

# The simultaneous production of sugar and biomass ethanol using high-biomass sugarcane derived from inter-specific and inter-generic cross in Japan

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Sugarcane production area in Japan is limited to the Nansei Islands. During the 2003 - 2004 milling season, the total harvest area, total cane production and average cane yield were 23844 ha, 1,387,510 t, and 58 t / ha, respectively. Sugarcane is an important crop for sugar production to maintain food security in Japan. Sugarcane has only been used for sugar production, although the production costs are very high. Effective utilization of by-products generated by sugar production is demanded. But the by-products (bagasse, molasses etc.) yield of commercial cultivar is too small to utilize.

To overcome such problems, we have carried out inter-specific and inter-generic cross with *Saccharum spontaneum*, *Sorghum bicolor*, *Miscanthus* spp. and *Erianthus* spp. to develop high-biomass sugarcane clones for multi purpose use. To date, we succeeded in selecting many high-biomass clones that offer high yield, about two-fold the yield of current commercial cultivars. At present, we have designed the simultaneous production of sugar and biomass ethanol from high-biomass sugarcane in cooperation with Asahi Breweries, LTD. The objectives of this project are 1; maintenance of sugar production at current levels, 2; produce biomass ethanol by fermenting a large quantity of sugar-rich molasses, 3; production of total energy for sugar and ethanol production generated by a large quantity of bagasse.

Our productivity simulations confirmed that sugar production could be maintained at present levels and three-times more biomass ethanol could be generated compared with that in the conventional process. In addition, we demonstrated that a carbon-neutral process could be achieved using the new process.

