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Brief Report

Selective Isolation and Screening of Actinobacteria Strains Producing Lignocellulolytic Enzymes Using Olive Pomace as Substrate

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Background: Olive pomace, as the main by-product of the olive oil industry, is recently recycled as fermentation substrate for enzyme production.
Objectives: Actinobacteria isolates were separated from an Algerian soil under olive pomace cultivation and were evaluated for their lignocellulolytic enzymes production.
Materials and Methods: Isolates of Actinobacteria were separated from soils around oil mills using four isolation media, among them three were enriched by olive pomace. The isolates were screened for their cellulolytic, xylanolytic and ligninolytic activities. Isolates with potential of producing lignocellulose-degrading enzymes were selected under submerged fermentation based olive pomace.
Results: Ninety isolates of Actinobacteria were separated from soil samples. M3 medium (raw pomace autoclaved alone) was the best isolation medium (68 strains), whereas, the soil from oil mill with continuous system (S1) led to separation of 52 strains. Among the 90 isolates, 82 were shown promising enzyme activity, 19 isolates were presented the largest zone diameter (<30 mm). S1M3I and S1M3II isolates were exhibited the highest values.
Conclusions: Olive pomace with medium low cost and high titers of enzymes can be valorized by culture of Actinobacteria to produce lignocellulolytic enzymes for industrial applications.

Keywords: Actinobacteria; Lignocellulolytic enzymes; Olive pomace; Submerged fermentation

1. Background

Actinobacteria, highly abundant filamentous Gram positive bacteria are ubiquitously present in all natural substrates and soil (1-2). Actinobacteria are involved in recycling hard-to-degrade organic matter such as cellulose, cell wall matrix polysaccharides and lignin (3-4).

Use of low-cost residues from agro-industries, as substrates for growing microorganisms, may constitute an interesting alternative in enzyme industry (4). According to the National Agency for Development of Investment (ANDI, Algeria), 87500 tons of olive pomace are being produced and discarded that can act as pollutant in near future (5). Olive pomace consists of lingnocellulosic matrix with phenolic compounds, uronic acids, and oily residues and may represent an important alternative source for enzymatic processes and biofuel production (4). However, studies dealing with lignocellulolytic production by Actinobacteria using olive pomace residues are rare.

Here, Actinobacteria isolates from an Algerian soil under olive pomace cultivation were separated, and the production of carboxymethyl cellulases (CMCases), xylanases and laccases were evaluated qualitatively and quantitatively.