Separation and purification of bio-based diamines from fermentation broth

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1,3-diaminopropane (1,3-DAP), 1,4-diaminobutane (1,4-DAB), and 1,5-diaminopentane (1,5-DAP) are important chemicals due to their wide industrial use including bionylon synthesis. In this study, an effective process for the separation and purification of diamines from fermentation broth without using highly flammable or toxic solvents was developed. The optimal process for the recovery and purification of these diamines from fermentation broth comprises several unit operations including removal of cell debris, decolorization of fermentation broth, product concentration, deprotonation of diamines, product separation, and final polishing to obtain extremely pure 1,3-DAP, 1,4-DAB, and 1,5-DAP with yields of 87%, 86%, and 81%, respectively. The strategy reported here could be similarly applicable in developing downstream processes to recover and purify other diamines and related chemicals from fermentation broth. This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries (NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557) from the Ministry of Science and ICT through the National Research Foundation of Korea.