신진과학자-4

# 식물 유래 물질 해독화를 통한 고부가가치 소재 생산

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# Improving Production of Value-added Materials by a Detoxification of Plant Derivatives

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Plant biomass, or lignocellulose, is one of the most abundant natural resources on earth. Lignocellulosic biomass, such as agricultural and forestry residue, serves as a renewable feedstock for microbial cell factories due to its low price and abundant availability. However, the recalcitrance of lignocellulosic biomass requires a pretreatment process prior to microbial fermentation, from which fermentable sugars including xylose and glucose are generated along with various inhibitory compounds. The presence of furan derivatives, such as 5-hydroxymethyl-2-furaldehyde and 2-furaldehyde (furfural), hampers the microbial conversion of lignocellulosic biomass into value-added commodities. In this study, furfural tolerance was improved by investigating the detoxification mechanism in non-model yeast. The genes encoding aldehyde dehydrogenases were overexpressed to enhance furfural tolerance and resulted in improving cell growth and lipid production that can be converted into biofuel. Taken together, this approach contributes to the understanding of the reducing toxicity mechanism of furfural by the aldehyde dehydrogenases and provides a promising strategy that the use of microorganism as an industrial workhorse to treat efficiently lignocellulosic biomass as sustainable plant derivatives.

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