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Editorial

Microbial Technology for Biosustainability

The current issues on resources, energy, and the environment of human society drive us to seek sustainable manufacturing methods and development approaches. Microbes, with a series of advantages of broad substrate ranges and diverse metabolic capacities, have great potential to produce fuels and chemicals from renewable resources [1]. In recent years, a series of progress has been made in this field in the context of fast-developing synthetic biology technologies and interdisciplinary research. The highly abundant renewable resources, including one carbon (C1) compounds and lignocellulose, can be converted to platform chemicals and then to various products by natural or engineered microbial cell factories [2].

In this special issue, we aimed to report the recent progress in microbial technologies for sustainable manufacturing. The bioconversion of one-carbon gases not only provides new technical routes to produce foods, fuels, and chemicals but also helps to mitigate climate change. Wei et al. reviewed the knowledge and advances in engineering the "Knallgas" bacterium *Ralstonia eutropha* for producing 2,3-butanediol from CO_2 and H_2 [3]. CO_2 and CO can also be converted to acetate, which also serves as a promising carbon source to produce organic acids, alcohols, esters, etc. Gong et al. summarized the studies in this field and indicated the existing challenges of microbial production from acetate [4]. As efficient CO_2 capturers in nature, microalgae are valuable sources of carbohydrates, lipids, proteins, and functional compounds. Idenyi et al. reviewed the use of microalgal compounds in the production of aquaculture diets [5], and Müller et al. discussed the key technologies and challenges in producing algal bioethanol [6]. Using algal biomass hydrolysates as the carbon source, Fiayaz and Dahman reported biobutanol production in clostridial strains obtained by protoplast fusion [7]. In addition, two research articles studied the production of cellulases and secondary metabolites by the well-known cellulolytic fungus *Trichoderma reesei*. Wang et al. demonstrated that the overexpression of cellobiohydrolase II facilitated the expression of major cellulases in the early stage of cellulose utilization [8]. Based on the results of transcriptomic analysis, Yang et al. suggested that the sorbicillin biosynthetic regulator Ypr1 is involved in the expression of other secondary metabolite synthetic genes [9]. These two studies are expected to promote the rational genetic engineering of industrial *T. reesei* strains.

Microorganisms have been attracting more and more attention in utilizing renewable resources for manufacturing. The articles in this special issue expand our understanding of important microbial processes in this field. Also, we hope they will advance the development of more efficient technologies for sustainable production.

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