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Review

A review on lactic acid production via microbial fermentation from biowaste: insights on scaling up to industrial process

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Abstract

Lactic acid (LA), the starting material for polylactic acid, is currently in high demand owing to rising bioplastic production. Large-scale production of LA typically uses a first-generation feedstock, namely food-grade sugars, *owing* to the absence of contaminants and ease of processing. However, it is not ethically correct to grow crops exclusively for LA production as the available land, water and resources should be utilized for food. Utilizing biowaste as a feedstock, which does not compete with the supply of the food chain, is a more responsible strategy. This review intends to address the most critical aspect of recent advances in laboratory- and pilot-scale LA production that utilizes biowaste as the substrate. Based on the review, the biowastes used for LA fermentation can be categorized into four main groups: starchy materials, lignocellulosic materials, food and dairy wastes. A flowchart that summarizes the process of developing a pilot scale LA production is proposed. It covers essential parameters to be considered, such as the substrate, fermentation process and inoculum. The future insights concerning LA production are critically addressed at the end of this review.

Conflict of interest