Measurement of Basic Taste Substances by a Fiber Optic Taste Sensor Using Evanescent Field Absorption

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A multichannel taste sensor using evanescent field absorption in fiber optics was developed, and its characteristics were evaluated for several substances with basic and mixed tastes. Optical response patterns were obtained from two kinds of sensing membranes; one is a dye/silicon polymer membrane, and the other is a dye/lipid/PVC-PVAc-PVA copolymer membrane. The sensor output exhibits different patterns for chemical substances that are responsible for tastes such as salty, sour, bitter, sweet, and umami. This optical fiber taste system was successfully applied in testing several commercial soybean sauces and ionic drinks. Principal component analysis (PCA) was utilized to express these taste qualities quantitatively on the basis of the output patterns of the taste sensor. These subtle differences are difficult to differentiate with the human tongue, but our experimental results demonstrated that it is possible to discriminate between tastes by the difference in their output patterns.