

**PESTICIDE RESIDUE ANALYSIS IN OKRA AND BRINJAL IN
BATTICALOA DISTRICT**



BY

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ABSTRACT

Accretive agriculture sector in the world has led a worldwide concern on food safety and also enforcement of strict pesticide regulations including Sri Lanka due to the uncontrollable heavy use of pesticides by farmers. This indiscriminate use of pesticides leads to the accumulation of pesticide residues in crop produce and cause numerous health and environment impacts. Batticaloa District is located in the Eastern province of Sri Lanka where main livelihood of people is farming and they consume most of the low-country vegetables grown within the district. Farmers in this area are suspected to use synthetic pesticides in high frequencies. Brinjal and Okra are among the major cultivated crops in this study area. Thus, this study was conducted to determine the type of pesticides that are used frequently by farmers, farmers common practices during application of pesticides, analyze the level of pesticide residues and residue levels of banned/restricted pesticide in okra and brinjal.

Questionnaire survey was conducted by using 40 farmers from whom the vegetable samples were collected and the results revealed that none of them followed the recommended practices while applying pesticides and while harvesting. 72.5% of them did not get obtained information regarding pesticides from appropriate information center/source. Diazinon and Profenofos were applied by 25% of okra farmers which are not recommended pesticides for okra and also restricted pesticide Diazinon was used by 15% of okra farmers. Cocktailed mixtures of pesticides were applied by 75% of the farmers. All of them applied pesticides in high frequencies and in high dosages in a manner that it was drastically deviated from the recommended practices.

40 farmer field samples of vegetables (brinjal and okra) and 19 market samples (okra and brinjal) in Batticaloa District were analyzed to determine 20 pesticide residues by using GC/MS/MS system. The samples were extracted according to the AOAC official method 2007.01 by using single step buffered acetonitrile (MeCN) extraction and salting out liquid-liquid partitioning from the water in the sample with MgSO₄. Dispersive-solid-phase extraction (SPE) cleanup was done by using primary secondary amine (PSA) sorbent and MgSO₄; then the extracts were analyzed by GC/MS/MS. Presence of pesticide was confirmed with Retention Time (RT) and Mass Spectrum. Recovery studies were performed at range from 0.01mg/kg to 0.1mg/kg and recoveries were obtained within the range of 70- 120%, with an associated repeatability $RSD_r \leq 20\%$ for all analytes. The recoveries were obtained with a linearity criteria of $R^2 \geq 0.98- 0.99$ and the 0.01 mg/kg was used as the Limit Of Quantification (LOQ). Reported residue levels were compared with the EU MRL values. Out of 40 farmer field samples tested, 4 brinjal farmer field samples collected from Kaluthavalai and Thettathivu south G. N. Divisions were contaminated with residues of Profenofos in a range between 0.06- 0.39 mg/kg and out of 19 market samples tested, one brinjal market sample collected from Kaluwanchikudy market was contaminated with 0.012 mg/kg of Profenofos residue where EU MRL for profenofos is 0.01 mg/kg in brinjal. The result of this study provide the information about farmers common practices of pesticide application during cultivations in Batticaloa District and pesticide residue analysis of their crop produce. The study also recommended that to analyze the residue of pesticides that frequently used by farmers including banded and restricted pesticides in Sri Lanka for major cultivating vegetables in Batticaloa District and expand it into other districts in Sri Lanka.

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