

Optimization of Monascus Orange Pigments Production Using pH-Controlled Fed-Batch Fermentation

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Abstract : Monascus pigments, commonly used as a natural colorant in Asia, have many biological activities, such as cholesterol level control, anti-obesity, anti-cancer, and anti-oxidant, that have recently been elucidated. Especially, amino acid derivatives of Monascus pigments are receiving much attention because they have higher biological activities than original Monascus pigments. Previously, there have been two ways to produce amino acid derivatives: one-step production and two-step production. However, the one-step production has low purity, and the two-step production—precursor(orange pigments) fermentation and derivatives synthesis—has low productivity and growth rate during its precursor fermentation step. In this study, it was verified that pH is a key factor that affects the stability of orange pigments and the growth rate of Monascus. With an optimal pH profile obtained by pH-stat fermentation, we designed a process of precursor(orange pigments) fermentation that is a pH-controlled fed-batch fermentation. The final concentration of orange pigments in this process increased to 5.5g/L which is about 30% higher than the concentration produced from the previously used precursor fermentation step.

Keywords : cultivation process, fed-batch fermentation, monascus pigments, pH stability

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