

# **Development of Pretreatment System for Enzymatic Saccharification of Japanese Cedar Wood by Wet-Grinding Bench Plant**

**Motohito Yoneda<sup>1</sup>, Sadayoshi Kitajima<sup>2</sup>, Takashi Watanabe<sup>1</sup>**

<sup>1</sup>Laboratory of Biomass Conversion, RISH, Kyoto University,

<sup>2</sup>Yamani Co., Ltd.

Energy supply in Japan mostly depends on fossil fuels imported from foreign countries. We have experienced oil crises two times and recognized that our life entirely depended on the stable import of crude oil at low cost. We have also recognized that mass consumption of fossil fuels caused rapid increase in carbon dioxide concentration in the atmosphere, leading to global warming. These backgrounds urged us to develop bioethanol production systems from lignocellulosics which is not competitive to food supply.

Akita Prefecture is famous for the production of Japanese cedar wood. We have started a project on bioethanol production from Japanese cedar wood as a grant research “The Regional Innovation Creating Research and Development Business” sponsored by the Ministry of Economy. In this project we studied a pretreatment system for enzymatic saccharification using a wet-grinding bench plant, in collaboration with Yamani Co., Ltd., Shimizu Co., Ltd., Sanei Kikai Co., Ltd., Asahi Research Center Co., Ltd., The Akita Center To Implement vigorous Enterprises, etc. The bench plant is constructed at Kosaka town in Akita prefecture. This plant is composed of sawing machine, blender and two disk-grinders for rough and fine grinding. The pretreatment effect was evaluated in terms of enzymatic saccharification ratio, energy cost, processing speed, and particle size distribution. Electron microscopy was used to analyze the grinding effect. It is important to optimize the condition for pretreatments. The cost of original wood, mill construction, processing and transportation is the limiting factor for industrialization in Japan. Because the bioethanol plant using wet-grinding can be placed in rural area near forestry, we hope that this study contributes to the establishment of sustainable society linked with activation of forestry and local economy.