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Effects of different fermentation temperatures on metabolites of Kimchi

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Abstract

The influences of fermentation temperature on metabolic changes in Kimchi using a gas chromatography–mass spectrometry (GC-MS) method were studied. Kimchi mixtures fermented at 4, 12, and 20°C were taken on the 1st, 5th, 10th, and 50th day of fermentation to determine overall changes in metabolites of Kimchi during fermentation. Based on the principal component analysis (PCA) score plot, Kimchi samples were confirmed to have separation trends by the first principal component 1 (PC1). One group included all samples on fermentation day 0 and day 1, and samples fermented at 4°C for up to 10 days after fermentation, demonstrating that metabolites of Kimchi fermented at 4°C changed slowly. The partial least squares discriminant analysis (PLS-DA) score plot also showed clear differences in metabolites among Kimchi samples with fermentation temperature. The changing metabolites were identified to be alanine, propylene glycol, fumaric acid, malic acid, citric acid, and galactaric acid. These results highlight that a GC-MS-based metabolomics approach can be used to monitor distinct metabolite changes in Kimchi with fermentation temperature.

Keywords: Kimchi, Chinese cabbage, fermentation, metabolomics, GC-MS

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