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Partition of free fatty acids in deacidification of macaúba (Acrocomia aculeata) pulp oil by liquid-liquid extraction using ethanol/water solution as solvent

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Free fatty acid (FFA) is one of the most frequently determined quality indices in fats and oils industry because it has the economic impacts on production [1]. Pulp of macaúba is considered a promising raw material for obtaining vegetable oils given its high productivity and its high oil content in the pulp (50 to 70%). Thus the FFA in macaúba pulp oil is usually very high (10 to 40%) due to enzymatic activity in the raw material [2]. In this case, alkali neutralization is not economically recommended due to neutral oil loss by occlusion in the soapstock. The differential solubility of fatty acids and triacylglycerides in various organic solvents has formed the basis of several processes for deacidification of crude oils by liquid–liquid extraction .

The aim of the present work was to evaluate the influence of ethanol/water ratio and temperature extraction on partition coefficients of FFA during macaúba oil deacidification. The raw macaúba crude oil presented high acid index, about 44 ± 0.6 %. The extraction data for the system macaúba oil + free fatty acids + ethanol + water was determined for oil:solvent mass ratios 1:1. Alcoholic solutions containing 2 to 10 % (w/w) of water were used to FFA extraction and the partition coefficients were determined after 24 hours at room temperature (293 K). The phase's separation was observed for water content in the mixture above 4%. After solvent evaporation, the FFA in oil phase was evaluated by AOCS standard method. The single stage liquid-liquid extraction reduced the FFA in macaúba pulp oil in about 23%. This result shows the potential of alcoholic solutions to vegetable oil deacidification. Besides reduced generation of environmental pollutants, this new approach could also lead to reduction in oil losses.

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