

## Evaluation of Saltiness Using Taste Sensor

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### Summary

Salt monopoly was maintained in order to protect and to develop the industry of salt. As one sphere of deregulation, it was abolished so that salt monopoly has been continued for 92 years at April 1, 1997 in Japan. Salt manufacture and sale began due to abolishment of salt monopoly, and 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  $MgSO_4$ ,  $MgCl_2$  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 discrimination for various kinds of foodstuffs and to quantification of taste. In the study on The Salt Science Research Foundation in 1999, we examined saltiness of mixed solution of sodium chloride, which contains minerals, and salts on the market using the taste sensor. However, after-taste was not measured, because the lipid/polymer membranes were composed of short-chain lipids.

In the present study, lipid/polymer membranes of the taste sensor were composed of 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. In case of using long-chain lipid, the long-term measurement is possible, because it is certified that long-chain lipid membranes have long stability more than short-chain lipid membranes. Furthermore, we can evaluate and control the taste of salts using the taste sensor, because it is possible to detect a slightly difference of taste, which is difficult for humans.