105 SUSTAINABLE SOLID WASTE MANAGEMENT: ISOLATION OF CELLULOLYTIC MICROORGANISMS FROM SOLID WASTE DUMPSITES IN LAGOS, SOUTHWEST NIGERIA

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Background Microorganisms perform their metabolic processes rapidly with remarkable specificity under ambient conditions catalyzed by their diverse enzymes – mediated reactions. The introduction of microbial enzymes as an alternative to harsh chemical technologies has led to intensive exploration of natural microbial biodiversity to discover microbial enzymes with possible application in waste recycling under appropriate conditions (Gautam *et al*., 2010). Cellulase is the key enzyme for the conversion of cellulosic materials into simple sugars which can serve as feed-stock for the production of different chemicals and fuels via anaerobic fermentation (Ryu and Mandels, 1980). Cellulolytic enzymes play an important role in natural biodegradation processes in which plant ligno-cellulosic materials are effectively degraded by cellulolytic fungi, bacteria, Actinomycetes and protozoa. Many fungi capable of degrading cellulose synthesize large quantities of extracellular cellulases that are more efficient in depolymerising the cellulose substrate.

Objectives This research was to carry out an environmental surveillance for cellulose-degrading microorganisms present in wastes dumpsites in Lagos, southwest Nigeria.

Methods Soil and leachate samples were collected from three dumpsites in Lagos following aseptic procedures and the microbial species were isolated using Nutrient agar and Potato-dextrose agar media respectively. The cellulase-producing microbial species were characterized following conventional and standard methods. They were then screened for cellulase activity using the Cellulose Congo-Red plate technique. The diameters of clear zone of inhibition were measured in millimeters (mm) (Lu *et al*., 2005; Guatam *et al*., 2012).

Result All isolates were cellulase producers, with Bacillus licheniformis having the highest cellulase activity and hydrolytic value (34mm and 8.5 respectively) among the bacterial species while Aspergillus sp. had the highest cellulase activity (63mm) and hydrolytic value (15.8) among the fungal species. The colonial and microscopic characterization of the fungal isolates showed that they belong to the genera; Penicillium, Aspergillus and Trichoderma.

Conclusion This result suggested that these microorganisms utilized the available sources of cellulose present in wastes both for growth and biodegradative processes. Consequently, this will enhance the sustainable solid waste management practice for megacities as well as the public health in developing economies.

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