

## Technological development of bioethanol production from starch-based biomass

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### ABSTRACT

Starch-based bioethanol is produced by processes known as pre-treatment, fermentation and refinery process. The pre-treatment process can be subdivided into the stages called milling, gelatinization, liquefaction and saccharification unit. The insoluble high molecular starch particle is gelatinized at 60~70°C and then low molecular starch particle is liquefied at 85~95°C using  $\alpha$ -amylase. In the next, they are converted to zymohexose which can be fermented by yeast in saccharification process at 55~60°C by using glucoamylase. The SSF(Simultaneous Saccharification and Fermentation) process developed to carry out saccharification and fermentation at the same time has been recently used.

Hexose produced by going through the process of pre-treatment is fermented, in a fermenter of batch or semi continuous type(cascade), in anaerobic position by *Saccharomyces cerevisiae* and then produces ethanol with 10.0 ~ 12.0 v/v %.

Anhydrous ethanol blended with gasoline for fuel is produced from azeotropic distillation process using entrainers such as benzen, *n*-peatane, heptane and cyclohexane or PSA(Pressure Swing Adsorption) process using molecular sieve(0.3~0.4nm) or pervaporation process using membrane recently developed after making hydrous ethanol with 93.0~95.0 v/v % by using 2 distiller columns.

Starch-based bioethanol has developed its competitive power as alternative fuel in the world to increase productivity through the process development in connection with ethanol tolerance of yeast strains, a compact of equipment, reducing costs of production, breeding and developing of crops for bio-fuel, a processing of starch and a biorefinery industry.