

Área: FIS

Electrolysis Applied to Acidity Reduction in Vegetable and Waste Oils: Treatment Optimization and Characterization

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Highlights

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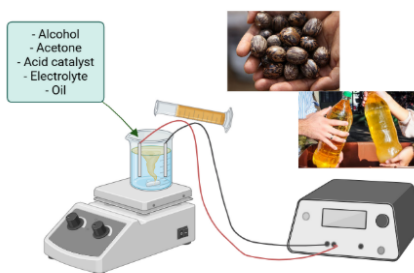
- Used oils and Hevea brasiliensis oil have high acidity and require prior treatment for use as alternative raw materials in biodiesel production.
- Electrolysis reduces free fatty acids without aggressive reagents or heating.
- Electrolysis treatment does not require heating and uses fewer reagents.

Resumo/Abstract

The growing demand for renewable energy drives biodiesel, but dependence on raw materials such as soybean oil and the presence of high levels of free fatty acids (FFA) in promising oils such as waste oils and Hevea brasiliensis oils pose critical challenges, as they hinder transesterification and compromise biodiesel yield.^[1,2]

In this context, electrolysis emerges as an innovative alternative, as it promotes non-spontaneous reactions capable of reducing acidity without requiring aggressive reagents or direct heating.^[3] This work proposes applying electrolysis as a pretreatment for acidic oils, with physical-chemical and spectroscopic characterization to prove the effectiveness of the process.

Figure 1. Methodology



Source: The author, 2025.

Results of previous treatments

Table 1. Reduction of acidity using an inert electrode

Tension	[Catalyst]	[Alcohol]	Time	mg KOH/g Oil	% reduction
1	-1	-1	1	24,95	60,65
1	1	1	1	18,11	71,43
-1	-1	-1	-1	60,18	5,08
-1	1	1	-1	46,27	27,02
-1	-1	1	1	22,28	64,87
-1	1	-1	1	26,73	57,84
1	1	-1	-1	48,88	22,91
1	-1	1	-1	52,08	17,85

Source: The author, 2025.

Reference

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