BIODEGRADATION OF HERBICIDE (GLYPHOSATE) BY SOIL BACTERIA

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Biodegradiation of herbicide (glyphosate) by soil bacteria. /
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BIODEGRADABLE OF HERBICIDE (GLYPHOSATE) BY SOIL BACTERIA

By
Nurul Husna binti Ja'afar

Research Report submitted in partial fulfillment of
the requirements for the award of the degree of
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DEPARTMENT OF BIOLOGICAL SCIENCES
FACULTY OF SCIENCE AND TECHNOLOGY
UNIVERSITI MALAYSIA TERENGGANU
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PENGAKUAN DAN PENGESAHAN LAPORAN PITA I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **Biodegradable of Herbicide (Glyphosate) by Soil Bacteria** oleh **Nurul Husna binti Ja'afar,** No Matrik: **UK11520** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda (Sains Biologi), Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu.

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DECLARATION

I hereby declare that this thesis entitled Biodegradable of Herbicide (Glyphosate) is the result of my own research except as cited in the references.

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ABSTRACT

Herbicides were used to control weeds in agricultural systems generally but since the application have practiced year by years, thousands of tons of it have been introduced to the environment making it one of environmentally problems due to its toxicity. The aims of this study were to isolates soil bacteria from soil samples treated by Roundup with the active compound of glyphosate (N-phosphonomethylglycine) and also identify soil bacteria degrading glyphosate. In this study, soil sample was taken from the tobacco farm with the history of glyphosate application for about 5years at the depth of 5 to 10cm situated in Seberang Takir, Terengganu. Screenings of isolates were carried out by enrichment culture method and rate of glyphosate degradation was measured by optical density by the wavelength of 600nm and also colony count method. Within this study, 5 isolated bacteria (from soil sample) were isolated randomly from plates. Graphs produced by optical density and plate count methods shows that there was glyphosate utilization by Isolate 1 (identified as *Corynebacterium kutsceri*).

ABSTRAK

Secara amnya, racun rumpai digunakan untuk mengawal rumpai dalam sistem agrikultur. Akan tetapi, sejak penggunaannya diaplikasikan tahun demi tahun, beribu-ribu tan racun rumpai telah diperkenalkan terhadap persekitaran menjadikan ia salah satu daripada masalah disebabkan ketoksidannya. Tujuan kajian ini dijalankan adalah untuk memencilkan bakteria tanah dari tanah yang telah diaplikasikan dengan penyemburan racun Roundup dengan bahan aktifnya glyphosate (N-phosphonomethylglycine) serta mengenalpasti bakteria tanah yang berkemampuan untuk menguraikan glyphosate. Dalam kajian ini, sampel tanah diambil dari kebun tembakau yang mempunyai sejarah penggunaan glyphosate selama hampir 5 tahun pada kedalaman 5 hingga 10cm yang terletak di kawasan Seberang Takir, Terengganu. Pengskrinan bacteria terpencil dijalankan menggunakan kaedah kultur pengkayaan dan kadar penguraian glyphosate diukur menggunakan ketumpatan optikal pada jarak gelombang 600nm serta kaedah pengiraan koloni. Hasilnya, 5 bakteria terpencil berjaya dipencilkan dari media agar. Graf yang terhasil dari nilai ketumpatan optikal dan pengiraan koloni menunjukkan adanya penggunaan glyphosate oleh bakteria terpencil 1 (dikenalpasti sebagai *Corynebacterium kutsceri*)