

Ethanol production from steam exploded rapeseed straw and the process simulation using artificial neural networks - DTU Orbit (08/11/2017)

Ethanol production from steam exploded rapeseed straw and the process simulation using artificial neural networks

Rapeseed straw was utilized as a cheap raw material for ethanol production. Effects of steam explosion on chemical composition, enzymatic hydrolysis (EH) and simultaneous saccharification and fermentation (SSF) were studied. Changes in the pretreatment conditions showed strong effects on digestibility of the resulting straw. The optimum results were obtained at 180A degrees C, 10% solid fraction, 1% H₂SO₄, and 10 min retention time. Under optimal condition, glucose hydrolysis yields of 93 and 89% were obtained for 5 and 10% solid fractions, respectively. The corresponding ethanol yields were 63 and 67% of maximum theoretical value. Next, data of the experimental runs were exploited for modeling the processes by artificial neural networks (ANNs) and performance of the developed models was evaluated. The ANN-based models showed a great potential for time-course prediction of the studied processes. Efficiency of the joint network for simulating the whole process was also determined and promising results were obtained.

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