

Sweetness Sensor with Lipid/Polymer Membranes: Sweet-Responsive Substances

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A sweetness sensor with lipid/polymer membranes has been developed for evaluating the sweetness of sugars and sugar alcohols. Among the constituents of lipid/polymer membranes, gallic acid has been used as the main substance involved in sucrose response in our group. In this study, as a step toward understanding the response mechanism of the sweetness sensor, functional groups of gallic acid, namely, carboxyl and hydroxyl groups, were focused on. The results demonstrated that the carboxyl group is essential for the sweetness sensor, whereas the hydroxyl group is not always necessary for the sucrose response. It was also revealed that the phosphate group may be a substitute for the carboxyl group. Then, for one of the sensors with the highest response to a 300 mM sucrose solution, named the sweetness sensor GL1, the basic characteristics such as selectivity and correlation with sweetness were investigated. The behavior of GL1 sensor outputs was relatively similar to the sweetness perception in humans.

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