

Process design alternatives to purify 2,3-Butanediol

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2,3-Butanediol is an important chemical have numerous properties both in chemical and energy. The design alternatives for the purification of 2,3-butanediol 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. To carry the process design simulations the binary interaction parameters are regressed and validated using experimental data by NRTL and UNIQUAC thermodynamic models in Aspen Plus simulator. 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 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).