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Integrated Approach for Extraction of Xylose, Cellulose, Lignin and Silica from Rice Straw**Meena Krishania^{1*}, Vinod Kumar¹, Rajendra Singh Sangwan²**

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Abstract

In this paper, a novel process for xylose production was developed and discovered with simultaneous extraction of other product like cellulose, silica, and lignin. The study explored the effect of chemicals on xylose yield, and the xylose production process was optimized as followings: After pre-impregnation with nitric acid at 140 °C for 15 min, rice straw was treated at 1 bar with 0.5% (v/v) nitric acid, followed by second hydrolysis by using 2.5%(w/v) sodium hydroxide with 2%(w/v) sodium hypochlorite at 121 °C for 1 h, decolouration and ionic impurities were removed by ion exchange. Using this process, 13.8 g of crystal xylose was produced from 100 g rice straw, simultaneously 26.01 % (w/w) of cellulose, 10.11% (w/w) silica, and 6.21% (w/w) lignin were also extracted from rice straw respectively. All results indicated that this process is a more effective than the traditional method sulphuric acid hydrolysis process for lignocellulose biorefinery.

Key Words: Rice Straw; Pretreatment; Xylose; Cellulose; Lignin; Silica

Highlights

- 13.8 g of crystal xylose was produced from 100 g rice straw,
- 85.5% of xylose sugar as a monomeric form was liberated from present hemicellulose in rice straw.
- Simultaneously extraction of cellulose 26.01%, silica 10.11% and lignin 6.21% from rice straw.

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