

TITLE: PRODUCTION OF BIODISPERSANT BY *Rhizopus sp.* USING RENEWABLE SUBSTRATES

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ABSTRACT:

Chemical dispersants are extensively used during oil spills, although these agents have been increasingly restricted due to their toxic potential to marine life and coastal populations. In this context, microbial dispersants are emerging as a promising alternative, since they have some advantages including low toxicity, high biodegradability and good ecological acceptability. In addition, microorganisms can bioconvert agro-industrial by-products into dispersing agents, contributing to minimize their high production costs. Thus, this study aimed to investigate the production of biodispersant by *Rhizopus sp.* using waste soybean oil (WSO) and papaya peel juice (PPJ) as renewable substrates. For this, production media were formulated using salt solution supplemented with WSO and PPJ, according to a 2² full-factorial design (FFD). Then, they were adjusted to pH 5.5, sterilized in autoclave and inoculated with 5% spore solution (10⁷ spores/ml) of *Rhizopus sp.*, previously grown in Sabouraud agar for 96 h. Fermentations were carried out during 96 h, at 28°C and 150 rpm and then, the cultures were subjected to filtration and centrifugation. Cell-free metabolic liquids were used to determine oil displacement area (ODA) using burned motor oil, as well as the surface tension by the Du Noüy ring method. According to the results, the filamentous fungi showed higher ability to produce biodispersant in condition 4 of FFD (5% WSO and 20% PPJ), with 52.81 cm² of ODA and 33.7 mN/m of surface tension. Also, the statistical analysis demonstrated significant influence of concentration of both agro-industrial substrates in the production. These promising results confirm the use of underutilized by-products as a sustainable alternative to low-cost production of microbial dispersants, and suggest their potential application in oil spill remediation processes.

Keywords: Mucoralean fungus, dispersing agent, biosurfactant, agro-industrial by-products

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