# Hydrolysis of Woody Material and Utilization by High Steam Reactor

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	キーワード (Ja):
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	作成者: Sawada, Tatsuro
	メールアドレス:
	所属:
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## 1988 Fiscal Year Final Research Report Summary

### Hydrolysis of Woody Material and Utilization by High Steam Reactor

Research Project

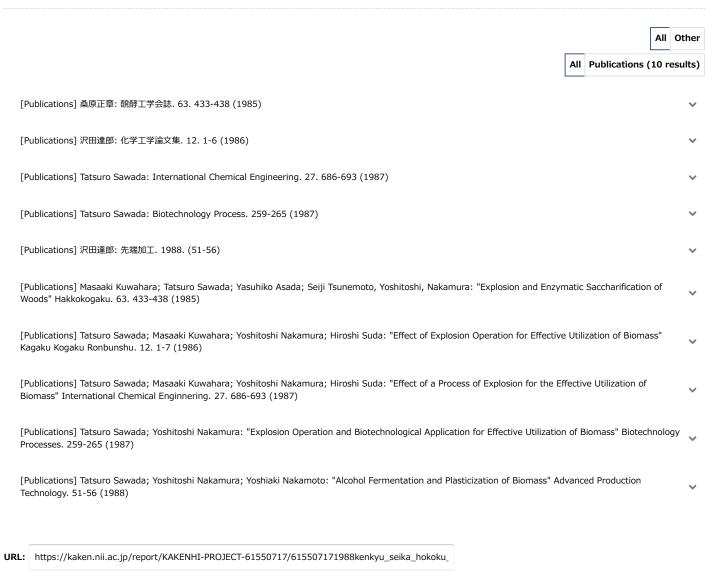
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Kanazawa University
Principal Investigator
SAWADA Tatsuro Faculty of Technology, Kanazawa University, Professor, 工学部, 教授 (80019728)
Co-Investigator(Kenkyū-buntansha)
NAKAMURA Yoshitoshi Faculty of Technology, Kanazawa University, Assistant, 工学部, 助手 (20172455)
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#### **Research Abstract**

The application of bioprocess system for microbial conversion of lignocellulosic materials into energy was studied experimentally by using steam explosion process as pretreatment. Wood chips of Larix leptolepis and Eucalyptus were exploded at various pressures of steam and times of heating. The products were separated into water-soluble hemicellulose, cellulose, methanol-soluble lignin and Klason lignin. The effects of explosion on the concentration of methanol-soluble lignin, Klason lignin, hemicellulose, and cellulose were determined from the experimental data. The effect of explosion on the enzymatic saccharification was examined by using exploded wood samples. The explosion treatment was found to be effective for delignification of the wood and for increasing its susceptibility to enzymatic hydrolysis. The enzymatic hydrolysis and ethanol productivity were compared in three culture systems: a liquid cultures of two steps of the enzymatic saccharification and fermentation, and immobilized culture of cells, and a simultaneous culture of saccharification and fermentation. As a result, it was the most effective for producing alcohol from exploded wood. The conditions of optimal operation in this explosion system was evaluated from the contour map of ploting ratio of saccharification per unit energy consupmtion against steam pressure and reaction time. It was

realized that the ration of saccharification per unit energy consumption against steam pressure and reaction time in Larch attained to the maximum at 4.3 MPA of pressure and 3 minute of reaction time and that of eucalyptus attained to the maximum at 3.7 MPA and 2 minute.

#### Research Products (10 results)



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