

Development of high nutritional quality food ingredients from Avocado production wastes and by-products

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Introduction

In line with PhD thesis project that concerned the valorization of the wastes and by-products of avocado production, the pruning leaf wastes from different avocado varieties cultivated in Sicily were considered and the main results of the first activities concerning (A1) the leaves waste drying by conventional and green technologies, (A2) the development of high-quality herbal teas, (A3) chemical analyses (aroma compounds, polyphenols) of the herbal teas, (A4) sensory descriptor evaluation, and (A5) consumer's acceptability test are here reported.



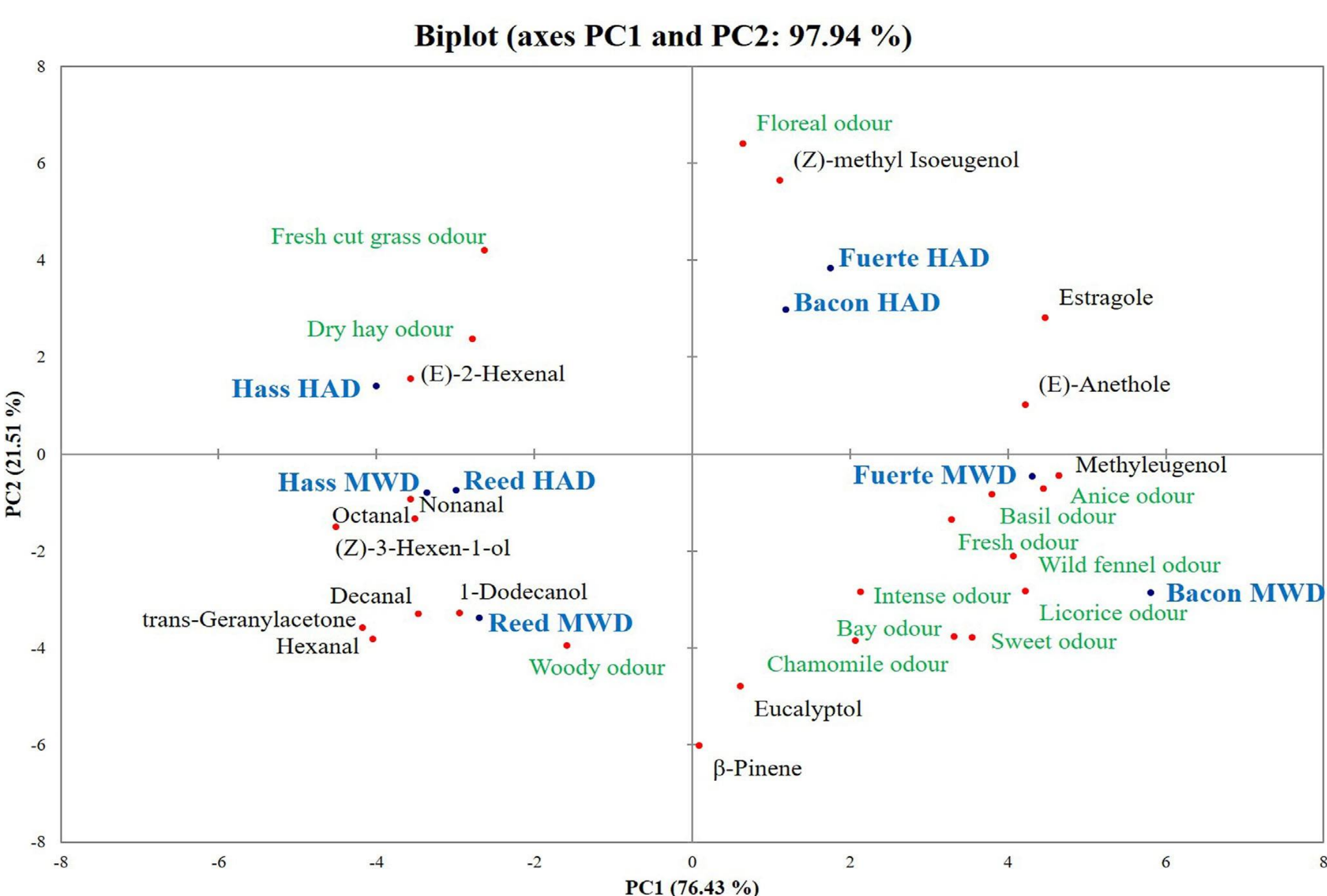
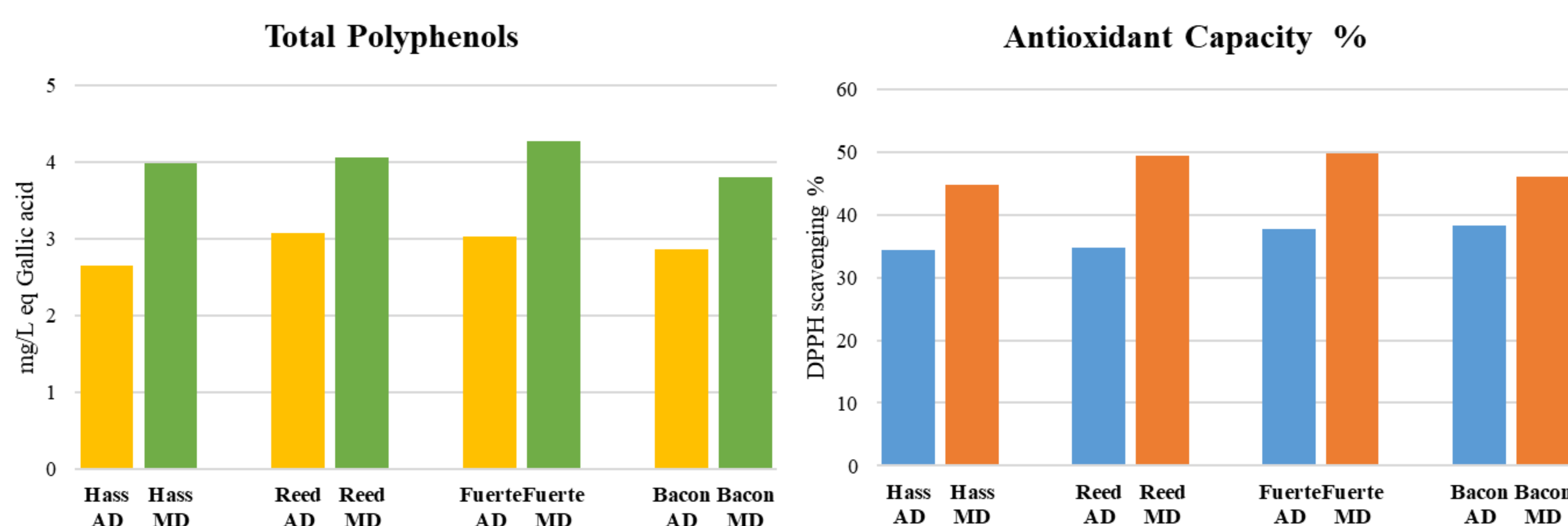
Materials and Methods

Avocado leaves wastes from "Reed", "Hass", "Fuerte", and "Bacon" varieties were collected during the pruning activity in an avocado orchard sited in Giarre and subjected to Air-Drying (AD) at 50 °C for 3 hours, and Microwave-Drying (MD) at 400 W for 4 minutes. Avocado herbal teas (AHTs) were prepared by steeping 3 g of chopped avocado leaves in 120 mL of boiling mineral water (~95 °C) for 10 minutes, then filtered for subsequent analyses. Total phenolic content (TPC) was determined by spectrophotometric analysis using the Folin-Ciocalteu method, Antioxidant Capacity (AC) by DPPH scavenging capacity, volatile aroma compounds by HS-SPME-GC-MS analysis; AHTs were then subjected to Qualitative Descriptive Analysis (QDA) and consumer's acceptability test. Data were statistically elaborated through Analysis of Variance (ANOVA) and Principal Component Analysis (PCA).

Results and Discussions

Total phenolic content and Antioxidant Capacity

• Microwave-dried AHTs of all varieties showed a higher total phenolic content and antioxidant capacity than air-dried ones.

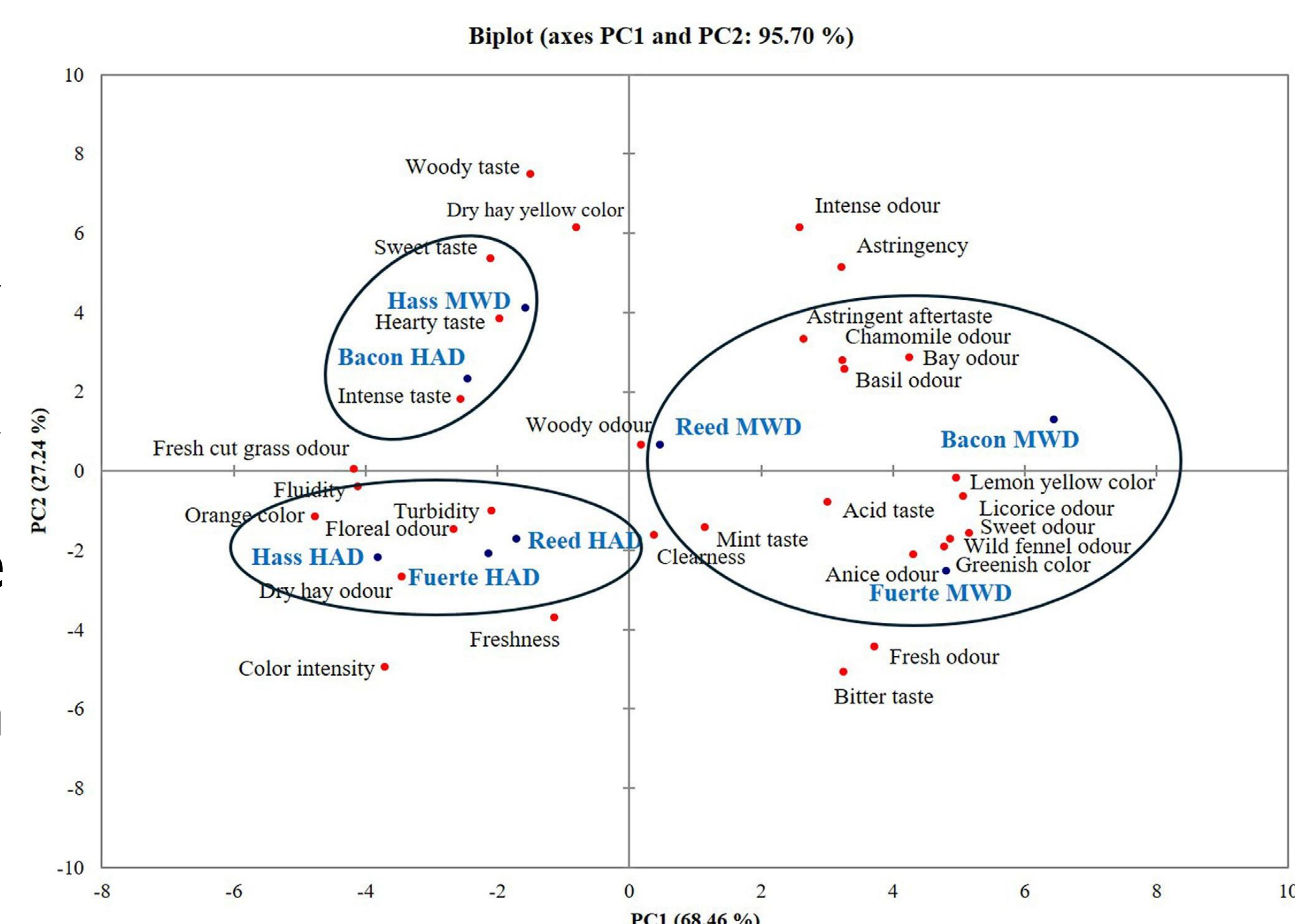


Volatile aroma compounds

- Fuerte and Bacon AHTs were characterized by a high estragole content, followed by methyl eugenol and eucalyptol.
- Hass and Reed AHTs were characterized by aldehydes and alcohols, especially (E)-2-hexenal and (Z)-3-hexen-1-ol.
- Air-drying led to an increase in (E)-2-hexenal; in contrast, microwave-drying increased both mono- and sesquiterpenes.

Sensory analyses

- Microwave-dried AHTs, except Hass, were characterized by anise, licorice, basil, wild fennel, bay leaf and fresh odours.
- Air-dried AHTs, except Bacon, were characterized by a dry hay, floral, and fresh-cut grass odours.
- Hass microwave-dried and Bacon air-dried AHTs were characterized by an intense earthy and woody taste.
- Consumers indicated a higher preference for Fuerte and Bacon microwave-dried AHTs.



Conclusions

Following circular economy models and meeting the increasing herbal tea demand in European countries, avocado leaf wastes could be used to produce healthy herbal teas appreciated by consumers. The drying technology strongly influenced the final quality of the herbal tea differently in relation to the variety. The environmentally friendly microwave drying technology increased the bioactive compounds and sensory features at least in Fuerte and Bacon AHTs.