

Production of arabinose by dilute sulfuric acid hydrolysis from Cornfiber

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Abstract

The two most wide spread pentose sugars found in our biosphere are D-xylose and L-arabinose. Arabinose is five-carbon sugar that have been used a precursor of chemical synthetic pharmaceuticals and an additives for diet foods. Its contents in the hemicellulose among varied cellulosic materials is approximately 0.2~4.0%. In previous papers, it was focused in the production of arabinose. High arabinose yield and selectivity was achieved at 0.4% sulfuric-acid concentration and 100°C, 1h.

The kinetics of cellulose hydrolysis under extremely low acid conditions(0.4~0.6%) and at 100~130°C was investigated using reactor. The corn fiber was hydrolysed by dilute sulfuric acid treatment. 27g /300 ml cornfiber(with moisture) was soaked in 0.4%~0.6%(v/v) sulfuric acid for 1h in a 3L reactor. pH of the suspension was adjusted to 7 using 1M ammonium hydroxide solution. The total hydrolysis process was followed by National Renewable Energy Laboratory(NREL) procedure. The glucose yield of 26.85%(xylose 11, arabinose 7.53 wt %) were obtained at some temperatures of 100~130°C. In the fermentation of cornfiber hydrolyzate by yeast, xylose was fully converted to xylitol over 90% yield at 3 days culture.

References

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