

Evaluation of Saltiness Using Taste Sensor

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Summary

Salt manufacture and sale began due to abolishment of salt monopoly, and then imported salts were on the market in the country. In recent years, many kinds of salts are on the market; however, there are a few systematic studies about saltiness of salt, and hence, proper use of salt has not been found. An argument about taste of salt with or without minerals has been and still is a matter of controversy among consumers since salt manufacture by ion-exchange membrane process produces more than 99% pure NaCl, while bay salt produced by salt drying process contains rich minerals (bittern called "nigari" in Japanese) such as MgSO₄, MgCl₂ and KCl. The factors which would affect salt taste are apparently believed to be crystal shapes, moisture contained and mainly the above minerals. It is, however, difficult to evaluate how the minerals affect the salt taste quantitatively.

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. The taste sensor is being used to discriminate various kinds of foodstuffs and to quantify taste. In the study on The Salt Science Research Foundation in 2001, we examined saltiness of mixed solution of sodium chloride, which contains minerals, and salts on the market using the taste sensor, which is composed of membranes with long-chain lipids; therefore, it enabled us to make a CPA (Change in membrane Potential due to Adsorption) measurement, which can measure the after-taste. Potential measurement and CPA measurement had different information, and hence we obtained a taste map, which is composed of two dimensions.

We here studied the long-term stability of taste sensor in evaluation of taste of salt, and compared the sensor output with results of human sensory tests. As a result, we confirmed the high stability because almost the same results as the previous were obtained for the response patterns and taste map. However, we got no reliable result of human sensory tests; there was no definite difference between salts on the market. It means that we can evaluate and control the taste of salts using the taste sensor, because it is possible to detect a slight difference of taste, which is difficult for ordinary persons.