# Influence of apricot maturity levels on the sensory perception of distillates

***Pascale Deneulin[1], Loïc-Marco Guélat[1], Danilo Christen[2], Julien Ducruet[1]***

*[1]School of Engineering at Changins, Nyon, Switzerland*
*[2] Agroscope Changins-Wädenswil ACW, Conthey, Switzerland*
Corresponding author: pascale.deneulin@eichangins.ch

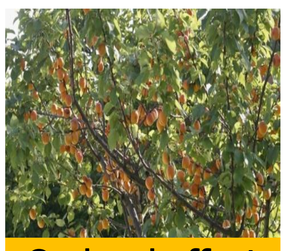
Poster P10.44


## Introduction & objectives

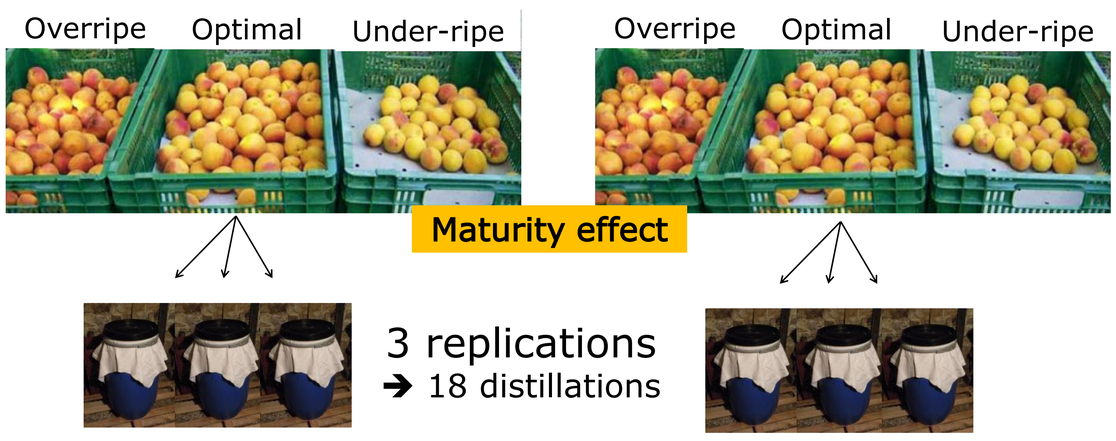
The swiss controlled appellation of origin « Abricotine » mentions in its booklet of responsibilities that the fruit should be of optimal ripeness, soft texture, and should liquefy around the stone. Today, the grower uses his senses and experiences to fix the harvest date. This study analyzed the relationship between apricot (*Luizet* cultivar) maturity levels and the sensory description of its distillates. Several methods (destructive and non-destuctives) of maturity determination for apricots were also compared.

## Materials & methods

### 6 different products x 3 replications



High altitude — Orchard effect — Low altitude




3 replications
➔ 18 distillations

### Near Infrared Spectroscopy

Spectra were directly acquired on 120 apricots for each products using the NIR spectrometer Phazyr (Polychromix, USA; absorbance 940-1797 nm in reflectance mode). Factorial discriminant analysis (FDA) was carried out on the spectral data (corrected by SNV) in order to classify the fruits according to the orchards and to the maturity levels.

### Chemical analysis

The eighteen brandies obtained over various maturities were submitted to analysis GC-MS and were quantified for each replicate.

### Sensory analysis

18 aroma and 8 mouth-feel descriptors were previously generated by the panel (13 assessors with previous experience in wine sensory descriptive analysis). The panel has been trained to use those attributes during 6 sessions. After take care to verify homogeneity of replicate, those were blended in order to limit sensory assessment at 6 products. The products were served pure (42% vol.). Panellists marked the intensity of the attributes on a linear scale from 0 (not perceived) to 10 (high intensity). The evaluation itself was repeated 3 times.

## Conclusion

- This study shows clearly the importance of different apricot growing sites and maturity levels on the sensory quality of the obtained distillates.
- Optimal maturity develops high positive aromas, whereas overripe fruit decreases intensity of all the aromas (except Ethyl actetate). With under-ripe fruits, soap taste and higher methanol content was produced.
- The non-destructive NIRs is a promising method to determine the optimal harvest date, is a good indicator of fruit maturity and was highly correlated with the sensory and chemical quality of the distillates.

## Acknowledgements

- A. Defayes, N. Berthod & J. Rossier (Canton of Valais)
- F. Etter & M. Gillièron (Régie Fédérale des Alcools)
- J. Morand (Interprofession Abricotine AOC du Valais)

## Results

### Classification of fruits (NIRs)

- Good discrimination between the 6 products (87% of correct classification).
- FDA map allowed discriminating the orchards according to F1 (59.83%; most important effect) and the maturity levels according to F2 (22.31%).

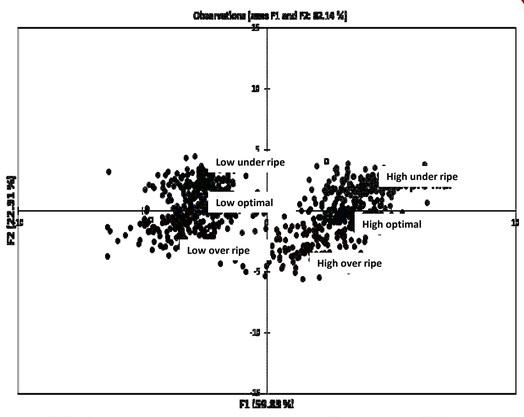



*Fig. 1. FDA map according to F1 and F2 scores. FDA was performed on spectral data of different orchards and maturity levels.*

### Chemical analysis

- Chemical analysis were examined by Kruskal-Wallis test
- Methanol is higher for under-ripe products
- Acetaldehyde and acetate ethyl are higher for overripe products
- Orchard effect is also significant for few parameters (no shown here)

*Table 1. Mean chemical parameters and estimated significance by Kruskal-Wallis*

| | Under-ripe | optimal | overripe |
|---|---|---|---|
| **Alcools sup.** NS | 2880 | 3352 | 2870 |
| **Methanol**** | 12302[a] | 9332[b] | 9098[b] |
| **Acetaldehyde*** | 24[b] | 28[b] | 56[a] |
| **Ethyl acetate*** | 41[b] | 41[b] | 86[a] |
| **Propanol** NS | 903[a] | 813[ab] | 748[b] |
| **Hexanol** NS | 13 | 17 | 20 |
| **Ethyl lactate** NS | 55 | 57 | 81 |

Sample with the same letter are no significant different

### Sensory analysis

- ANOVA allowed us to select the 15 more significant attributes (30%) for the PCA
- First dimension (59,84%) opposes the two orchards
- Second dim. (20,54%) ranks product depending their maturity
- Under-ripe products have tail odours and soap aroma in mouth
- Overripe products have higher acetate ethyl odours
- Optimal apricot maturity brings complexity and intensity aromas

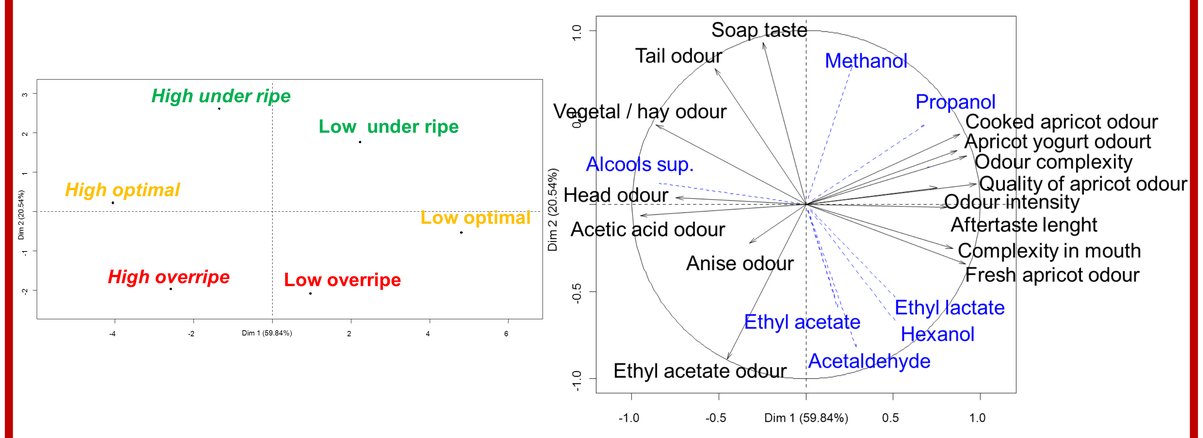



*Figure 2. Products and attributes representation of the two first principal components of the PCA (sensory profile) – chemical parameters were projected in illustrative (blue dotted line)*

### Correlation between NIRs, chemical and sensory analysis

- Common configuration was found by Multiple Factor Analysis and was illustrated by the superimposed representation of products and the Partial axes
- Global RV run on all dimensions measures the similarity between the three analysis
  - NIRs and sensory profile - RV=0.80 - p-value= 0.03
  - NIRs and chemical analysis – RV=0.80 – p-value=0.008
  - Sensory profile and chemical – RV=0.61 – p-value=0.14

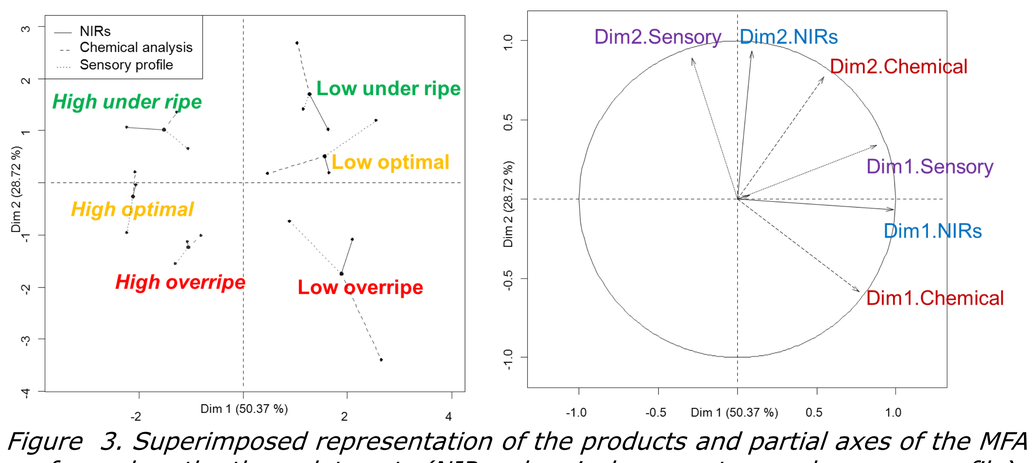



*Figure 3. Superimposed representation of the products and partial axes of the MFA performed on the three data sets (NIRs, chemical parameters and sensory profile)*