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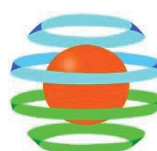
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RECHERCHE EN ECO-TOXICOLOGIE

Pour un monde sans pollution

Dissipation of chlorpyrifos, pendimethalin, and thiophanate-methyl pesticides in compost based-versus peatmoss based-biomixtures of biobeds

Talaat El Sebai*^{†1}, Wafaa Zidan¹, Wafaaabd El Rehim¹, Alaa Marzouk², Marion Divers³, and Fabrice Martin-Laurent³

¹Agricultural Microbiology Dept. National Research Centre – Cairo, Egypt

²Laboratory of pesticide analysis, Agriculture Research Centre – Cairo, Egypt

³Agroécologie – Institut National de la Recherche Agronomique : UMR1347, Université de Bourgogne, Institut National Supérieur des Sciences Agronomiques, de l'Alimentation et de l'Environnement – Université de Bourgogne - 17 rue Sully - BP 86510 - 21000 Dijon, France

Abstract

Biobeds is a simple and a cost effective way to treat point source pesticide's contamination. In this study, we replaced peat-moss (P) with compost (C) which is locally available to compare the effectiveness of both bio-mixtures (biomix) P and C on pesticide dissipation. Chlorpyrifos, pendimethalin, and thiophanate methyl were added separately (at three concentrations 25, 50, and 75 mg/kg of both biomix P and C). Our results showed that biomix composition influenced the dissipation of pesticides. For chlorpyrifos, the highest dissipation rate was recorded in biomix P. This result was confirmed by the mineralization kinetics, since, 25% of ¹⁴C-chlorpyrifos initially added to biomix evolved to ¹⁴CO₂ in biomix P while only 14% evolved to ¹⁴CO₂ in biomix C. In addition, chlorpyrifos dissipation rate was found to be influenced by the initial concentration applied to biomix P and C. In contrary, highest rate of dissipation of pendimethalin was observed in biomix C. More than 76% of pendimethalin was dissipated in biomix C while only 67 % were dissipated in biomix P. The efficiency of both biomix (C and P) was similar in the dissipation of thiophanate-methyl but less efficient compared to other tested pesticides. The addition of the three tested pesticides as mixture at 25 mg/kg of biomix C had a positive effect on both chlorpyrifos and thiophanate-methyl dissipation, while pendimethalin dissipation was similar when applied separately or mixed. In both biomixtures, dehydrogenase activity of microorganisms was stimulated by the addition of pesticides.

Keywords: biobeds, pesticide, contamination, point source, bioremediation

*Speaker

[†]Corresponding author: