

INTRODUCTION

Herbicides such as diuron are often used to control broad-leaf weeds. However, wide spread use of diuron in oil palm plantations has led to concerns on its impact on the environment. Therefore, it is necessary to develop an analytical method to detect and quantify diuron residue in soil. Diuron (Figure 1) is the common name for 3-(3,4-dichlorophenyl)-1,1-dimethyl urea ($C_9H_{10}Cl_2N_2O$). Some of its trade names include *Karmex*, *Crisuron*, *Di-on*, *Diater*, *Di-urex*, *Toterbane* and *Unidron*. In the pure form, it is an odourless crystal while at 93% purity is a viscous semi-solid. Its melting point is in the range of 158°C-159°C. Diuron has low solubility in water (42 mg litre⁻¹ at 25°C), high adsorption rate on soil particles ($K_{oc} = 418 - 560$) and low n-octanol-water partition coefficients ($\log K_{ow}$), around 2.87.

METHODOLOGY

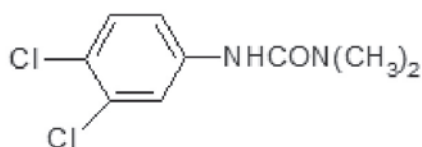


Figure 1. Chemical structure of diuron.

The method to detect and quantify diuron involves the addition of acetonitrile to the soil. The soil is then homogenised using the ultrasonic bath before the extraction of diuron. The extract is filtered, dried and re-dissolved in acetonitrile:water (1:1, v/v). The detection and quantification of diuron is by high performance liquid chromatography using an ultra violet detector (HPLC-UV) (Figure 2).



Figure 2. High performance liquid chromatography – ultra violet (HPLC-UV).

RECOVERY STUDIES

Recoveries of diuron from soil samples spiked with 0.2–1.0 mg kg⁻¹ standard diuron ranged from 93.2%–98.7% with coefficients of variation between 0.4% and 4.8%. Figure 3 is the HPLC-UV chromatograms of (A) standard diuron,

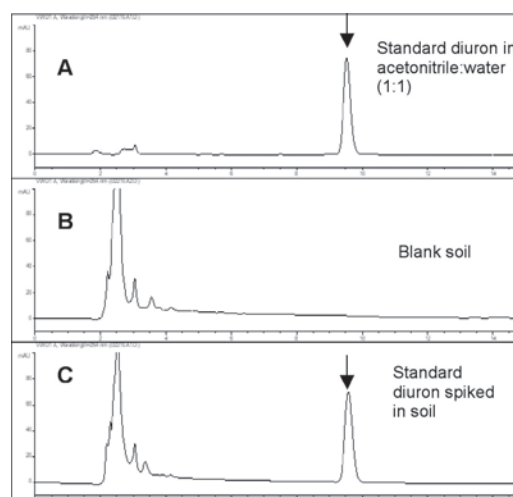


Figure 3. HPLC-UV chromatograms of (A) standard diuron 1.0 µg ml⁻¹, (B) blank soil and (C) soil spiked with 0.2 µg g⁻¹ diuron standard.

1.0 $\mu\text{g ml}^{-1}$, (B) blank soil and (C) soil spiked with 0.2 $\mu\text{g g}^{-1}$ diuron standard. The method detection limit and limit of quantification of diuron in soil are 0.002 $\mu\text{g g}^{-1}$ and 0.006 $\mu\text{g g}^{-1}$ respectively.

BENEFITS

- Precise and reliable method for detection and quantification of diuron residue in soil.
- Generation of environmental data on diuron.

OBJECTIVES

- To detect and quantify diuron residue in soil.
- Information on the fate of diuron in agro-environment.

TYPES OF SERVICE

- Quantification of diuron in soil.
- Private laboratories are encouraged to adopt this method as part of their scope of analyses.

Services are offered in Peninsular Malaysia, Sabah and Sarawak.

The cost of method transfer, including competency training for analyst, is negotiable.

CLIENTS

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