

Process Design and Optimization of Furfural Production from Lignocellulosic Biomass

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Interest in the production of chemicals and fuels from renewable resources has been increasing in recent year due to environmental concerns as using fossil fuels. Furfural has been identified as one of the major bio-based platform chemicals that can compete with petroleum-based chemicals. However, the current commercial furfural process has low yield and has required intensive energy. In this work, a distillation process of furfural from reactor condensate is studied. First, we presented an optimal conventional sequence optimized by response surface methodology (RSM). A novel distillation technology to enhance energy and cost efficiency of furfural production process was then proposed by combining bottom dividing wall column and decanter (BDWC-D) optimized by RSM. Simulation works were conducted using Aspen HYSYS. The results show the proposed design can reduce significantly production costs and environmental impacts as compared to the base case. The authors wish to acknowledge the financial support from the R&D Convergence Program of NST (National Research Council of Science & Technology) of Republic of Korea and KITECH (Korea Institute of Industrial Technology) (ES150001).