

Analysis of Nisin in Processed Cheese Using Mass Spectrometry Coupled with Liquid Chromatography

Noriko Kuze and Takashi Morimoto

San-Ei Gen F.F.I., Inc.

1-1-11, Sanwa-cho, Toyonaka-shi, Osaka 561-8588, Japan

Summary

Nisin A, an antibacterial peptide derived from *Lactococcus Lactis*, has been used as a food additive in a number of countries. In order to establish an analytical method to distinguish Nisin A from other Nisin species in food, we investigated a method to distinguish between Nisin A and Nisin Z in processed cheese containing Nisin A or Nisin Z, using electrospray ionization mass spectrometry coupled with liquid chromatography (LC-ESI-MS). In the positive mode of LC-ESI-MS, in the mass spectrum of Nisin A, signals of m/z 839, 1119 corresponding to $[M+4H]^{4+}$, $[M+3H]^{3+}$ were detected, whereas signals of m/z 834, 1111 were detected in the case of Nisin Z. Further, we analyzed Nisin A and Nisin Z in processed cheese by the use of the selected ion monitoring (SIM) method with the signals of m/z 1119 (Nisin A) and m/z 1111 (Nisin Z). After purifying the cheese extracts using reversed-phase polymeric cartridges and ultra-free centrifugal filters, the chromatograms monitored signals at m/z 1119, and a peak was detected only in the cheese samples that contained Nisin A, while in chromatograms monitoring at m/z 1111, a peak was detected only in the samples containing Nisin Z. Through these signals in SIM chromatograms, we were able to discriminate which species of Nisin was added to processed cheese, Nisin A or Nisin Z. Therefore, we believe that this analytical method could be useful in distinguishing Nisin A from other Nisin species in foods such as processed cheese.