

Method Validation and Investigation of Paclobutrazol in Soil Using SPME-GC-MS Technique

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ABSTRACT

Solid-phase microextraction (SPME) is a solvent-free sample preparation technique. 85 µm polyacrylate fiber was used to extract the analytes directly from aqueous samples, associating with the conventional extraction, and then thermal desorption was carried out in the hot injector of GC. The application of them to soil sample in paclobutrazol residue analysis was validated. This technique was coupled mainly with gas chromatography and mass spectrometry (GC-MS). The preparative soil procedures for extraction of paclobutrazol, extraction time and analysis were obtained. 67% of the recovery from spiked soil samples was an average. Limit of detection was found at the concentration of 0.01 mg/kg sample, an appropriate extraction time was at 30 min. However, the simple dilution of the extraction to avoid negative matrix effects is more important. This technique was applied to determine paclobutrazol residues in soil corresponding with soil depth at mango orchard which was treated by soil drench method. The results showed high volume of paclobutrazol residue in upper soil layer (0-5 cm) after application, while low quantity was obtained in lower soil layer (10-20 cm). Moreover, the persistence of paclobutrazol residue was evaluated to be about 3-5 months.

Key words: Paclobutrazol, Soil, GC-MS, SPME-GC-MS, Residue, Method Validation

INTRODUCTION

The residue of paclobutrazol depends on the methods of application, doses and crop species. It was found to persist 2-5 years in apple and 1-3 years in peach (Singh and Ram, 2000). Soil application of paclobutrazol has been found to be more effective as regard to suppressing the vegetative growth and enhancing the reproductive growth in mango than foliar application (Burondkar and Gunjate, 1991; Tongumpai et al., 1996; Singh, 2002). It may remain active for many years