

Heavy metal bioaccumulation in soil arthropods at Malaysian sanitary landfill

ABSTRACT

Orthomorpha coarctata and Trigoniulus corallines, which are common soil arthropods found in Southeast Asia, were found in abundance at a Malaysian sanitary landfill. This indicates that both these species were able to tolerate heavy metal contaminated soils. A study was conducted to assess the bioaccumulation of heavy metals in these soil arthropods, to determine the possibility of these heavy metals contaminating our food chain and also the possibility of developing natural absorbents of heavy metals. This study was conducted at Air Hitam Sanitary Landfill, one of the largest landfills in Malaysia. Chemical analyses were conducted to determine the concentration of heavy metal in the top soil (10.0 cm), washed and unwashed Orthomorpha coarctata and Trigoniulus corallines samples. Comparison between the heavy metal concentrations in the washed arthropods samples, unwashed arthropods samples and the top soil were conducted using one way analysis of variance (ANOVA) at significance difference of $P \leq 0.05$, followed by Tukey HSD test, to determine if the soil arthropods were bioaccumulators for any of the heavy metals. Only Cd was found to be significantly higher in both the soil arthropods when compared to the top soil content, meaning that both Orthomorpha coarctata and Trigoniulus corallines were soil arthropods that were bioaccumulators of Cd. More research should be conducted to determine the exact part the Cd is stored in these arthropods and also the possibility of Cd entering our food chain via these soil arthropods.

Keyword: Heavy metal; Soil arthropods; Bioaccumulation; Landfill