

عنوان مقاله:

Hydrogen and syngas production from gasification of lignocellulosic biomass in supercritical water media

محل انتشار:

مجله بین المللی بازیافت مواد آلی در کشاورزی، دوره 4، شماره 2 (سال: 1394)

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خلاصه مقاله:

Purpose Novel biomass-processing technologies have been recently used for conversion of organic wastes into valuable biofuels like bio-hydrogen. Agricultural wastes are available and renewable energy resources to supply energy demand of the future. The purpose of this study is to investigate the production of hydrogen-rich syngas from wheat straw, walnut shell, and almond shell. **Methods** Supercritical water gasification is a promising technology to convert biomass into useful fuels. Non-catalytic conversion of wheat straw, walnut shell, and almond shell into the hydrogen-rich gas in supercritical water media was performed using homemade batch microreactor system. **Results** Hydrogen gas yields of 6.52, 4.26 and 4.1 mmol per 1 gram of wheat straw, walnut shell, and almond shell were observed, respectively. In addition, hydrogen and carbon gasification efficiencies equal to 42.6 and 46.9 % were calculated from gaseous products and elemental analysis of wheat straw, which were higher than other feedstocks' gasification efficiencies. **Conclusion** Wheat straw had the highest and walnut shell had the lowest total gas and hydrogen gas yields. Taking into account the structural analysis, it was recognized that feedstocks with higher cellulose and hemicellulose and lower lignin contents were better gasified due to their easier hydrolysis and higher solubility in water.

کلمات کلیدی:

Biomass Hydrogen production Gasification Supercritical water media

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