Measurement of Saltiness with a Trace Amount of Minerals Using Taste Sensor with Lipid Membranes

Kiyoshi TOKO (Kyushu University)

Summary

Saltiness elicited by salt is one of the basic tastes. However, components of salt on the market differ depending on manufacturing processes and its taste as well. Salt manufactured by ion-exchange membrane process is composed of more than 99% pure sodium chloride, while bay salt contains trace amounts of minerals. Despite reports on sensory evaluation, the differences in taste are still uncertain because of a small amount of minerals. We studied the interaction between salt with trace amounts of minerals; the bittern ("*nigari*" in Japanese) was evaluated objectively and quantitatively using a multichannel taste sensor with lipid/polymer membranes.

A multichannel taste sensor which has several types of lipid/polymer membranes with different characteristics can detect taste in a manner similar to human gustatory sensation. Taste information is transformed into a pattern composed of the electric signals of membrane potentials of the receptor. The sensor outputs are not related to the amount of specific molecules present, but rather to the taste quality, because similar patterns are obtained for substances producing the same taste quality.

The model samples were composed of sodium chloride and a small amount of *nigari* such as magnesium sulfate, magnesium chloride, calcium chloride and sodium chloride. The taste sensor clearly discriminated each sample according to the response patterns. Based on the sensor outputs, we evaluated the taste by means of the combination of principal component analysis and ionic strength. The results show that the change of taste from pure saltiness with *nigari* can be estimated quantitatively.