

Determination of Ginseng with Different Ages Using a Taste-Sensing System

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In the medicinal herb market, adulteration of ginseng at different ages is commonly observed, which harms the health of consumers. Changes in the taste properties of ginseng at different ages were investigated using an intelligent taste-sensing system with artificial lipid-based membrane sensors and an ultraviolet spectrophotometer. It was found that the ginsenoside content increased linearly with increasing age, with the determination coefficient (R^2) reaching 0.951. Results from the taste-sensing system provided rich information for the tested ginseng samples. The radar curve of taste value indicated that ginseng samples of different ages showed various taste characteristics and some certain tendencies. A linear correlation was established between ginseng age and the taste values of sourness, saltiness, and umami, with the determination coefficients (R^2) being 0.941, 0.943, and 0.974 respectively. Taste data were analyzed using principal component analysis (PCA) and discriminant function analysis (DFA). A difference was obtained among groups with the first two PCs reaching 92.25%. While in DFA a significant difference was observed with the first two function scores reaching 99.4%. From the viewpoint of sensor response, the responses of the umami sensor AAE, saltiness sensor CTO, and sourness sensor CAO increased over the first 30 s, while those of the bitterness sensor COO and astringency sensor AE1 decreased and remained at maximum in the negative value continuously, which provided additional information for the determination of ginseng samples at different ages. On the basis of integrated and special taste information, the ginseng growing year might be identified from the taste evaluation angles. A flow chart for further research on the taste features was suggested. This study intimated possible indexes for determining adulteration of ginseng at different ages by using an intelligent taste-sensing system.

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