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EFFECTS OF CANNED FOOD INDUSTRY SLUDGE AMENDMENT ON ENZYME ACTIVITIES IN SOIL WITH EARTHWORMS

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Abstract

Wastewater sludges are organic and nutrient-rich materials that could be used to improve soil tilth. However, the land application of sludge needs to be properly managed to avoid the detrimental effects on micro and macroorganisms in the soil. Earthworms are one of the most important soil macroorganisms. Addition of sludge to the soil environment may impact earthworm activity, and in turn, soil productivity and health. In this study, sludge from the canned food industry was added to soil microcosms containing earthworms at application rates of 20, 40 and 80 g kg⁻¹ dry sludge. Alkaline phosphatase, dehydrogenase, β -glucosidase and urease activities were measured in the earthworm casts and the surrounding soil throughout a 90 day incubation period at 20°C. Enzyme activities significantly depended on the type of sampled material (soil or cast), the sludge dose, and the incubation time. The addition of canned food industry sludge resulted in increased enzyme activities in the earthworm casts and the surrounding soils (reaching approximately 3-175% and 11-125%, respectively). The enzyme activities in the casts were higher than those in the surrounding soil until the 60th day of the experiment. However, all of the enzyme activities in the earthworm casts decreased after the 60th day due to nutrient depletion. The present study suggests that the accumulated earthworm casts produced from the digestion of canned food industry sludge may enhance the microbial activity and nutrients/organic matter content of surface and subsurface soils, potentially resulting in improved soil productivity.

Key words: incubation-trial, *Lumbricus terrestris*, soil biochemical properties, wastewater sludge

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