
Effect of volatile compounds on the quality of Japanese fermented soy sauce

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【Objective】The concept of fermented soy sauce quality is established with a comprehensive understanding of chemical compositions and flavor. Flavor as an important distinguishing characteristic of fermented soy sauce was mainly produced during a long period of fermentation. At present, one of the key quality indexes for a high-quality soy sauce is believed to have an intense flavor. In the present study, volatile compounds detected from the Japanese fermented soy sauce by using GC-MS were correlated directly to the sensory evaluation.

【Methods】48 samples that have been in progress for three consecutive years from 2015 to 2017 are evaluated and then ranked. The volatile compounds of the evaluated samples were directly extracted by headspace to reduce technical interference and found the most common compounds in soy sauce: Samples of 0.25 g of soy sauce were equilibrated at 80 °C for 30 min in a HS-20 headspace auto-sampler (Shimadzu Co., Kyoto, Japan). The extracted gas phase (1 μL) was automatically withdrawn from the headspace then transferred to the GC-MS. The GC-MS analysis was performed using a Shimadzu GCMS-QP2020 system (Shimadzu Co.) equipped with a SH-Rxi-5Sil MS capillary column. The individual volatile compound was identified by comparing retention times (RT), mass spectral data, and Kovats retention index (RI) of the peaks.

【Results】Results showed that a total of 62 volatile compounds were identified in the evaluated soy sauces, of which 35 compounds were in common. Consequently, the correlation between the overall detected volatile compounds and the rankings of the evaluated soy sauces were quantificationally calculated. Thus, 19 compounds were found to be positively correlated with the quality increased; 25 compounds showed a negative correlation to sensory quality of soy sauce. The statistical analysis of the data using principal component analysis (PCA) confirmed the effect of the volatile compounds suggested. The obtained results provide additional data for flavor optimization of soy sauce.