

## **Dilute acid pretreatment of biomass for enhancement of anhydrosugar production by fast pyrolysis**

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### *Abstract:*

Levogluconan is one of the major components in bio-oil produced from fast pyrolysis of lignocellulosic biomass. Raw bio-oil can be fractionated into a pyroligneous fraction with a 29% yield and an anhydrosugar-rich aqueous fraction with a 71% yield, which can either be reformed via a catalytic approach by aqueous phase processing (APP) to produce specific classes of liquid hydrocarbons suitable as transportation fuels, or be hydrolyzed and fermented into bioethanol. Both of the pathways require that aqueous fraction anhydrosugars content be as high as possible.

Previous research has reported that the maximum anhydrosugars produced by fast pyrolysis is nearly 27.5 wt% based on biomass if mild acid pretreatment is applied to demineralize the feedstock prior to fast pyrolysis. In this study, a new process was developed based on traditional fast pyrolysis process. Dilute acid pretreated pine wood was pyrolyzed in a modified pyrolysis reactor, producing a large amount of anhydrosugars in the aqueous fraction. Our new process produced 32.5 % anhydrosugars, which was mostly levoglucosan, resulting in a greater than 18% yield increase of anhydrosugars compared with the previous research. This high yield was obtained by combining biomass pretreatment with modified pyrolysis reactor technology.