Nidal Zabermawi et al., J Microb Biochem Technol 2015, 5:4
http://dx.doi.org/10.4172/1948-5948.S1.014

OMICS International
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World Congress and Expo on
Applied Microbiology
August 18-20, 2015 Frankfurt, Germany

Residue analysis and biodegradation of atrazine in open field and indoor cultures

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The present study aimed to investigate atrazine residues and biodegradation by naturally occurring bacteria in open field and indoor cultures of corn and cucumber and amended with atrazine. The comparative study employed three soil types {Abu El-Matameer area, El-Behaira Governorate, Egypt (soilM), Hada Al-Shame area, Saudi Arabia (soilH), and El-Sharqia Governorate, Egypt (soilE)}to investigate the relation between the fate of atrazine in different ecosystems and soil characteristics including the indigenous degraders. In a previous study by the authors, physical, chemical, mechanical and biological properties of soils were characterized with special emphasis on quantitative and qualitative analysis of atrazine-resistant bacteria from different contaminated soils. This study resulted in isolation and identification of 23 indigenous bacteria and showed quantitative and qualitative variations in soil bacterial populations based on the natural characteristics of the soil and atrazine concentration. In the field experiment, corn grew well to its full cycle (120 days) in the presence of the atrazine at its recommended dose (RD). Cucumber plant grew only to its full cycle in the presence of 0.5 X RD of the herbicide in soil E while it did not grow in soil H at any concentration of the tested herbicide. Also no atrazine residue was detected in any of cucumber fruit. Higher averages of atrazine residues (0.232 and 0.140 ppm after 25 and 50 days respectively) were detected in soil M during outdoor corn cultivation compared to the residues in the indoor cultivation. However, in the outdoor cultivation atrazine was not detected after 75 days of its application. During indoor cucumber cultivation much lower atrazine residue averages were detected compared to residues obtained in the outdoor corn cultivation. Results clearly confirmed that soil characteristics, plant type as well as environmental conditions controlled biodegradation of atrazine which is reflected by its residues.

Biography

Nidal Zabermawi is an Assistant Professor of Applied Microbiology. She is currently working at the Department of Life Sciences, Faculty of Science, King Abdul Aziz University, Jeddah, Kingdom of Saudi Arabia. She completed her Master's degree in Microbiology (Microbial Fermentations) 2006 in King Abdul-Aziz University, Saudi Arabia Jeddah and her PhD in Applied Microbiology 2013 from the same University as well. Her research interests include first study and monitoring of environmental pollutants either organic (pesticides; crude oil etc.) or inorganic (e.g. heavy metals etc) in aquatic environments and contaminated soils; second, removal of such pollutants using indigenous and /or exogenous microorganisms in free-living or fixed treatment systems.

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