

Identification of key odorants related with higher quality Touriga Nacional wine

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INTRODUCTION

Higher quality Touriga Nacional (TN) wines are characterized by a fruity-citric aroma described as sweet and fresh citrus evoking the bergamota fruit (*Citrus bergamia*) [1]. In fact, "bergamota like" descriptor is currently employed to rate higher quality TN wines. Previous work has shown that TN wines have higher levels of terpenol compounds [2, 3] compared with other wines made from other red wine varieties. This cultivar is one the most important wine red variety planted in Portugal and also in another abroad viticultural regions. Wines produced with have higher commercial prices. The aim of this work was to determine with a trained panel (not related to industry) the descriptors of wines selected by industry panel as higher quality TN wines. In order to evaluate the relationship between bergamota like descriptor and TN wine quality, several mono-varietal wines were analysed.

MATERIALS AND METHODS

TN wines selected by industry as higher quality - seven TN wines were selected by industry panel as corresponding to TN higher quality wines with the typical aroma, called by this panel as "bergamota-like" aroma. **Other monovarietal red wines**, (total 75) from Tinta Roriz (TR), Tinto Cão (TC), Tinta Franca (TF), Tinta Barroca (TB). **Sensory studies.** **Sensory panel:** Two Sensory panel were used: one composed by winemaking producers, which has selected the higher quality TN wines. A second one composed by 12 University of ESB-UCP graduate students which were selected on the basis of their sensory performances [4]. **Descriptor selection and Similarity tests:** The AFNOR NFV-09-021 [5] procedure was used to select the most important descriptors which describe the global aroma of TN wines. The "Similarity Value" (SV), of each sample with the TN higher quality was determined by a comparison test using a discontinuous scale from 0 to 10. **Chemical Studies Gas Chromatography:** GC-O analysis was employed using DCM extracts of TN wines in order to determine odorant zones. Dichloromethane extracts of bergamota oil were also analyzed to determine the Dilution Factors of the most important odorant zones. Flavour dilution (FD) factors of the odour-active compounds were determined. Aroma Dilution Extract Analysis, AEDA, was performed according to [6]. α -pinene, linalool, terpineol, geraniol, nerol, citronellol, linalyl acetate, limonene were quantify by GC-MS as described [7].

RESULTS AND DISCUSSION

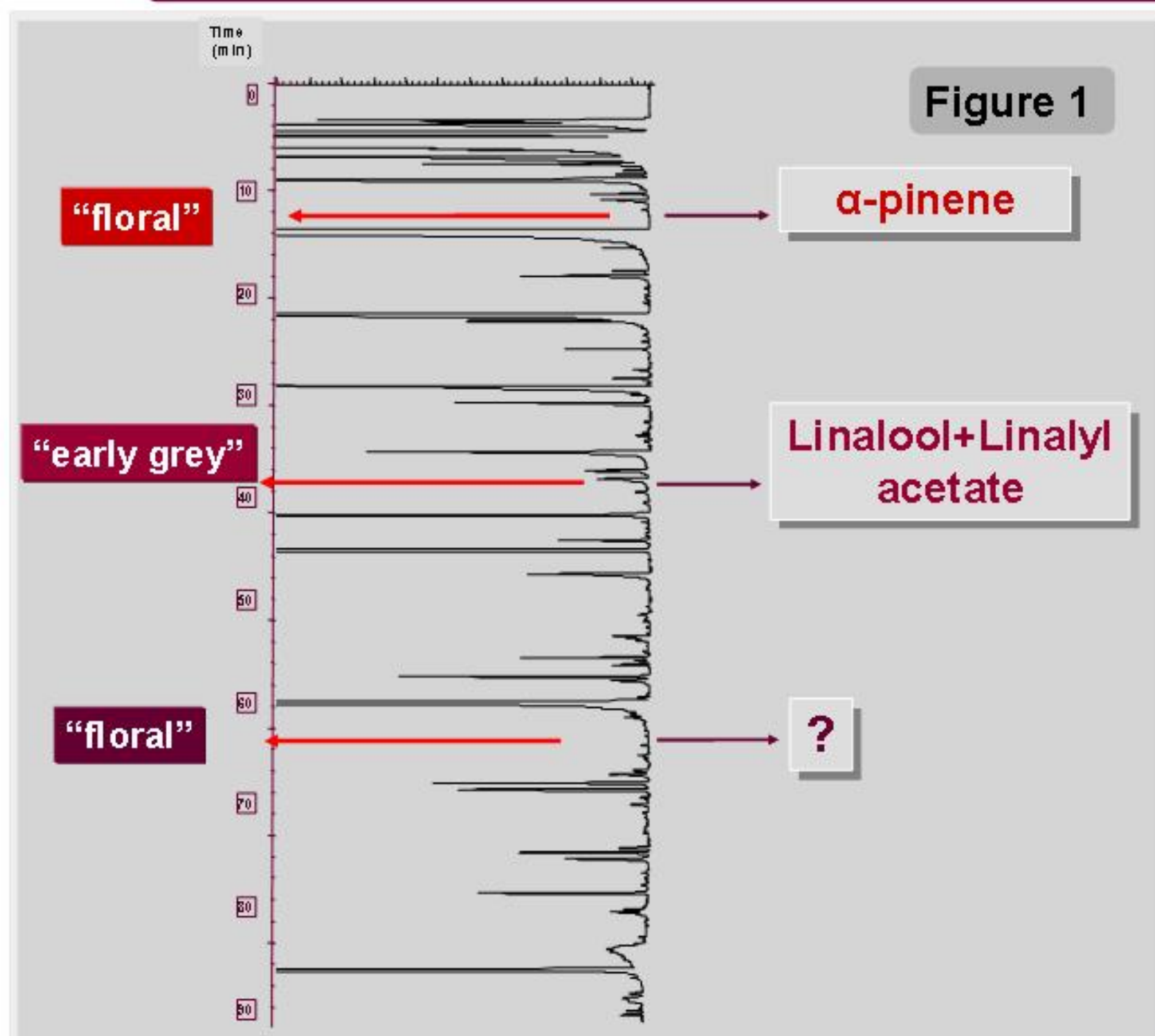
1 Identification of the most important descriptors related with bergamota-floral character of TN higher quality wines

- Procedure : 1.** Typical higher quality wines were selected by industry panel (TNw)
2. With the second panel four free choice profiling sessions were performed.
3. Eighteen preliminary terms were obtained.
4. Two sessions were used to ask the panel for the presence or absence of the former descriptors.
5. Among the all the attributes selected, combination of 2 or 3 attributes were made.
6. Comparison of one TN wine selected by industry panel with a non typical wine added with 3 attributes combined was performed.

The most similar was those added with the follow attributes :

3 GC-O analysis of a TN wine extract used in the AFNOR analysis

i Identification of odorant zones on TN wine (fig.1)



GC-O analysis of a "no TN wine" and a "TN wine" show 3 different odorant zones :
Using a GC/MS it was possible to identify the corresponding molecules :
- α -pinene (RI=1023), linalool and linalyl acetate (RI=1560), unknown (RI=1940).

2 Determination of which compound has the major sensory contribution on the global aroma of bergamota

An AEDA of a DCM extract of bergamota diluted oil was performed. Results show that the major contributors were: α -pinene (FD=1024), linalool (FD=512) and linalyl acetate, γ -terpinene, (E)- β -ocimene (all with FD=256). The presence of linalool and linalyl acetate was confirmed, and their quantification by GC-MS showed that these two volatile compounds are present in the highest concentration, which suggest its important role in the flavour of bergamot oil.

bergamota
scraped
mandarin
violet



iii Distribution of terpenols compounds on wines coming from different red varieties

Higher levels of terpenols are present in wines produced with TN variety. In fact, among 75 red wines analysed levels of terpenols are much higher in TN wines, which contributes to the particular global perception aroma of TN wines.

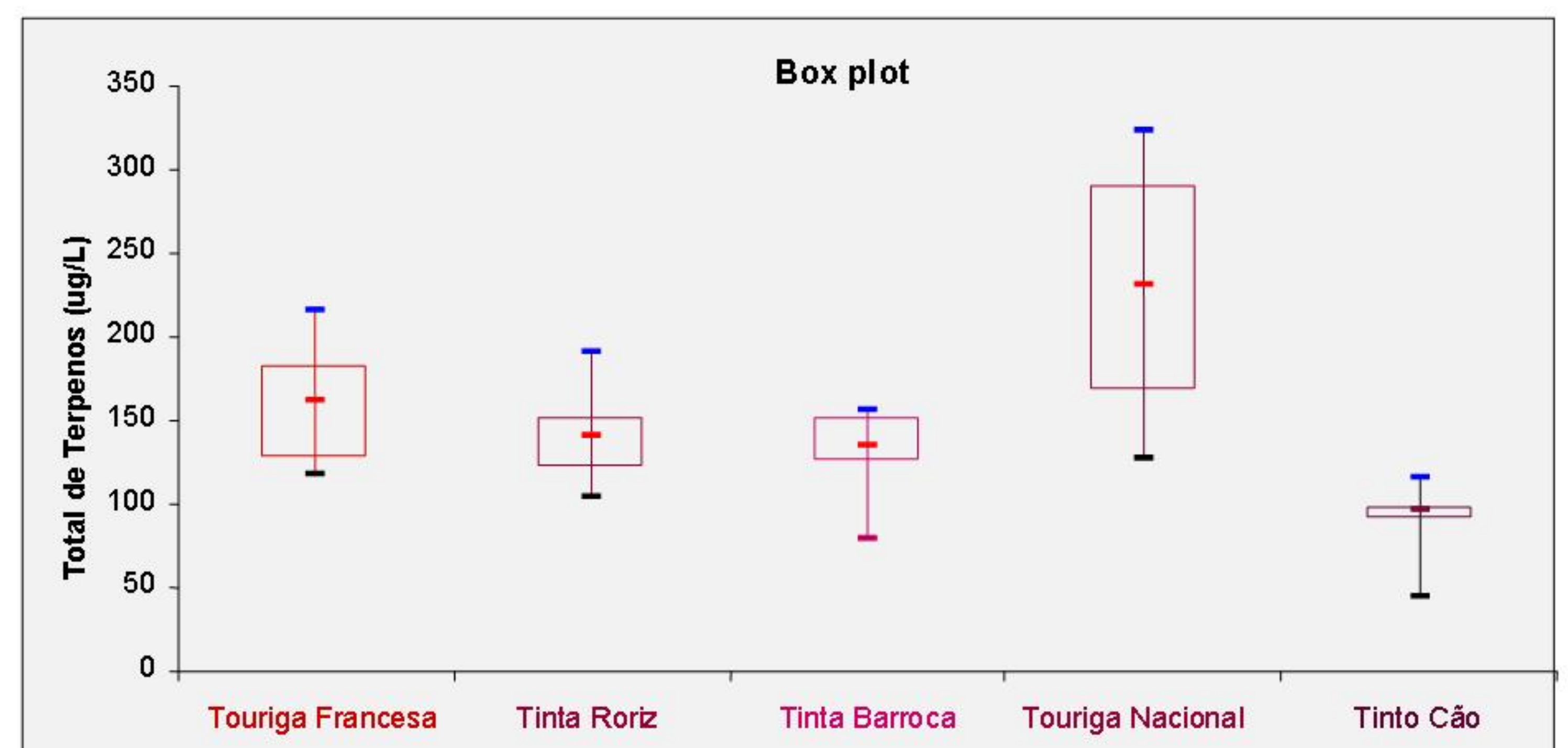


Figure 2 Distribution of terpenols compounds (linalool, terpineol, geraniol, nerol and citronellol) on red wines coming from 5 different varieties.

ii Similarity Value

A recombinant analysis was performed using linalool (150 μ g/L), linalyl acetate (100 μ g/L) and linalool+linalyl acetate (150+100 μ g/L, respectively), concentrations usually found in the TN wines. The molecules were added separately or together to a no-TN wine (nTNW). The panel was asked to rate the degree of similarity (SV) between each sample and the TNw, on a scale of 0 (no similarity) to 10 (equal) :

- When linalool was added alone to the wine the highest similarity value was found (5.9).
- When the two compounds were added simultaneously to the wine the similarity value found was 5.5.
- The simple addition of linalyl acetate was responsible for 3.3 of similarity.

CONCLUSION

- ✓ This work attempts to correlate the characteristic descriptors of TN wines, floral, bergamota-like aroma with the presence of specific compounds.
- ✓ By GC-Olfactometry analysis it was possible to identify three odorant zones. The AEDA technique was employed to evaluate the relative importance of each odorante zone.
- ✓ The identification of linalool and linalyl acetate and maybe other terpenols are key odorants on the perceived aroma of TN typical wines.

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