

Abstract

Maitake mushroom (*Grifola frondosa*) is extensively cultivated in Japan using sawdust matrices (SM), mainly made of hard wood chips, as media. This leads to the accumulation of a large amount of spent-sawdust matrix (SSM). For example, one of the maitake mushroom cultivation companies in Japan produces more than 230 tons (wet weight) of SSM every day. There is yet no major utilization method of the SSM, and this has resulted in a high cost of treating the waste material. Our studies have been focused on effective methods for bioconversion of SSM into bioethanol. Given that the moisture content of SSM was about 70% after the maitake cultivation, drying of the SSM is required to prevent decay during storage and to reduce the cost of transportation. In the present study, the effects of drying conditions on the efficiency of grinding and a simultaneous saccharification and fermentation process (SSF) were investigated. Thermal analysis (TG/DTG) of the raw SSM was conducted using a thermo-analysis instrument (EXSTRAR6000 TG/DTA, Seiko Instruments, Inc., Japan). The thermal analysis was also used for determining appropriate thermal dry treatment conditions for saccharification of the SSM. The dry-treated SSM was milled using a beads beater (TOMY Micro smash MS-100) for enzymatic saccharification. The results of thermal analysis of the raw SSM showed that the optimal drying condition for grinding and saccharification was in the temperature range of 25 and 200 °C, at a rate temperature increase of 50 °C/min. To develop a large-scale drying process, effects of oven-drying were also investigated. The results obtained from the oven-drying showed that the optimal condition was 200 °C for 30 min and, thus, conforms with the results of the thermal analysis. The ethanol concentration yield by SSF from the oven-dried SSM (at 200 °C for 30 min) was higher than that of the air-dried SSM at room temperature.

Do you want to **read the rest** of this article?

Request full-text

Optimization of the Thermal Dry Treatment To Enhance the.... Available from:

https://www.researchgate.net/publication/231273166_Optimization_of_the_Thermal_Dry_Treatment_To_Enhance_the_Enzymatic_Hydrolysis_of_a_Spent-Sawdust_Matrix_Used_for_Grifola_frondosa_Cultivation