DEVELOPING A METHOD TO DETERMINE 2,4-D AND MCPA IN TEA WITH DERIVATIZATION BY GAS CHROMATOGRAPHY –ELECTRON CAPTURE DETECTOR (GC-ECD)

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By

PANAKADUWA GAMAGE THARANGA CHAMARA

Export Agriculture Degree Programme

Faculty of Animal Science and Export Agriculture

Uva Wellassa University

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ABSTRACT

A gas chromatographic method with electron capture detector was developed for the residue determination of two phenoxy acid herbicide residues (4-Chloro-2-methylphenoxy acetic acid and 2,4-dichlorophenoxy acetic acid) in black tea. The black tea samples were extracted with methanol: water (8:2) mixture, and then followed by liquid-liquid partition with dichloromethane and water. Then the residues were derived with methanol: sulfuric acid (9:1) mixture and the resulting mixture was further cleaned up by hexane and washed with $NaHCO_3$. The esters were analyzed by a gas chromatograph equipped with an electron capture detector (ECD) and they were quantified by the external standard method. The average recovery percentages of the spiked samples at 0.05, 0.1, 1.0 ppm were 0.09225, 0.05775 and 0.05325 consecutively. Since the recoveries of the spiked samples at 3 spike levels were all below 70%, it was revealed that the method is not capable to comply with different acceptability criteria of food regulatory organizations for 2,4-D and MCPA maximum residue in black tea for European Union and Japanese market. The proposed method can be applied with some modifications of methylating reagent, extraction method and clean-up method to determine pesticide residue in black tea.