ABSTRACT

Bioethanol is a new renewable energy that is being developed to meet future energy needs. Currently, the second generation of bioethanol (G2) is being developed using raw materials in the form of lignocellulosic waste. The distillation process is a stage of purification of ethanol and water solutions by boiling the solution until it reaches the boiling point of ethanol. In the pilot plant-scale production of G2 ethanol at the LIPI Research Center for Chemistry, distillation is carried out in two stages. Phase 2 distillation will purify ethanol from a concentration of 60-70% to a percentage of 96% ethanol. Currently, the parameters that affect the performance of the distillation process require a monitoring and control system so that the system performance is more stable and the resulting product meets the required specifications. To overcome this problem, in this study the authors designed a monitoring and control system for the flow rate of steam that entered the distillation column stage 2. The monitoring and control system was designed using a SCADA-based PLC. Based on the research conducted by simulation, it was found that the monitoring and control system runs according to the required features, namely the monitoring system simulation can function and store sensor reading data, besides that the control system can run simulations on GX Works2 software such as signal conversion using Q68ADI, Q68DAIN, and temperature monitoring modules using the Q64TCRTN module. From the data in the test results of the monitoring and control system, the effect of the steam flow rate on the temperature when the process is running was obtained the value of the steam flowrate increases in the range of 10-12 kg/h and the temperature also increased at the optimum condition of 100ºC at the same time

Keywords*: bioethanol, control, distillation, PLC, SCADA.*