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Bioprospection of bacteria and yeasts from Atlantic Rainforest soil capable of growing in crude-glycerol residues

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ABSTRACT. The increasing world production of biodiesel has resulted in an accumulation of crude glycerol as the major byproduct. This could be used as carbon source for industrial microbiology, with economic and environmental advantages for the biodiesel industry. We explored an Atlantic Rainforest soil sample to search for crude glycerol-degrading microorganisms. Microcosms of this soil were established containing minimal medium + 8% crude glycerol (w/w); the biological activity was measured by respirometry. High CO_2 levels were found in some of the crude glycerol microcosms, suggesting the activity of microorganisms capable of degrading this residue. In an attempt to isolate and cultivate these microorganisms *in vitro*, aliquots of the soil suspension were plated on minimal medium containing 10% crude glycerol (v/v). Out of 19 morphologically distinct isolates, 12 bacteria and 6 yeasts were identified by PCR from universal primers 16S and 26S rDNA, respectively. Optical density readings revealed growth differences among cultures.

Two yeasts and three bacteria with distinct growth profiles stood out and appeared to have potential for liquid fermentation of crude glycerol. The yeasts adapted rapidly, but produced relatively little biomass. Opposite tendencies were found in the bacteria. Amplicon sequencing placed the bacterial isolates as close to *Staphylococcus arlettae*, *Pseudomonas citronellolis*, and *Bacillus megaterium*, and the yeasts to *Trichosporon moniliiforme* and *Meyerozyma guilliermondii*. We concluded that these species have potential for use in crude glycerol bioreactors and for bioremediation processes.

Key words: Biofuels; Glycerol conversion; Microbial diversity; Clean energy; Crude glycerin; Glycerol industry

