ABSTRACT

Cassava *(Manihot esculenta* L.*)* is a high-yield crop rich in starch, producing large amounts of peel waste that remain underutilized. Cassava peel, containing 80–85% starch and cellulose, is a promising feedstock for bioethanol, which serves as an alternative fuel and is also applied in pharmaceuticals, cosmetics, sterilization, and beverages. Bioethanol yield depends on peel composition, which varies by region, as well as raw material quality and yeast starter type. *Saccharomyces cerevisiae* is commonly used to produce ethanol through fermentation. This study aimed to obtain the best treatment of cassava peel collection area and yeast starter volume in the process of making bioethanol from cassava peel waste. This research was conducted at the Industrial Technology Laboratory, Faculty of Agriculture and Renewable Energy Engineering Laboratory, Faculty of Engineering, Malikussaleh University in North Aceh Regency from May to July 2025. This study used two factors a completely randomized design (CRD) and 3 replications, so that 18 treatments were obtained. The testing variables carried out are yield, density, viscosity, bioethanol content and cloud point. The results showed that the area where cassava peel waste was collected affected the bioethanol product in terms of density. The best treatment for the cassava peel collection area was L_2 (Saree). The yeast starter volume affected the quantity and quality of bioethanol from cassava peel waste in terms of yield and density. The best treatment was found in treatment S_1, which used a yeast starter volume of 250 mL. There was an interaction between the cassava peel waste collection area and the yeast starter volume on the quantity and quality of the bioethanol product. This can be seen in the density variable. The best treatment was found in the combination treatment (L_2S_1), which used the Saree area with a yeast starter volume of 250 mL.

Keyword: Fermentation, starch, sustainable, yeast, raw materials