

## **ABSTRACT**

*Hydrolysis is one of the most time-consuming G2 bioethanol production processes compared to other stages, as it relies on enzymatic reactions that can decrease the efficiency of the process. RPM is one of the parameters observed with the aim of shortening processing time. Currently, the rotary speed control of the hydrolysis process motor at the G2 bioethanol pilot plant is controlled by the PLC without the use of a PID controller. Therefore, in this study, the design of a simulation of monitoring and control systems to regulate the motor rotary speed in the hydrolysis process using PLC and SCADA was carried out. The setup is done by determining the frequency change of the inverter controlled using the PLC Mitsubishi Q-series in the program in the form of a ladder diagram with PID algorithm function. The determination of PID parameters is based on tuning results using the Ziegler-Nichols 2 method and trial and error. While SCADA is used to monitor working tools and regulate motor turn speed. Based on the results of the simulation obtained that the system will experience a rapid response to reach the set point when the values  $K_p=1800$ ,  $K_i=2$ , and  $K_d=700$ . From these parameters the system takes 1.954 seconds to reach setpoint 30 Hz. Ladder diagram that has been created can be used for the process of controlling the motor's rotary speed because the program works in accordance with the function that has been created. The SCADA display is designed to have functions for tank monitoring, frequency value input settings, system response graph displays, and data logging. Data logging during the process can be done and stored in Microsoft Excel.*

**Keywords :** Bioethanol G2, Hydrolysis, RPM, PLC, SCADA, PID.