

Feasibility study of various design alternatives for dehydration and purification of
2,3-butanediol

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The feasibility of various design alternatives for the purification of 2,3-butanediol (2,3-BD) from fermentation broth were examined. For the proposed configurations, an economic optimum design based on minimum total annual cost as an objective function was developed. The simulation are performed in Aspen Plus® and the binary interaction parameters are regressed and validated using experimental data by NRTL and UNIQUAC thermodynamic models. The energy efficient and heat integrated designs such as dual distillation and vacuum flash distillation obtained savings in terms of energy and TAC by up to 51%, 66.6% and 55%, 61.2% respectively. In addition, energy efficient vacuum flash distillation can be employed to distillation based separation and purification of any kind of biofuels in an industry. This work was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2018R1A2B6001566) and by Priority Research Centers Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2014R1A6A1031189).