Puification and separation of 2,3-butanediol from fermentation broth through butanol-based low boiling solvents

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2,3-butanediol has drawn a great interest as a most promising drop-in fuel, mainly due to its high anti-knock index and higher heating value. However, to produce 99% pure 2,3-butanediol, dehydration and purification step in microbial production process consumes tremendous amount of energy. In this context, we are going to propose an energy efficient dehydration and purification scheme naming as "butanol-based extraction-assisted distillation". Based on economic, technical and environmental impact, the iso-butanol and 1-butanol were chosen as a solvent for the proposed scheme. By employing the proposed scheme with iso-butanol and 1-butanol, the overall energy efficiency in dehydration and purification step of 2,3-butandiol microbial production process can be improved up to 24.5% and 31.3% with total annualized cost reduction up to 10.42% and 18.9%, respectively. 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).