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UPSCALING OF COMMUNAL SEWAGE SLUDGE VERMICOMPOSTING TECHNOLOGY

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The proper management of communal sewage sludge is a priority of environmental protection. Recently the vermicomposting technology, of using earthworm species in waste management has been increasing. Earthworms are utilizing of the bacterial components of the sludge and during of their metabolic processes, can contribute for the acceleration of full composting processes. In addition, vermicomposting increase the nitrogen (N), phosphorus (P) and potassium (K) content of the treated sludge, and eliminate of the potential pathogens. We examined the vermicomposting processes both in pilot scale (open- and closed environmental conditions) and among industrial composting conditions, where the compost piles were covered or uncovered with straw-mulch and/or with geotextile. *Eisenia foetida* worms were inoculated into the compost-piles. Samples were taken at the beginning, at half time and at the end of the experimental period. Physical and chemical characteristics, such as the pH, dry matter content, organic matter content, total salinity, total nitrogen, total phosphorus content (P_2O_5), potassium content (K_2O), calcium, magnesium, humus content (H%), humus quality and the dehydrogenase enzyme activities were determined. Temperature and redox potential were assessed twice a week in order to characterize oxidation-reduction conditions. Heavy metal concentrations (Pb, Zn, Fe, Cu, Mn) in the starting sludge, in the finished vermicompost and in the earthworms were also measured, which means, that bioaccumulation of heavy metals by earthworms can be determined. Straw-cover was the best for improving the survival ability of the worms and in increasing the total phosphorous and potassium availability in the final composts. Vermicomposting therefore can be a potential tool of the agri/horti-cultural practice for reducing the environmental risks of the increasing amount of communal sewage sludge wastes.

Keywords: *communal sewage sludge, vermicomposting, Eisena foetida*

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