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Screening and Optimization of Conditions for Pectinase Production by Aspergillus Flavus

Authors : Rumaisa Shahid, Saad Aziz Durrani, Shameel Pervez, Ibatsam Khokhar

Abstract : Food waste is a prevalent issue in Pakistan, with over 40 percent of food discarded annually. Despite their decay, rotting fruits retain residual nutritional value consumed by microorganisms, notably fungi and bacteria. Fungi, preferred for their extracellular enzyme release, are gaining prominence, particularly for pectinase production. This enzyme offers several advantages, including clarifying juices by breaking down pectic compounds. In this study, three Aspergillus flavus isolates derived from decomposed fruits and manure were selected for pectinase production. The primary aim was to isolate fungi from diverse waste sources, identify the isolates and assess their capacity for pectinase production. The identification was done through morphological characteristics with the help of Light microscopy and Scanning Electron Microscopy (SEM). Pectinolytic potential was screened using pectin minimal salt agar (PMSA) medium, comparing clear zone diameters among isolates. Identification relied on morphological characteristics. Optimizing substrate (lemon and orange peel powder) concentrations, pH, temperature, and incubation period aimed to enhance pectinase yield. Spectrophotometry enabled quantitative analysis. The temperature was set at room temperature (28 ºC). The optimal conditions for Aspergillus flavus strain AF1(isolated from mango) included a pH of 5, an incubation period of 120 hours, and substrate concentrations of 3.3% for orange peels and 6.6% for lemon peels. For AF2 and AF3 (both isolated from soil), the ideal pH and incubation period were the same as AF1 i.e. pH 5 and 120 hours. However, their optimized substrate concentrations varied, with AF2 showing maximum activity at 3.3% for orange peels and 6.6% for lemon peels, while AF3 exhibited its peak activity at 6.6% for orange peels and 8.3% for lemon peels. Among the isolates, AF1 demonstrated superior performance under these conditions, comparatively.

Keywords : pectinase, lemon peel, orange peel, aspergillus flavus
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