TITLE: PRODUCTION OF BACTERIAL ENZYMES FROM TOBACCO POWDER RESIDUE

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ABSTRACT:
The development of bioprocesses allows the use of many microorganisms for the treatment and/or remediation of a wide variety of industrial residues, such as tobacco powder (*Nicotiana tabacum* L.). Tobacco powder, resulting from the processing of tobacco, is an abundant residue in southern Brazil and large quantities are deposited directly in the crops leading to accumulationt of substances often harmful to the environment. The objective of this work was to search for alternatives to the use of tobacco powder through the isolation of bacteria and to evaluate the potential of the isolates in the production of enzymes of industrial interest. The centesimal composition of the residue was performed according to the Adolfo Lutz Institute. The bacterial prospection was conducted by serial dilution in Nutrient Agar. After incubation, at 30ºC for 72 h, bacteria were isolated according to their distinct morphological characteristics and pre-characterized by the form and tinctorial reactions of the cells. The enzymatic activity of cellulase, protease, amylase and pectinase of the isolates was determined by the ratio between the mean diameter of the degradation halo and the mean colony diameter expressed as Enzyme Index (EI), spiked in specific media, incubated at 30ºC for up to 5 days. The isolate with higher EI was identified through biochemical tests. The residue had the following centesimal composition: moisture content: 13.75 ± 0.19; Proteins: 18.12 ± 0.38; Ashes: 12.46 ± 0.18; Lipids: 4.14 ± 0.22; Carbohydrates: 6.24 ± 2.30. A total of six different bacterial colonies were isolated from the tobacco powder. After the enzymatic tests, the isolate with the highest and most extensive enzymatic activity was selected, with EI-pectinase = 3,492 ± 0,449; EI-cellulase = 5.472 ± 0.488; EI-amylase = 1,350 ± 0,076; EI-protease = 1.661 ± 0.239. The isolate was identified as a Gram positive rod, glucose and lactose fermenter and gelatin hydrolysis positive. The results for urease, lysine decarboxylase, phenylalanine deaminase, VP (Voges Proskauer), MV (methyl red) and citrate use were negative. The partial identification suggests a bacterium of the genus *Bacillus*. In the liquid phase fermentation studies, the selected bacterium has shown similar metabolic behavior in both the BHI commercial medium and in the tobacco powder medium. The tested isolate showed, until now, a good potential for the bioconversion of the tobacco powder in enzymes with industrial application.

Keywords: tobacco powder, enzymatic activity, bioprocess

Financial support: CAPES, FAPERGS