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BIOSURFACTANT PRODUCTION BY Pseudomonas aeruginosa USING PALM OIL (Elaeis guineensis Jacq.) WASTE AS RAW MATERIAL

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Biosurfactants (BS) are amphiphilic molecules that exhibit surface-active properties comparable to those of synthetic, petroleum-derived surfactants. This study aimed to evaluate the production of rhamnolipid BS by Pseudomonas aeruginosa P23G-02, isolated from a gas station tank in the city of Marabá, Pará, using oil palm (Elaeis guineensis Jacq.) residues as a raw material. BS production occurred in Erlenmeyer flasks containing Vegetable Saline Medium (VSM), with palm oil residues (sludge, fiber, and a combination thereof) as the sole nutrient source. The flasks were incubated on a shaker for 10 days at 36 °C and 200 rpm. BS were extracted with a chloroform-methanol solvent mixture (3:1, v/v). Rhamnolipid quantification was performed by determining rhamnose using the orcinol method. Surfactant activity was assessed by the emulsification index (%), using mineral oil. The rhamnose dosage of the BS was 0.75 µg/mL with the sludge, 0.63 µg/mL with the fiber and 0.38 µg/mL with the combination of residues, after the application of the correction factor (3.2), the rhamnolipid concentration was 2.40 µg/mL, 2.02 µg/mL and 1.21 µg/mL respectively. The emulsification index of the BS with the sludge was 45%, of the fiber 43% and 40% of the combination. The results demonstrate that palm oil residues are a low-cost alternative source for bacterial production of BS. Thus, the biotechnological applicability of this residue could strengthen the palm oil production chain, reducing the risk of improper disposal and promoting sustainable development and a circular economy in the Amazon region.

Keywords: Biotechnology, bacteria, palm oil, surfactant.