 0.02), prothiofos (0.008 - 0.02), permethrin (0.01 - 0.02), deltamethrin (0.01 - 0.02), diazinon (0.004 - 0.005), pirimiphos-methyl (0.005 - 0.01), phenthoate (0.01 - 0.01), profenofos (0.008 - 0.02) and fenthion (0.005 - 0.02). Percentage recoveries obtained for all pesticides were in the acceptable range of 70 to 110.

Residues of carbofuran, carbaryl, carbosulfan, prothiofos, diazinon, phenthoate and fenthion were not detected. Residues of chlorpyrifos, profenofos, permethrin fipronil, deltamethrin, imidacloprid, carbaryl and pirimiphos-methyl were detected in 27, 11, 4, 2, 2 1, 1 and 1 number of samples respectively. chlorpyrifos level in four cabbage and three bean samples exceed the Codex MRLs (1 for cabbage & 0.01 for beans in mg kg^{-1}). Even though imidacloprid in cabbage and carbaryl in lettuce were detected, the levels did not exceed the MRLs (0.5 for Imidacloprid & 10 for carbaryl in mg kg^{-1}). Local or international MRLs are not available for 13 pesticide-crop combinations for which residue levels exceeded the LOQs and that is 76% of the total pesticide-crop combinations in which pesticide residues were detected. Therefore it is difficult to predict how safe these vegetables for human health with respect to the pesticide residues. Thus it is very important to generate MRLs for common pesticides for fruit and vegetables consumed in abundance in Sri Lanka.

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*piyalaravinna@yahoo.com Tel: 077 – 3483480