

Bioprocess innovation to zero-concepts for carbon neutral biorefinery

나정걸[†], 박시재¹, 이진원
서강대학교 화공생명공학과;
¹이화여자대학교 화공신소재공학과
(narosu@sogang.ac.kr[†])

Biorefinery has received much anticipation to play a crucial role in the construction of a carbon-neutral society. The biorefinery process utilizes sustainable, carbon-neutral biomass, which could replace fossil resources directly for chemical production. However, to assure the complete sustainability of this biomass conversion technology, it is necessary to consider environmental and economic feasibility during the entire process as well as the raw material aspect. The bioprocess consists of a combination of various unit processes, each of which may generate carbon footprints. For example, in the aerobic fermentation process, a large amount of energy is required to supply oxygen. Since water is inherently involved in biological reactions, much energy expense is incurred for the separation and purification of final products. In this presentation, we propose a bioprocess based on zero concepts under these contexts. An ideal bioprocess should minimize the formation of CO₂ and other byproducts, and the introduction of water and air supply, and eliminate the need for energy-intensive steps. The state-of-the-art technology for these purposes and future directions will be discussed.