

Analysis of the Effect of Field Snail Shell (*Pila ampullacea*) and Microwave Assisted Transesterification Process Duration in Biodiesel Production

Dafit Ari Prasetyo S.T., M.T. (*Supervisor Thesis*)

Alfa Fikri Afisyena

*Renewable Energy Engineering Study Program
Department of Engineering*

ABSTRACT

Biodiesel is one of the efforts to process waste cooking oil. Making biodiesel from used cooking oil is done through several stages, one of which is the transesterification reaction. Conventional transesterification methods require a long time compared to microwave assistance that can break down molecules from all directions. This research utilizes rice paddy conch shell waste which has a CaO content of 99.5% so it is suitable for use as a catalyst in transesterification reactions. This study aims to determine the effect of the combination of the addition of the concentration of the scarecrow conch shell catalyst and the length of time of the transesterification process using microwaves on the biodiesel yield. This study used a 2-factor Completely Randomized Design (CRD) with 3 treatment levels each. The first factor is CaO catalyst concentration (C) with variations 3, 4 and 5% m/v. The second factor is the length of transesterification time (T) with variations 7, 9 and 11 minutes. Tested with analysis of variance (ANOVA) and if there is a difference in the mean of the test results followed by Duncan's Multiple Range Test (DMRT). The results of this study resulted in the highest biodiesel yield percentage in the T3C1 variation (11 minutes, 3% m/v) of 53.33%, with biodiesel characteristics namely density 854.20 kg/m³, kinematic viscosity 3.62 cSt, acid number 2.03 mg-KOH/g, cetane number > 62,5, iodine number 54,15 %mass (g-I₂/100g), methyl ester content 85,9% mass.

Keywords: *Biodiesel, Field Snail Shell, Microwaves, Transesterification, Waste Cooking Oil*