

BIOETHANOL PRODUCTION FROM CORN BY SIMULTANEOUS SACCHARIFICATION AND FERMENTATION USING BAKER'S AND DISTELLERS YEAST

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Bioethanol is most promising, widely used renewable biofuel with long history as environmentally friendly alternative to replace fossil fuels, especially in transportation sector. Nowadays, bioethanol is mainly produced worldwide from first-generation raw materials including various sugar-containing feedstocks (sugar beet, sugar cane, molasses, sweet sorghum, and fruits) and starch-containing feedstocks (corn, wheat, rice, triticale, potato, cassava, etc.).

Corn remains to be the primary feedstock that is still used for about half of the world's bioethanol production.

Baker's yeast was traditionally used as a starter culture in ethanol production due to its low cost, easy availability, and tolerance to a wide pH range. However, modern biotechnology developed highly efficient distiller's *S. cerevisiae* strains which can achieve ethanol concentrations up to 20% v/v because they can tolerate an increase in ethanol concentration, high fermentation temperatures, osmotic stress, and are able to compete with contamination during fermentation.

In general, there are two technological techniques that are commonly used in industrial bioethanol production referred to as:

- separated hydrolysis and fermentation (SHF), and
- simultaneous scarification and fermentation (SSF).

In this work, SHF and SSF techniques were investigated and compared for bioethanol production from corn by baker's yeast and distiller's yeast. It was found that the SSF process was significantly more efficient for ethanol production than the SHF process, especially when baker's yeast was used as producing microorganism. The results showed that the SSF process integrates the advantages of the application of appropriate technical amylase and superior distiller yeast.

Starch conversion to ethanol in the SSF process reached 91% of the theoretical for baker's yeast and 94% for distiller's yeast. Ethanol yield of 37,2 mL and 38,5 mL per 100 g of corn was obtained by baker's and distiller's yeast, respectively.

