

## SciFinder Biomass Reference Example

**Simultaneous [saccharification](#) and [ethanol fermentation](#) of oxalic acid pretreated corncob assessed with response surface methodology**

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Response surface methodol. was used to evaluate optimal time, temp. and oxalic acid concn. for simultaneous [saccharification](#) and [fermn.](#) (SSF) of corncob particles by *Pichia stipitis* CBS 6054. Fifteen different conditions for pretreatment were examd. in a 23 full factorial design with six axial points. Temps. ranged from 132 to 180 °C, time from 10 to 90 min and oxalic acid loadings from 0.01 to 0.038 g/g solids. Sep. maxima were found for enzymic [saccharification](#) and hemicellulose [fermn.](#), resp., with the condition for max. [saccharification](#) being significantly more severe. [Ethanol](#) prodn. was affected by reaction temp. more than by oxalic acid and reaction time over the ranges examd. The effect of reaction temp. was significant at a 95% confidence level in its effect on [ethanol](#) prodn. Oxalic acid and reaction time were statistically significant at the 90% level. The highest [ethanol](#) concn. (20 g/l) was obtained after 48 h with an [ethanol](#) volumetric prodn. rate of 0.42 g [ethanol](#) l<sup>-1</sup> h<sup>-1</sup>. The [ethanol](#) yield after SSF with *P. stipitis* was significantly higher than predicted by sequential [saccharification](#) and [fermn.](#) of substrate pretreated under the same condition. This was attributed to the secretion of  $\beta$ -glucosidase by *P. stipitis*. During SSF, free extracellular  $\beta$ -glucosidase activity was 1.30 pNPG U/g with *P. stipitis*, while [saccharification](#) without the yeast was 0.66 pNPG U/g.

**Indexing**

Fermentation and Bioindustrial Chemistry (Section 16-5)  
Section cross-reference(s): 52

**Concepts****Hydrolysis**

acid, as a pretreatment; simultaneous [saccharification](#) and [ethanol fermn.](#) of oxalic acid pretreated corncob assessed with response surface methodol.

**Saccharification**

enzymic; simultaneous [saccharification](#) and [ethanol fermn.](#) of oxalic acid pretreated corncob assessed with response surface methodol.

**Fermentation**

[ethanol](#); simultaneous [saccharification](#) and [ethanol fermn.](#) of oxalic acid pretreated corncob assessed with response surface methodol.

**Corncob****Temperature****Time*****Yamadazyma stipite***

simultaneous [saccharification](#) and [ethanol fermn.](#) of oxalic acid pretreated corncob assessed with response surface methodol.

**Optimization**

statistical; simultaneous [saccharification](#) and [ethanol fermn.](#) of oxalic acid pretreated corncob assessed with response surface methodol.

**Hydrolysis**

thermal, as a pretreatment; simultaneous [saccharification](#) and [ethanol fermn.](#) of oxalic acid pretreated corncob assessed with response surface methodol.

**Substances**

[50-99-7P](#) D-Glucose, preparation

[58-86-6P](#) D-Xylose, preparation

simultaneous [saccharification](#) and [ethanol fermn.](#) of oxalic acid pretreated corncob assessed with response surface methodol.

Biochemical process; Biosynthetic preparation; Biological study; Preparation; Process

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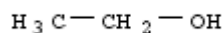
**Language**

English

9012-54-8 Cellulase  
 1086523-26-3 Accellerase 1000  
 simultaneous **saccharification** and **ethanol fermn.** of oxalic acid pretreated corncob assessed with response surface methodol.  
 Biochemical process; Catalyst use; Biological study; Process; Uses

9004-34-6 Cellulose, reactions  
 simultaneous **saccharification** and **ethanol fermn.** of oxalic acid pretreated corncob assessed with response surface methodol.  
 Biochemical process; Reactant; Biological study; Process; Reactant or reagent

64-17-5P Ethanol, preparation



simultaneous **saccharification** and **ethanol fermn.** of oxalic acid pretreated corncob assessed with response surface methodol.  
 Bioindustrial manufacture; Biological study; Preparation

144-62-7 Oxalic acid, uses  
 simultaneous **saccharification** and **ethanol fermn.** of oxalic acid pretreated corncob assessed with response surface methodol.  
 Catalyst use; Uses

#### Supplementary Terms

corncob oxalate pretreatment **ethanol fermn**

#### Citations

- Akhtar, M; WO 02075043 A1 2002  
 Barl, B; J Sci Food Agric 1991, V56, P195  
 Dutton, M; Can J Microbiol 1996, V42, P881  
 Evans, C; FEMS 2006, V13, P235  
 Green, F; Mater Organism 1991, V26, P191  
 Hofrichter, M; Enzyme Microbial Technol 2002, V30, P454  
 Igarashi, K; J Biosci Bioeng 2003, V96, P572  
 Inglett, G; Corn:Culture, Processing and Products 1970  
 Jeffries, T; Nat Biotechnol 2007, V25, P319  
 Kenealy, W; Holzforschung 2007, V61, P223  
 Mosier, M; Biotechnol Prog 2001, V17, P474  
 Munir, E; PNAS 2001, V98, P11126  
 Sassner, P; Bioresour Technol 2008, V99, P137  
 Schmidl, C; Proceedings of the American Wood Preservrs' Association 1981, V77, P157  
 Shimada, M; FEMS Microbiol Rev 1994, V13, P285  
 Swaney, R; Proceedings of the Tappi Fall Technical Conference:Engineering Polping & PCE & 1 2003  
 Torget, R; US 5424217 2002  
 Yan, T; J Agric Food Chem 1998, V46, P431

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