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Bioethanol has many functions, both as a chemical, a food, and an energy source. The development of bioethanol production is currently leading to residues of the main product. So in this study, we used palm and palm biomass with large waste availability. Therefore, a performance and economic analysis was carried out in the production of bioethanol from palm and palm biomass with Ionic Liquid (IL) using SuperPro Designer (SPD) software. As a preparatory stage, a process of testing the characteristics of the biomass is carried out to obtain the most optimal composition of aren and palm oil in bioethanol production. After simulating the conditions according to the experimental process for the most optimal composition of palm biomass, it was found that the most optimal Ionic Liquid (IL) and biomass ratio was 0.5 g/g with an ethanol concentration obtained at 90.6 g/L at 13 hours, which corresponds to a theoretical yield of 96% conversion of biomass to ethanol. Meanwhile, the composition using the most optimal oil palm biomass was obtained by Ionic Liquid (IL), and the biomass was 0.5 g/g with an ethanol concentration obtained of 92 g/L at 12 hours according to the theoretical yield of 96% conversion of biomass to ethanol. The production of ethanol in a factory for energy can reduce the price of ethanol by 30% from the initial price. Thus, with the abundant availability of biomass, bioethanol production with aren biomass has the potential to be developed in Indonesia.

Key Words: Biomass, Bioethanol, Ethanol, Ionic Liquid, SuperPro Designer