Pectinase and Cellulase Activity of Bacterial Strains Isolated from Unsanitary Landfills

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Cellulase and pectinase producing bacteria can bring a scientific solution to overcome the municipal solid waste problem by introducing them as organic waste decomposers. Such bacterial species can use to reduce the cost of industrial enzyme production. The study aimed to isolate the bacterial strains with good cellulase and pectinase producing capability from unsanitary landfill soil to be utilized in organic waste degradation and industrial enzyme production in the future. All 21 bacterial strains were isolated in Nutrient Agar plates using serial dilution, spread plate, and streak plate methods. Morphological characteristics of bacterial colonies were noted. Well, diffusion assay was used to screen the cellulase and pectinase activity using carboxymethylcellulose (CMC) and Pectinase Screening Agar Medium (PSAM) respectively. The positive results were evidenced by clear inhibition zones in CMC and PSAM. The diameters of the clear zones were measured. There were three replicates for each bacterial culture. The experimental design was Complete Randomized Design. Data were analyzed by ANOVA in Minitab 16. Out of 21 isolates, 62% presented at least one considerable enzymatic activity. Zones of hydrolysis produced by the bacterial strains were ranged from 1.4 - 3.2 cm for cellulase while it was 1.0 – 5.1 cm for pectinase. The bacterial culture B14 showed the significant ($p \leq 0.05$) halo zone diameter in the CMC medium over the tested species by proving the highest cellulase activity. The most potent pectinase producers were found to be the isolate B1 and B6 because such cultures showed the significant ($p \leq 0.05$) halo zone diameter over the other species in PSAM. Based on morphology B1 was a bacillus in shape whereas B6 and B14 were coccus in shape. As per the results, it can be concluded that unsanitary landfill soil is inhabited by cellulose and pectin degrading bacteria, hence can be utilized in enzyme production and organic waste treatments.

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Keywords: Cellulase, Pectinase, Soil bacteria