Effect of the heavy metals Cu, Ni, Cd and Zn on the growth and reproduction of epigeic earthworms (E. fetida) during the vermistabilization of municipal sewage sludge

Domínguez-Crespo, M.A.[a] , Sánchez-Hernández, Z.E.[a], Torres-Huerta, A.M.[a], Negrete-Rodríguez, M.D.L.L.X.[b], Conde-Barajas, E.[b], Flores-Vela, A.[a]

[a] Instituto Politecnico Nacional, CICATA-Altamira, Km 14.5, Carretera Tampico-Puerto Industrial Altamira, 89600 Altamira, Tamps, Mexico
[b] Departamento de Bioquímica, Instituto Tecnologico de Celaya, Av. Tecnologico y García Cubas s/n, 38010 Celaya, Guanajuato, Mexico

Abstract

In order to enhance the removal of heavy metals such as Ni, Cu, Zn and Cd from wastewater, different cow dung/sewage sludge ratios were tested to assess the effect of these metals on the adaptability of Eisenia fetida earthworms to the treatment process carried out in a typical plant located in Tamaulipas, Mexico. Two experimental water treatment setups were proposed. The first set of experiments was planned to determine the adequate sewage sludge/cow dung ratio(s), whereas the second arrangement was designed to evaluate the growth performance and fecundity of the earthworms under high heavy metal concentrations. To achieve the objectives, the experiments were conducted for 90 days under controlled environmental conditions. Maximum worm biomass and growth rates were attained in samples containing 25 wt.% of sewage sludge. Weight and mortality of worms were significantly affected by the high levels of heavy metals, making difficult the metal accumulation in the worm tissues.

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