The feasibility of an electronic tongue coupled with chemometrics in the taste-masking of polyphenolic dietary supplements

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Introduction

The sensory properties of powdered dietary supplements are increasingly important to influence consumer choice. Product developers often face the challenge of masking the unpleasant taste of biologically active compounds. The volume of new compounds and the frequent change of recipes encourage the application of automated electronic systems to support traditional sensory panels.

Aim

Present research explores the applicability of an electronic tongue (ET) with chemometrics to help the masking process of polyphenolic drink powders and promote stable product quality.

Materials and Methods

- 7 different flavor mixtures to mask the bitterness of the active compound.
- Samples differing in sweetener concentration, aroma or colorant type.
- Aqueous solutions of samples evaluated by a trained panel and measured with an α-ASTREE II Liquid Taste Analyser (ET).
- Principal component analysis (PCA) used for pattern recognition and linear discriminant analysis (LDA) used for sample classification based on ET data.

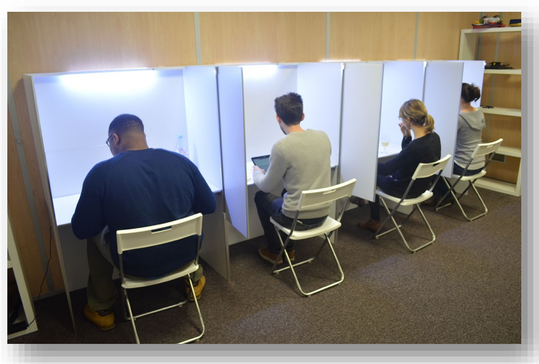
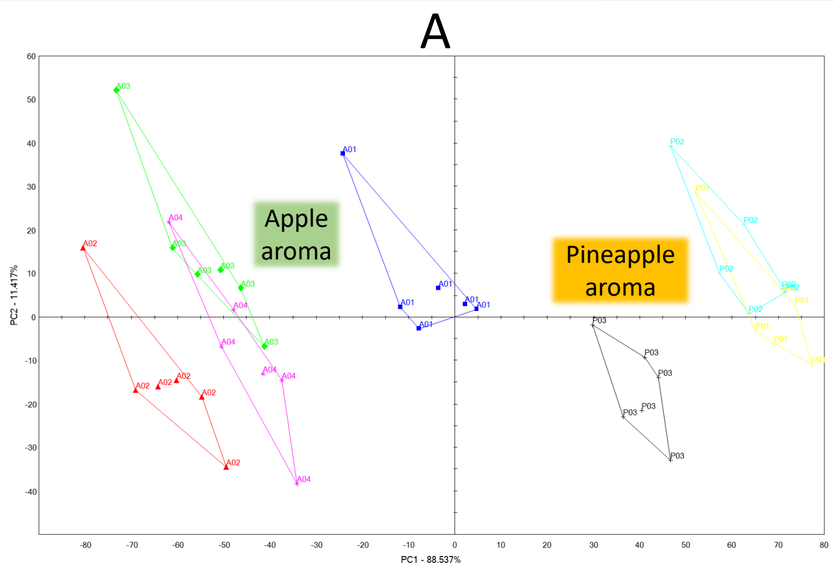


Figure 1. The process of sensory panel and ET data acquisition.

Results and Discussion

The E-tongue method could discriminate most samples with a 100% accuracy. LDA results were in agreement with the panel…



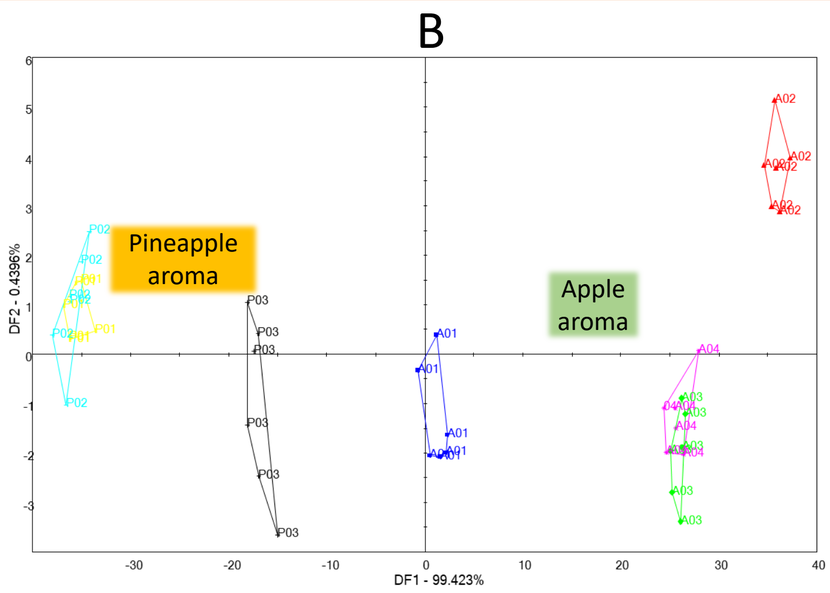
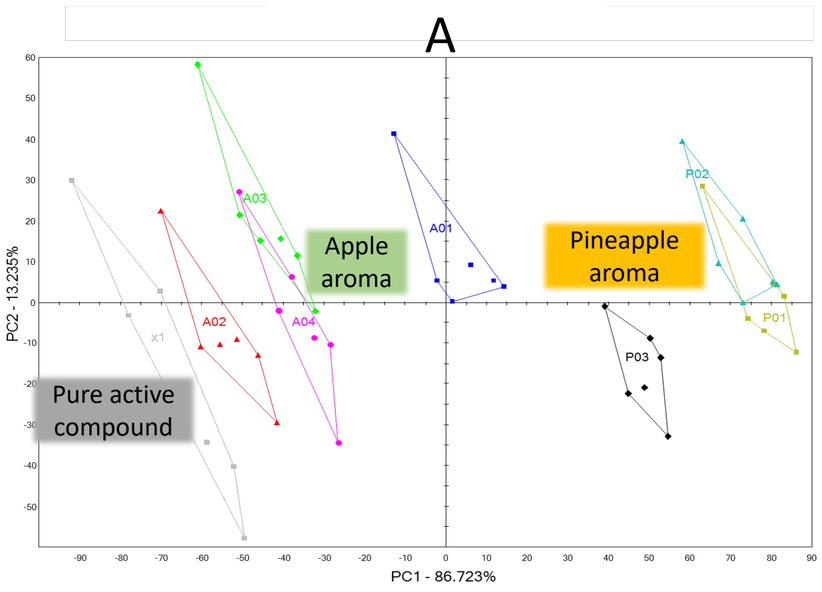


Figure 2. PCA (A) and LDA (B) results based on ET data.

… as pineapple samples were the most differentiable from the pure active compound. Samples A03 and A04, differing only in colorant, were properly classified to the same group.



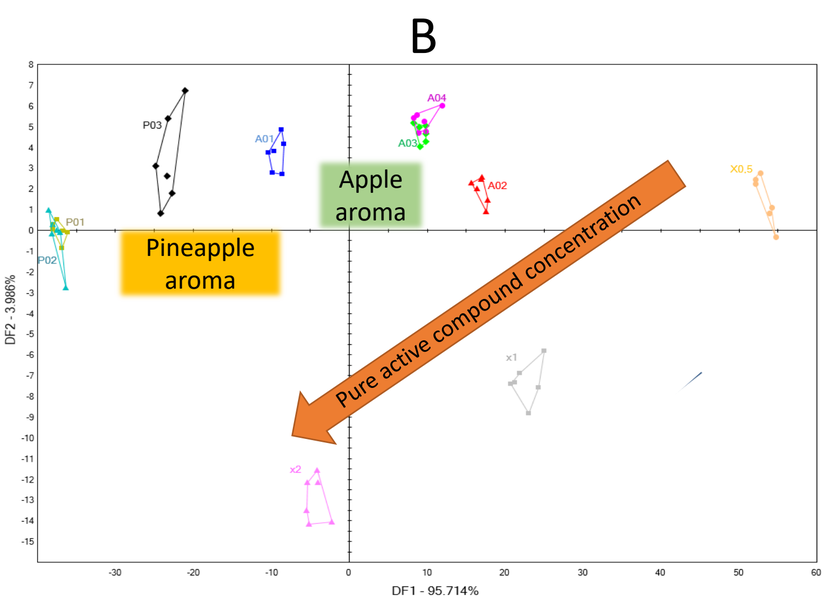


Figure 3. PCA (A) and LDA (B) results based on ET data including the pure active compound.

Conclusion

The developed ET method proves feasible to increase the objectivity during the product development of powdered dietary supplements with unpleasant taste characteristics, giving a more convenient and less time-consuming alternative to traditional sensory evaluation.