

Taste Map of Beer by a Multichannel Taste Sensor

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The taste of beer was studied using a multichannel taste sensor with lipid membranes as a transducer of taste substances. Different brands of beer were easily distinguished by the output electric-potential patterns. A two-dimensional taste map expressing the sense of taste was obtained. The sensor could detect the taste in a manner similar to the human gustatory sensation. The sensitivity and durability were superior to those of humans.

1. Introduction

Taste is classified into five basic qualities elicited by many chemical substances which affect each other and change the taste strength.⁽¹⁾ Sourness is produced by hydrogen ions such as of HCl and acetic acid. Bitterness is elicited by many alkaloids such as quinine and caffeine, electrolytes such as NaCl and KCl produce saltiness, while many nonelectrolytes such as sucrose and glucose effect sweetness. Umami is the fifth taste,⁽²⁾ which is characteristic of, for example, monosodium glutamate (MSG) and monosodium inosinate (IMP). The strength of saltiness is weakened by coexistent bitter substances. Umami substances strengthen each other. These are called suppression and synergistic effects, respectively.

Conventional chemical sensors cannot reproduce the human taste sense, because only the quantities of contained taste substances are analyzed. It may be difficult to correlate the output signals with the taste sense. The physical value measured by, for example, a pH meter (to measure sourness) or a refractometer (for sweetness) is also affected by extra substances (e.g., starch) which do not elicit taste sensations in