



Method development for analysis of selected pesticides residues in tea

By

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ABSTRACT

Sri Lanka is one of the most famous tea producing country in the world and tea is one of the major export product of Sri Lanka with great impact to the economy. In this regard pesticide residues in tea play a major role for the quality and safety image of Sri Lankan made tea. Pesticides are used as a pest control measure to get the maximum production and residues of pesticides could be remaining in made tea if proper control measures have not been adopted. Tea consumer countries have imposed stringent quality control measures and regulations to control pesticide residue in made tea. Therefore made tea should be screened for pesticide residues before exporting to the international market. Tea buying countries have their own maximum residue limit (MRL) for each pesticide and MRL shows the highest level of a pesticide residue that is legally tolerated in or on food. Therefore Tea Research Institute (TRI) has been developing methods to analyze pesticide levels in tea.

Method development was consists of few analytical steps including extraction, cleanup, separation and detection of pesticides. Accelerated solvent extractor (ASE) was used for pesticide extraction from tea samples with organic solvents. Extracted mixture was cleaned up using gel permeation chromatography (GPC) for removal of unwanted materials and interferences from sample. Finally GC-MS technique was used for separation and quantitative determination of pesticide residues. GC-MS has excellent separation and quantitative determination of pesticide residues in tea and used for method development. Hexaconazole, propiconazole, tebuconazole, bitertanol, diazinon and methylated MCPA were analyzed using GC-MS.

As per the recovery analysis data to develop multi residue method, average recovery percentage of all pesticides was observed in between 83.22 % to 105.08 %. Average recovery percentage for bitertanol is varied in between 99.12 % to 104.98 %, for diazinon is varied in between 89.91 % to 100.14 %, for hexaconazole is varied in between 87.92 % to 98.12 %, for propiconazole-1 is varied in between 93.81 % to 98.91%, for propiconazole-2 is varied in between 91.51 % to 100.27 % and for tebuconazole is varied in between 83.22 % to 105.08 %. As per the recovery analysis data for MCPA, recovery percentage varied in between 86 % to 109 %. Finally multi residue analysis method was developed for the analysis of diazinon, hexaconazole, propiconazole, bitertanol and tebuconazole. Single residue analysis method was developed for the analysis of MCPA.