

# THE VOLTAMMOGRAM OF BIODIESEL FROM USED COOKING OIL PROCESSING

by Isana Supiah Yosephine Louise, Endang Widjanti L.F.X., Eli Rohaeti

## ABSTRACT

The cyclic voltammogram is a voltammetry method that has an important role in studying the characteristics of a system, including studying the components in a system. Cooking oil is a staple ingredient that people really need in food processing, especially fried food, and often leaves behind waste that is simply thrown away without being used. Therefore, it is natural for research to be carried out regarding used cooking oil, which will be processed into biodiesel, an alternative fuel using several types of catalysts, the cyclic voltammogram of which will be studied and linked to the properties of the biodiesel. This research will study the cyclic voltammogram of biodiesel resulting from processing used cooking oil using several types of catalysts, combined with an infrared spectral test to determine the components contained in the biodiesel.

The cyclic voltammogram of biodiesel from processing used cooking oil was obtained using the cyclic voltammetry method using the eDaq eChem voltameter at the UNY Chemistry Laboratory using a stainless steel working electrode. The research was carried out at room temperature (25<sup>o</sup> C), with a scan rate of 50 mV/s. The FTIR test was carried out at the FMIPA UNY Integrated Laboratory. The stainless steel used as the working electrode has been characterized spectroscopy-microscopy or SEM-EDX (scanning electron microscope-energy dispersive x-ray spectroscopy) and XRD (x-ray diffraction).

Based on research data, it shows that the processing of used cooking oil kitchen waste into biodiesel products has been successfully carried out with physical properties (free fatty acid levels, density, flash point and water content) that meet SNI quality standards. The highest yield when using a NaOH catalyst. The cyclic voltammogram of biodiesel products has different patterns for different catalysts (H<sub>2</sub>SO<sub>4</sub>, NaOH, tempeh yeast (*Rhizopus* sp) and lipase enzyme from soybean extract (*Glycine max* L.)). This indicates the content of different components for each biodiesel product, although in general it contains methyl esters as the main component of biodiesel (based on FTIR spectra). The type of catalyst that has the best relative activity in processing used cooking oil kitchen waste into biodiesel products is tempeh yeast (based on FTIR spectra) and NaOH (based on yield).

Kata Kunci: *cyclic voltammogram, used cooking oil, biodiesel, scan rate*