ABSTRAK

Hasri Tri Maya Saragih, NIM 4193210022 (2023). Konversi Glukosa Kulit Nanas Menjadi Bioetanol Menggunakan Metode *Simultaneous Saccharification And Fermentation* (SSF) dan Metode *Separate Hydrolysis And Fermentation* (SHF).

Penelitian ini bertujuan untuk mengetahui perbandingan *yield* dan karakteristik bioetanol dengan metode *Simultaneous Saccharification and Fermentation* (SSF) dan *Separate Hydrolisis and Fermentation* (SHF) yang dihasilkan. Pada persen *yield* bioetanol yang dihasilkan dari fermentasi kulit nanas (*Ananas comosu*s L.) diperoleh *yield* bioetanol tertinggi pada metode *Simultaneous Saccharification and Fermentation* sebesar 63,50%, Sementara *yield* bioetanol melalui metode *Separate Hydrolisis and Fermentation* sebesar 58,75% lebih rendah dibandingkan *yield* yang dihasilkan metode *Simultaneous Saccharification and Fermentation*. Karakteristik fisik bioetanol limbah kulit nanas yang dihasilkan diantaranya *Simultaneous Saccharification and Fermentation* memiliki berat jenis sebesar 0,8237 gr/mL sedangkan berat jenis *Separate Hydrolisis and Fermentation* sebesar 0,8858 gr/mL, viskositas dari *Simultaneous Saccharification and Fermentation* sebesar 1,05 Cp sementara viskositas *Separate Hydrolisis and Fermentation* sebesar 1,02 Cp yang tidak terlalu jauh dengan sifat fisik etanol standar. Bioetanol kulit nanas dianalisis menggunakan spektrofotometri UV-Vis untuk menentukan kadar etanol, maka kadar bioetanol yang dihasilkan dari metode *Simultaneous Saccharification and Fermentation* sebesar 13% sementara bioetanol dengan metode *Separate Hydrolisis and Fermentation* sebesar 7,92%. Bioetanol yang diperoleh dari kulit nanas selanjutnya dikarakterisasi menggunakan FT-IR untuk mengetahui gugus fungsi dari ikatan senyawa etanol. Dari hasil penelitian diperoleh bahwa sampel bioetanol kulit nanas dengan perlakuan metode *Separate Hydrolisis and Fermentation* dari penambahan urea dan tanpa penambahan urea menunjukkan gugus fungsi CH, CH_3, CO tidak muncul hal ini karena kadar etanol yang rendah sementara bioetanol dengan perlakuan metode *Simultaneous Saccharification and Fermentation* menunjukkan hasil yang sempurna. Dapat diketahui dari hasil penelitian ini metode *Simultaneous Saccharification and Fermentation* lebih efektif untuk menghasilkan bioetanol.

Kata Kunci: Kulit nanas, Bioetanol, *Simultaneous Saccharification and Fermentation*, *Separate Hydrolisis and Fermentation*

ABSTRACT

Hasri Tri Maya Saragih, NIM 4193210022 (2023), Conversion of Pineapple Skin Glucose into Bioethanol Using *Simultaneous Saccharification And Fermentation* (SSF) Method *and Separate Hydrolysis And Fermentation* (SHF) Method.

This study aims to determine the yield comparison and characteristics of bioethanol with the resulting Simultaneous Saccharification and Fermentation (SSF) and Separate Hydrolysis and Fermentation (SHF) methods. In percent bioethanol yield produced from pineapple peel fermentation *(*Ananas comosus L.) obtained the highest bioethanol yield in the simultaneous saccharification and fermentation method of 63.50%, while bioethanol yield through the separate hydrolysis and fermentation method was 58.75% lower than the yield produced by the method simultaneous saccharification and fermentation. The physical characteristics of bioethanol pineapple skin waste produced include simultaneous saccharification and fermentation has a specific gravity of 0.8237 gr/mL while the specific gravity of separate hydrolysis and fermentation is 0.8858 gr/mL,viscosity of simultaneous saccharification and fermentation is 1.05 Cp while viscosity of separate hydrolysis and fermentation of 1.02 Cp which is not too far off with the physical properties of standard ethanol. Pineapple peel bioethanol was analyzed using UV-Vis spectrophotometry to determine ethanol levels, then the bioethanol content produced from the simultaneous saccharification and fermentation method was 13% while bioethanol with the separate hydrolysis and fermentation method was 7.92%. Bioethanol obtained from pineapple peel was further characterized using FT-IR to determine the functional group of the ethanol compound bond. From the results of the study, it was obtained that pineapple peel bioethanol samples with separate hydrolysis and fermentation method treatment from the addition of urea and without the addition of urea showed CH, CH_3, CO functional groups did not appear, this was because of low ethanol levels while bioethanol with simultaneous saccharification and fermentation method treatment showed perfect results. It can be known from the results of this study that the simultaneous saccharification and fermentation method is more effective for producing bioethanol.

Kata Kunci: Pineapple peel, Bioethanol, Simultaneous Saccharification and Fermentation, Separate Hydrolisis and Fermentation