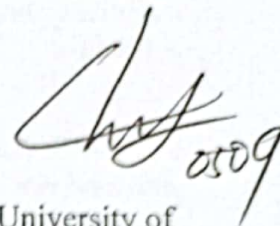


Improving the quality of green tea in acceptability of taste and monitoring aroma compounds using electronic nose

Didit Rahadian¹, Ho-Hsien Chen²



¹Departement of Agriculture and International Cooperation, National Pingtung University of Science and Technology, Pingtung 91201, Taiwan

²Departement of Food Science, National Pingtung University of Science and Technology, Pingtung 91201, Taiwan

Abstract

The taste and aroma of tea which is refreshing as well as rich in health benefits make green tea become second-ranked tea beverage after black tea. Bitterness and astringent taste, although not favorable for many consumers, and aroma including clean, fresh, and chest-nutty aroma are quality characteristics of green tea. Those are affected by phenolic compounds (phenolic acids, flavonoids, and tannins) and alkaloid (methylxanthines) content which is influenced by planting, processing, and storage. Tea processing plays an important role in the phenolic composition, as well as some compounds are degraded during this process. This paper aimed to identify the characteristics of green tea from many countries, optimize green tea processing (withering, fixing, rolling, and drying) to improve the quality, and evaluate aroma compounds using an electronic nose (e-nose). The parameters measured are physical parameters (moisture content, color, texture, and tenderness), chemical properties (catechin, polyphenols, amino acid, caffeine, and antioxidants), and sensory evaluation. New techniques in the processing are expected to reduce the bitter and astringent taste and increased the palatability of green tea. Enose is a non-destructive technique that can be evaluated the composition of gases that were related to the physicochemical properties as well as distinguished aroma compounds rapidly.

Keywords: Astringency, Bitterness, Catechin, Electronic nose (e-nose), Green tea.

References:

- Chen, L., Liu, F., Yang, Y., Tu, Z., Lin, J., Ye, Y., & Xu, P. (2021). Oxygen-enriched fermentation improves the taste of black tea by reducing the bitter and astringent metabolites. *Food Research International*, 148(July), 110613. <https://doi.org/10.1016/j.foodres.2021.110613>
- Deng, S., Zhang, G., Aluko, O. O., Mo, Z., Mao, J., Zhang, H., ... & Liu, H. (2022). Bitter and astringent substances in green tea: composition, human perception mechanisms, evaluation methods and factors influencing their formation. *Food Research International*, 111262. <https://doi.org/10.1016/j.foodres.2022.111262>
- Huang, R., & Xu, C. (2021). An overview of the perception and mitigation of astringency associated with phenolic compounds. *Comprehensive Reviews in Food Science and Food Safety*, 20(1), 1036–1074. <https://doi.org/10.1111/1541-4337.12679>
- Liu, H., Ueno, S., Shimada, R., & Araki, T. (2019). The effect of high hydrostatic pressure on taste substance distribution in fresh green tea leaves. *High Pressure Research*, 39(2), 408–416. <https://doi.org/10.1080/08957959.2019.1607850>
- Musial, C., Kuban-Jankowska, A., & Gorska-Ponikowska, M. (2020). Beneficial properties of green tea catechins. *International Journal of Molecular Sciences*, 21(5). <https://doi.org/10.3390/ijms21051744>
- Wei, Y., Yin, X., Wu, H., Zhao, M., Huang, J., Zhang, J., Li, T., & Ning, J. (2022). Improving the flavor of summer green tea (*Camellia sinensis* L.) using the yellowing process. *Food Chemistry*, 388(March), 132982. <https://doi.org/10.1016/j.foodchem.2022.132982>
- Xu, M., Wang, J., & Zhu, L. (2021). Tea quality evaluation by applying E-nose combined with chemometrics methods. *Journal of Food Science and Technology*, 58(4), 1549–1561. <https://doi.org/10.1007/s13197-020-04667-0>
- Ye, J. H., Ye, Y., Yin, J. F., Jin, J., Liang, Y. R., Liu, R. Y., Tang, P., & Xu, Y. Q. (2022). Bitterness and astringency of tea leaves and products: Formation mechanism and reducing strategies. *Trends in Food Science and Technology*, 123(March), 130–143. <https://doi.org/10.1016/j.tifs.2022.02.031>
- Zhu, Y. M., Dong, J. J., Jin, J., Liu, J. H., Zheng, X. Q., Lu, J. L., Liang, Y. R., & Ye, J. H. (2021). Roasting process shaping the chemical profile of roasted green tea and the association with aroma features. *Food Chemistry*, 353(January), 129428. <https://doi.org/10.1016/j.foodchem.2021.129428>
- Zhuang, J., Dai, X., Zhu, M., Zhang, S., Dai, Q., Jiang, X., Liu, Y., Gao, L., & Xia, T. (2020). Evaluation of astringent taste of green tea through mass spectrometry-based targeted metabolic profiling of polyphenols. *Food Chemistry*, 305(September 2019), 125507. <https://doi.org/10.1016/j.foodchem.2019.125507>