

Optimization of Enzymatic Hydrolysis Conditions of Sheep Manure

An Dan^{*}, Mi Hang

School of Environmental Science and Engineering, Shanxi University of Science & Technology, Xi'an, China

Email address:

andan@sust.edu.cn (An Dan), 911152108@qq.com (Mi Hang)

^{*}Corresponding author

Abstract

Biohydrogen production using sheep manure hydrolysate as a substrate is very promising, but one of the bottlenecks limiting this technology is the low content of reducing sugars in sheep manure hydrolysate. Optimizing the hydrolysis process conditions is an effective way to solve this problem. Enzymatic hydrolysis has significant advantages in the hydrolysis process of sheep manure. On this basis, the process conditions for enzymatic hydrolysis of sheep manure were optimized in this experiment, enzymatic hydrolysis pH, enzyme dosage (cellulase and hemicellulose), enzymatic temperature, and enzymatic time selected as parameters for optimization, and the optimal hydrolysis conditions were obtained. The optimal hydrolysis conditions are: enzymatic hydrolysis pH of 6.0, enzyme dosage (cellulase 12 g/L, hemicellulose 12 g/L) of 24 g/L, enzymatic temperature of 45 °C, and enzymatic time of 16 hours under acid (sulfuric acid) concentration of 3.5%. Under these conditions, the hydrolysis rate of sheep manure is $43.73 \pm 6.34\%$, and the reducing sugar content in the hydrolysis solution is 38.96 ± 2.93 g/L. The results of this study can provide reference for the process conditions of sheep manure hydrolysis and also contribute to the resource utilization of sheep manure.

Keywords

Sheep Manure, Enzymatic Hydrolysis, Condition Optimization