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CONVERTING LIGNIFIED WASTE TO DIGNIFIED WEALTH: THE CRUCIAL ROLE OF MICROBIAL BIOTECHNOLOGY IN SUSTAINABLE AGRICULTURE AND ENVIRONMENTAL MANAGEMENT

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Abstract

The persistent food shortage and associated hunger, and poverty crisis plaguing many tropical African countries is as a result of poor performance of the agricultural sector. This phenomenon is attributed mainly to the use of unsustainable agricultural production practices such as abuse of inorganic inputs and poor management of organic wastes. This has rekindled concerns with regard to land degradation as well as human and environmental health. Instructively, understanding of waste is shifting from being material requiring collection, handling and disposal to now embracing sustainable resource management in the circular economy. Microbial biotechnology is a promising option to facilitate the modification/transformation of huge amounts of assorted organic wastes generated by all categories of farms, agro-allied industries and municipalities to useful bio-organic resources in agricultural production systems, energy production and environmental management. The paper focuses mainly on the conversion of organic wastes to bio-organic fertilizers for solubilization/mineralization of plant nutrients in agronomic production systems as well as use of these wastes in production of microbial secretions against biotic/abiotic stresses. Some microbes also find beneficial use as probiotics and recombinant DNAs in the livestock industry and bioremediation of polluted ecosystems. As a case study, it discusses the potential of microbial biotechnology in tropical Africa vis-a-vis the prevailing relatively rich biodiversity and degraded agroecologies.

Key words: biofertilizers, bioresources recycling, circular economy, organic wastes, tropical Africa

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