EVALUATION OF METSULFURON METHYL ON SELECTED AGRICULTURAL SOILS UNDER OIL PALM PLANTATION

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2005

Adsorption of metsulfuron-methyl on selected agricultural soils under oil palm plantation.

Lihat sebelah

ADSORPTION OF METSULFURON-METHYL ON SELECTED AGRICULTURAL SOILS UNDER OIL PALM PLANTATION

By

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Research report submitted in partial fulfillment of
the requirements for the degree of
Bachelor of Science (Analytical Chemistry and Environment)

Department of Chemical Sciences
Faculty of Science and Technology
UNIVERSITY COLLEGE OF SCIENCE AND TECHNOLOGY MALAYSIA
2005

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PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **ADSORPTION OF METSULFURON-METHYL ON SELECTED AGRICULTURAL SOILS UNDER OIL PALM PLANTATION** oleh **NICHOLAS YEOW JEE SING,** No. Matrik **UK 6750** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Kimia sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains – Kimia Analisis dan Persekitaran, Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

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ACKNOWLEDGEMENTS

I have great pleasure in carrying out my final year project. I wish to express my deepest appreciation to my supervisor Associate Professor Dr. Norhayati M. Tahir for her valuable guidance and suggestions. Many thanks to the management & staff of the laboratory in chemistry department especially to Mr Ruzeman B. Abd. Manaf, for their help and support.

I would also like to express my gratitude to Consolidated Plantations Berhad for granting me the permission to carry out the study/research in one of their estates – Dr. Mohamed Nazeeb [Plantations Director], Mr Chung Gait Fee [Senior Section Head] and management & staff of Ebor Research and Sungei Buloh Estate.

Last, but not least special thanks to my family and friends who have assisted me.

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°C	Degree Celsius
%	Percentage
>	More than
µg	Microgram
µg/ml	Microgram per millilitre
cm	Centimeter
g	Gram
ha	Hectare
K_d	Adsorption coefficient
K_{ow}	Octanol/Water partition coefficient
L	Litre
LD_{50}	Lethal dose to 50 % of a test population
LC_{50}	Lethal concentration to 50 % of a test population
M	Molarity
ml	Mililitre
mm	Milimeter
mg/kg	Milligram per kilogram
pka	Dissociation constant
ppm	Part per million

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ABSTRACT

In this study, the adsorption capacity of metsulfuron-methyl was examined on selected agricultural soils under oil palm plantation. The samples were collected from four agriculture soil series (Bernam, Tongkang, Selangor and Jawa) in Bukit Rotan Baru Division oil palm estate with 2 different depths: surface (0-10 cm) and bottom (20-30 cm). There are four different parameters which are involved in the chemical analysis of soil, which are: soil moisture content, soil pH, organic carbon content, and particle size distribution. These four parameters are very important in determining the physicochemical properties of soil because it will directly affect the adsorption behavior of sulfonylurea herbicides such as metsulfuron-methyl on the soil samples. High Performance Liquid Chromatography (HPLC) was used to analyze the adsorption capacity of the soil by determining the concentrations of the herbicide on the soil samples. The results show that metsulfuron-methyl was adsorbed more strongly towards the Bernam 9 series with an adsorption capacity of 28.99 for the top soil and 28.94 for the bottom soil. The soil organic matter content and soil pH play a major role in controlling the adsorption behavior of metsulfuron-methyl in the soil samples. Soil samples which contain high organic matter content and low pH showed higher adsorption capacity compared to soil samples with low organic matter content and high pH.

ABSTRAK

Dalam kajian ini, kapasiti bagi metsulfuron-methyl dikaji pada siri tanah pertanian dalam ladang kelapa sawit. Sampel-sampel tanah di kutip dari empat siri tanah pertanian (Bernam, Tongkang, Selangor and Jawa) di ladang kelapa sawit Bahagian Bukit Rotan Baru pada dua kedalaman yang berlainan, iaitu di permukaan (0-10 cm) dan bawah (20-30 cm). Terdapat empat jenis parameter yang berlainan yang terlibat dalam analisis kimia tanah, iaitu: kandungan kelembapan tanah, pH tanah, kandungan jirim organik, dan saiz agihan zarah. Keempat-empat parameter ini adalah sangat penting dalam menentukan sifat kimia fizik tanah kerana ia akan mempengaruhi perlakuan penjerapan herbisid sulfonylurea seperti metsulfuron-methyl ke atas sampel tanah. Kromatografi cecair prestasi tinggi (High Performance Liquid Chromatography, (HPLC)) digunakan untuk menganalisa kapasiti penjerapan oleh tanah dengan menentukan kepekatan herbisid dalam sampel tanah. Keputusan kajian menunjukkan bahawa metsulfuron-methyl lebih terjerap pada siri tanah Bernam 9 dengan kadar penjerapan 28.99 untuk tanah permukaan dan 28.94 untuk tanah bawah. Kandungan bahan organik dan pH tanah memainkan peranan yang penting dalam mengawal aktiviti penjerapan metsulfuron-methyl dalam sampel-sampel tanah ini. Sampel tanah yang mempunyai jirim organik yang tinggi dan pH tanah yang rendah menunjukkan kadar penjerapan yang lebih tinggi berbanding dengan sampel tanah yang mempunyai jirim organik yang rendah dan pH tanah yang tinggi.