



Analysis of profenofos and diazinon residues in pineapple

By -

Nimashini Dilanthi Semage

Department of Chemistry,
University of Colombo,
Sri Lanka.

Dissertation submitted as a partial fulfillment of the M.Sc. Degree in Analytical Chemistry of
the University of Colombo, Sri Lanka.

May, 2012

ABSTRACT

Pesticides are substances that kill or control unwanted organisms. Modern agriculture depends largely on pesticides for crop protection. Nevertheless, pesticides have caused severe problems to the biosphere. As pesticides cause harmful effects even at low concentrations, continuous monitoring of the levels of pesticides and their residues in crops is of great importance.

This study was carried out to determine the levels of profenofos and diazinon residues in a Sri Lankan fruit commodity namely, pineapple. These two insecticides are recommended by the Agricultural Department of Sri Lanka for the cultivation of pineapple and are widely used by farmers.

Fresh pineapples (25 numbers) were collected from a wholesale market, a super market and fruit sale points in Colombo and Gampaha districts. A survey was also conducted during sample collection to obtain information such as, origin of the fruit and the date of harvesting. The analytical method involved extraction of the samples by matrix solid phase dispersion (MSPD). This is a recently established method. This analytical method was developed, based on a published method. The pineapple samples were homogenized with the dispersant sorbent (silica gel) and eluted with ethyl acetate, followed by determination of the levels of profenofos and diazinon by GC/MS. MSPD has the advantage that sample preparation, extraction, fractionation and purification are carried out in a single step. Therefore, it is a less labour intensive, less solvent involving and a more efficient technique. This method has been applied successfully in the analysis of pesticides in various fruits, vegetables, animal tissues etc. To the best of our knowledge there is no reported work in Sri Lanka for determining pesticide residue levels of pineapple and the use of MSPD method.

Profenofos and diazinon were not detected in any of the samples analyzed. Prior to analyzing the samples, recovery studies were carried out by spiking pineapple samples with profenofos and diazinon at different standard concentration levels (0.1, 0.5 and 1.0 ppm) and carrying out the analysis. The average recoveries determined (three replicates) ranged from 94 % to 101 %. This was in the satisfactory range of 80 % - 120 %. The relative standard deviation of average recoveries ranged between 2 and 15%. Values of ≤ 20 are deemed satisfactory. Detection and quantification limits were respectively 1.2 ppb and 3.7 ppb for profenofos, and 1.2 ppb and 3.7 ppb for diazinon.