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Short Commentary

The use of a fungal isolate to degradate food processing wastes

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Abstract

Food manufacturing wastes include olive mill solid waste, tomato pomace, and grape pomace, to name a few. One of the most straightforward methods for properly disposing of these leftovers is to cultivate degrading mesophilic bacteria that consume these wastes as their primary carbon source. To decompose food manufacturing wastes, a fungus strain was obtained from tomato peel. This strain decomposed olive mill solid waste well, but only partially degraded grape and tomato pomace. The strain most likely belongs to the Botrytis genus based on mycelium morphology, ribosomal DNA sequence, and internal transcribed spacer (ITS) DNA sequence. This is the first time a strain comparable to Botrytis has been used to degrade food industry waste.

Keywords: Anthropologic, Tomato pomace, Phytotoxic, Pleurotus ostreatus.

INTRODUCTION

One of the primary causes of biosphere degradation is the discharge of toxins into the environment. The majority of these chemicals are gradually introduced as a result of increased human activities like as agriculture, food processing, and mining. Through the discharge of waste fluids, soil contaminants, and the release of hazardous gases into the atmosphere, these anthropologic factors endanger the health of flora, wildlife, and humans. At the moment, particular efforts are being made to create new methods and technologies that may be used to treat contaminated soil, water, and air in order to mitigate the harmful ecological and environmental repercussions of human activities (Berenbaum and Eisner, 2008).

Three main food processing wastes are olive-mill solid waste (OMSW), tomato pomace (TP), and grape pomace (GP) (FMWs). OMSW is a by-product waste generated by a two-phase centrifugation technique used to extract olive oil. The chemical composition of OMSW has been determined, revealing that it has a high moisture content, a slightly acidic pH, and a high content of organic matter, primarily lignin, hemicelluloses, and cellulose (the so-called lignocellulose complex); it also has a high fat content and hydrosoluble polyphenols. If not properly disposed of, OMSW has been classified as a hazardous pollutant for soil and waterways due to its antibacterial and phytotoxic effects. TP, on the other hand, is a fiber-rich by-product of the tomato that primarily consists of peels and seeds.

FMWs can be used as the only carbon source by a wide spectrum of fungal strains in nature. These fungi release a variety of enzymes with hydrolytic potential, which can destroy complex sugar polymers like those found in the cell wall. In the breakdown of coffee silverskin and discarded coffee grounds created by the coffee business, fungal enzymes from Penicillium purpurogenum, Neurospora crassa, and Mucor sp. were utilised, resulting in a larger release of phenolic chemicals that can be exploited in the pharmaceutical or food sectors. Pleurotus ostreatus has been used to produce laccase enzyme by degrading TP (Zhang, 1948).

As previously stated, FMWs are mostly made up of a polymer blend that includes cellulose, lignin, pectin, and hemicellulose. Cellulose is a glucose-based homopolymer; lignin is a polyphenol whose major monomer is p-hidroxiphenylpropane; and pectin is a p-D-galacturonic acid-based polymer. Finally, hemicellulose is a percentage of lignocellulose made up of a mixture of complicated heteropolymers comprising xylan, galactan, mannan, and arabinan that has been removed by alkali. The presence of numerous sorts of interactions between these polymers determines the cell wall's strength. Hemicellulose interacts with cellulose through hydrogen bonds, whereas lignin interacts with cellulose through eter or ester covalent bonds (Morales et al., 2009).

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