

AN ECO-FRIENDLY APPROACH TO EXTRACT MACAUBA (*Acrocomia aculeata*) PULP OIL

Guilherme Dallarmi Sorita^{1,2}, Simone Palma Favaro², Letícia Karen dos Santos², Dasciana Rodrigues², Rossano Gambetta², Alan Ambrosi¹, Marco Di Luccio¹

¹Federal University of Santa Catarina, Department of Chemical and Food Engineering, Florianópolis, Santa Catarina, Brazil

²Empresa Brasileira de Pesquisa Agropecuária – Embrapa Agroenergia, Brasília, Distrito Federal, Brazil

E-mail: simone.favaro@embrapa.br

ABSTRACT

Renowned for its versatility, macauba (*Acrocomia aculeata*) is a multipurpose plant, notably known by its oil-rich composition, which is suitable for the food, cosmetics, and biofuel production. This work assesses the aqueous enzymatic extraction (AEE) of macauba pulp oil. Fresh pulp of the macauba fruits was separated by a proper automated pulper. AEE was performed in a stainless-steel jacketed reactor using a pectinase pool (Olimax 101, 1% of enzyme m/m) applying the following extraction parameters: solid-liquid ratio: 1:1 w/w, 50 °C, 350 rpm for 2 hours. An aqueous extraction (AE) without enzyme assistance was also performed as a control. After the extraction, the slurry was centrifuged (8000 rpm for 10 min), and the products were separated (free oil, liquid, and solid fractions). The extraction process was evaluated by free-oil recovery efficiency (%), and by oil quality (acidity - % oleic acid; molar absorptivities - K232 and K270; total carotenoid content - TCC, $\mu\text{g g}^{-1}$). AEE provided higher process efficiency ($69.82\% \pm 1.24$) than the control extraction ($53.30\% \pm 0.02$). Macauba pulp oil obtained by AEE and AE presented similar quality: $2.93\% \pm 0.3$ acidity, 0.17 ± 0.1 K270, and $30.16 \mu\text{g g}^{-1} \pm 0.78$ TCC; and $2.76\% \pm 0.01$ acidity, 0.16 ± 0.01 K270, $28.82 \mu\text{g g}^{-1} \pm 0.82$ TCC, respectively. The K232 value was higher in AE (4.98 ± 0.50) compared to the AEE (2.48 ± 0.10), showing a beneficial effect on reducing oxidative compounds of the oil using the enzyme assistance in the extraction process. The results obtained in this study suggested that AEE is an eco-friendly and sustainable strategy for food industries to produce high-quality oil recovery from macauba pulp.

Keywords: Aqueous enzymatic extraction, Unconventional oil, Pectinase, Carotenoids