

Microbial Degradation of Polythene using Actinomycetes Isolated from Maize rhizosphere, Forest and Waste Damping Sites within Egerton University, Kenya

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Polythenes are used in many spheres of human life such as packing of commodities, construction of green houses and ponds among other uses. When not properly disposed, they contaminate our environment since they are not easily biodegraded. In this study, polythene papers were buried around growing maize, in the forest and in waste damping site. Soil samples were separately collected from the three sites, packed in sterilised polythene bags and taken to the laboratory for isolation of actinomycetes. The soils were dried on the bench for one week. Actinomycetes were using starch casein agar. Characterization of the isolates was carried out using cultural, physiological and biochemical means. The polythene were subjected to degradation by the actinomycetes by placing them in conical flasks having starch casein broth followed by incubation in shaking conditions at 30°C for one week. Three groups of potential actinomycetes were isolated from maize soil (EU10, EU15, EU19), forest soil (EU3, EU8, EU13) and damping site soil (EU21, EU25, EU30). The isolated actinomycetes had varying microscopic, physiological and biochemical characteristics. There was no significant difference in polythene sheets degradation between maize, forest and damping site soils ($F=38$, $P<0.05$). However, there was significant difference in the polythene sheets degradation among the actinomycetes ($F=11.49$, $P=0.03$). Actinomycetes from the soils of Egerton University had a great potential of producing metabolites that degraded polythenes. There is need for massive isolation and screening of the actinomycetes for production of metabolites that are capable of degrading polythene.

Keywords: Actinomycetes; degradation; Egerton; Kenya; polythene; rhizosphere.