MICROORGANISMS ASSOCIATED WITH *Elaeis guineensis* Jacq. FRUITS AND THEIR POTENTIAL TO PRODUCE LIPASE

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Abstract:

Lipase-based enzymatic routes toward biodiesel production hold advantages over chemical methods using alkaline and / or acid catalysts. However, biodiesel derived from chemical transformations still dominates the current market, mainly due to its lower cost than the equivalent prepared by biocatalytic processes. Therefore, the strain / genes discovery is central to warranty the economic viability of enzymatic biodiesel production. The aim of this study was to identify novel lipolytic strains among a large collection of microorganisms sampled from *Elaeis guineensis* Jacq. (oil palm tree) fruits. The fruit samples were collected in oil palm plantation at Embrapa Cerrados and were processed for isolation of epiphytic microorganisms in different culture media (Tryptic Soy Agar; Actinomycete Isolation Agar; YPD Agar; Potato Dextrose Agar; Oat Meal Agar). The isolates were purified and then stored at -80°C in Tryptic Soy Broth stocks containing 30% glycerol. The lipolytic activity was evaluated in solid media containing triolein, olive oil and Tween 20 as carbon source. The enzymatic index was estimated in triplicate. Selected bacterial and fungal strains were identified using the 16S rDNA and ITS1-5.8S-ITS2 sequences, respectively. From 664 bacterial strains, 9.1% showed lipolytic activity in at least one of the substrates evaluated. Twenty-two strains presented high enzymatic index and were identified as *Burkholderia* sp., *Erwinia* sp., *Falsibacillus* sp., *Gibbsiella* sp., *Kluivera* sp., *Leclercia* sp., and *Stenotrophomonas* sp. Among the 427 filamentous fungi screened, 45% and 96% degraded olive oil and triolein, respectively. Four selected strains were identified as *Fusarium* sp., *Trichoderma* sp., *Diaporthe* sp., and *Penicillium* sp. Among the 384 yeasts, 53%, 23%, and 9% degraded Tween 20, triolein, and olive oil, respectively. Overall, it was possible to identify distinct strains / species of bacteria and fungi able to produce lipases. Selected microorganisms will be assessed for the production of lipase by quantitative tests aiming their application in the synthesis of biodiesel from palm oil.

Keywords: biodiesel, lipase, fungi, bacteria