

Recovery process 2,3-butanediol from fermentation broth using multi-effect-evaporation-assisted distillation

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Due to the deficiency of conventional crude oil resources, great attention is focused on the production of bio-based chemicals from renewable resources. 2,3-Butanediol(2,3-BDO), is a valuable chemical itself because of its various applications as a printing inks, perfumes, softening and moistening agents, pharmaceuticals, anti-freeze agent, and liquid fuels. Nevertheless, because the concentration of target product from fermentation broth is low, this process consumes significant energy. Thus, a multi-effect evaporation-assisted distillation (MEED) was considered to improve the process efficiency. In this study, 2,3-BDO from fermentation broth was purified by multi-effect-evaporation-assisted distillation. Especially, the total annual cost of the proposed configurations with double effect, triple effect, quadruple effect, quintuple effect, and sextuple effect represents saving result by up to 12.3%, 16.9%, 20.1%, 21.7%, and 17.5%, respectively. The proposed configuration with heat integration significantly reduced the TAC by up to 38.9%.