ABSTRACT

Pretreatment is the stage that is considered to have the most important role in the G2 bioethanol production process because it serves to break down the lignocellulose biomass matrix and increase the accessibility of cellulose in the hydrolysis process. One of the problems contained in the pretreatment stage of the batch system in the G2 bioethanol production process is that the pH level of NaOH solution used for the delignification process is still monitored and controlled manually. Therefore, in this study was conducted the design of a simulation of the monitoring system and controlling the pH levels in NaOH solution automatically based on PLC (Programmable Logic Controller) and SCADA (Supervisory Control and Data Acquisition). The design of the system is done by determining the plc configuration, where for the type of PLC used is the MITSUBISHI Q-Series PLC. Then continued the process of making ladder diagrams in GX Works 2 software that utilizes the function of PID control algorithms. The value of PID parameters namely Kp, Ki and Kd is based on tuning results using trial and error methods. After the control system is completed, the system is integrated into CIMON SCADA software to be able to control and display system response data. The results showed that in the pid parameter tuning test it was obtained that the system would work at optimal state when given the value of Kp = 150, Ki = 100 and Kd = 0.3 with a set point value of 11.5. In the ladder diagram program there are 11 sequences that can describe the working sequence of the system to be designed on the plant. For the display of monitoring systems that are made have functions, among others, for monitoring plant conditions, controlling processes, displaying system response graphs and data logging.

***Keywords**: Bioethanol G2, pH, PLC, Pretreatment, SCADA*