

Identification of Adulterated Milk Using Electronic Nose

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Over the past few years, electronic nose (E-nose) technology has enhanced the possibility of exploiting information on aroma to assess food. The objective of this study is to monitor the adulteration of milk with water or reconstituted milk powder using an E-nose (PEN 2) containing 10 different metal oxide sensors. Whole fluid milk, reconstituted milk powder and whole fluid milk adulterated with different proportions of water or reconstituted milk powder were examined in experiments over 7 days of storage. The results were obtained by principal-component analysis (PCA) and linear-discriminant analysis (LDA). In the LDA plot, for the samples of 1st day, two samples of 100% skim milk and 100% reconstituted milk could be clearly discriminated, and four other samples with different proportions of skim milk and reconstituted milk were examined. In the LDA plot, the results for the six samples from the 1st day to the 3rd day were well separated. However, from the 5th day to the 7th day, the LDA plots of the samples overlapped completely. The E-nose has the capacity to discriminate the purity of milk when skim milk is adulterated with different volumes of water, and results for the three samples of skim milk, skim milk adulterated with reconstituted milk, and skim milk adulterated with water were distributed regularly in the LDA and PCA plots. By LDA and PCA, the E-nose could also discriminate between milk samples that had been aged for different numbers of days, and the 1st–4th day results were well separated.

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