TITLE: BIOTECHNOLOGICAL POTENTIAL OF *Absidia cylindrospora* UCP 1301 FOR BIOEMULSIFIER PRODUCTION USING AGRO-INDUSTRIAL BY-PRODUCTS

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ABSTRACT:

Large amounts of agro-industrial by-products and wastes are produced in Brazil every year. Often, they are underutilized and released into the environment without proper disposal and treatment, having a negative effect on human and animal health, and causing environmental pollution. One of the most used strategies is reuse them as raw material for obtaining high-added value products, such as bioemulsifiers. They are amphiphilic compounds produced by microorganisms, capable to form stable emulsions between two immiscible liquids and that have a wide range of industrial applications. In this context, the aim of this study was to investigate the potential of Mucoralean fungi *Absidia cylindrospora* UCP 1301 for bioemulsifier production, using agro-industrial by-products as alternative substrates. For this, the production media were formulated using saline solution supplemented with crude glycerol (CG), corn steep liquor (CSL) and whey, according to a 2^3 full-factorial design (FFD). Then, they were adjusted to pH 5.5, sterilized in autoclave and inoculated with 5% spore solution (10^7 spores/mL) of *A. cylindrospora*, previously grown in Sabouraud agar for 96 h. Fermentations were carried out at 28°C, 150 rpm for 96 h and, after this period, the cultures were subjected to filtration. Cell-free metabolic liquids were used to determine the emulsification index (EI_{24}) with motor oil. According to the results, *A. cylindrospora* demonstrated high ability in the production of bioemulsifier in all conditions of the FFD, since EI_{24} values were above 50%. However, the highest EI_{24} (93.3%) was obtained in condition 7 (2% CG, 5% CSL and 4% whey). The statistical analysis showed that the three agro-industrial substrates had a significant influence on the production of bioemulsifier. In addition, the emulsions with motor oil remained stable after 120 h of incubation and the bioemulsifier exhibited good emulsifying properties with castor oil (57.3%) and burned motor oil (53.8%). Therefore, this study confirmed the suitability of unconventional and renewable substrates for obtaining microbial emulsifiers, making this bioprocess attractive for various industrial sectors.

Keywords: Mucoralean fungus, emulsification index, agro-industrial substrates

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