Using modified rice husk for oil sorption

By

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Abstract

In this thesis, different ways of delignification on rice husks are tested and compared on the basis of their oil sorption capacity using chemical and biological pretreatment of rice husks. There chemical pretreatment methods and the four micro-organism pretreatment methods are investigated based on the results of lignin and hemicellulose degradation. In the chemical pretreatment, sodium hydroxide pretreatment with the supplement of hydrogen peroxide was proved to be the most productive way in generating the highest faction of cellulose. Sodium hydroxide pretreatment has been shown to be effective on both lignin and hemicellulose degradation. Meanwhile, hydrogen peroxide pretreatment is found to have a less obvious effect on lignin and hemicellulose degradation, comparing with the other two methods, although with the aid of hydrogen peroxide, the delignification of sodium hydroxide is increased largely. In the microorganism treatment, three strains of fungus have a better performance than that of the bacterium strain. A. flav is the most effective one in cellulose production. However, bacterium strain, B.lich degrades most hemicellulose among all the strains. For the oil sorption tests, sodium hydroxide (NaOH) / hydrogen (H₂O₂) peroxide pretreatment rice husks and A.flav pretreatment rice husks are compared for their oil sorption capacity. With the large amount of cellulose present, the oil uptake capacity of NaOH/ H₂O₂ pretreatment has the largest capacity. Meanwhile, uptake kinetics modeling and retention modeling were also used to find the most suitable model for modified rice husks oil sorption capacity test.

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