Using Multi-table analysis to study relationships between physico-chemical and sensory characteristics of red wines

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groStat 2012
12èmes journées Européennes Agro-Industrie et Méthodes Statistiques

MAXFUN project context

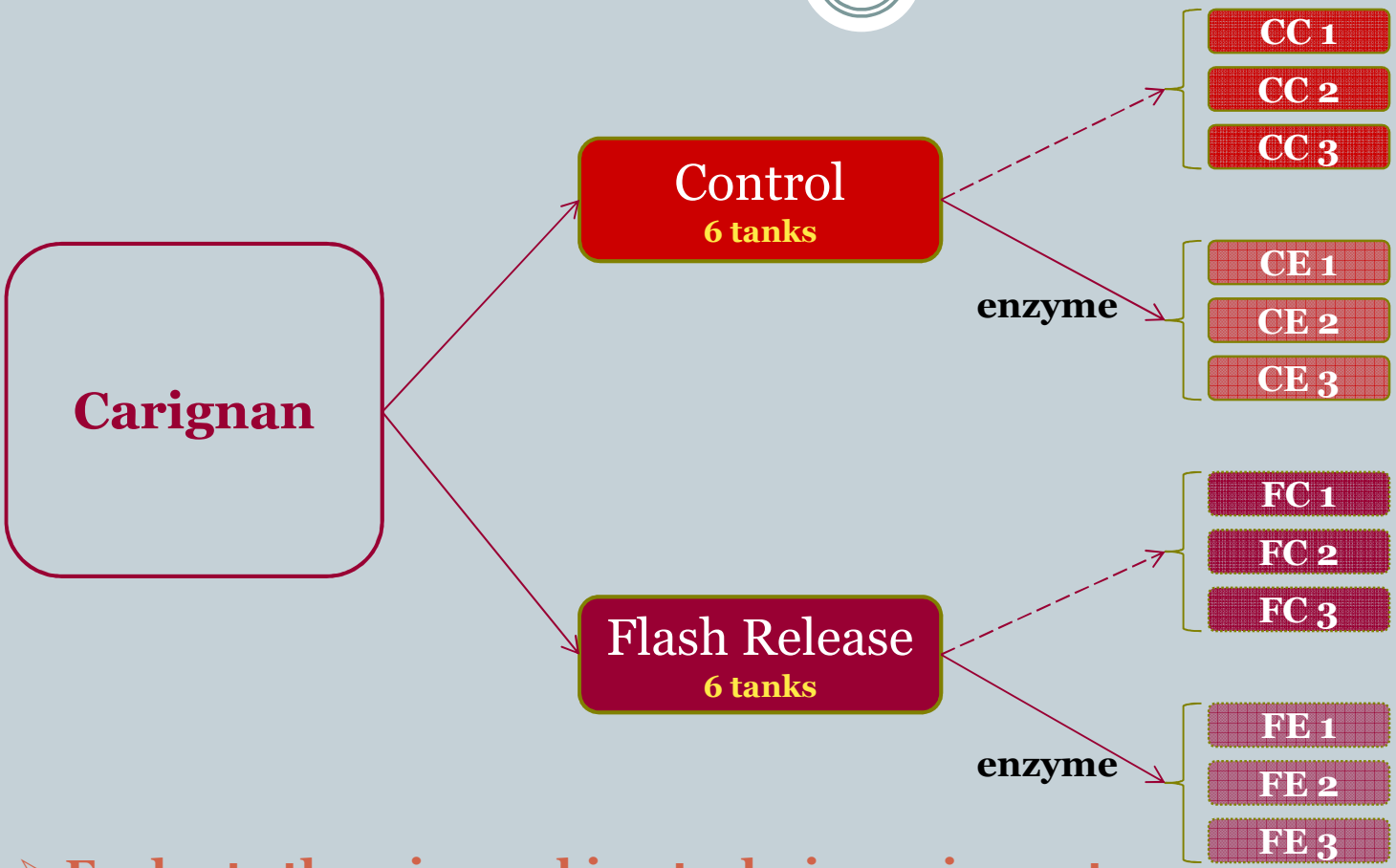
- Develop novel processing technologies for fruit and berry processing industry
- Maximize the quality and healhtiness

- Using grapes as model system

  ➔ physical extraction process : *Flash Release*

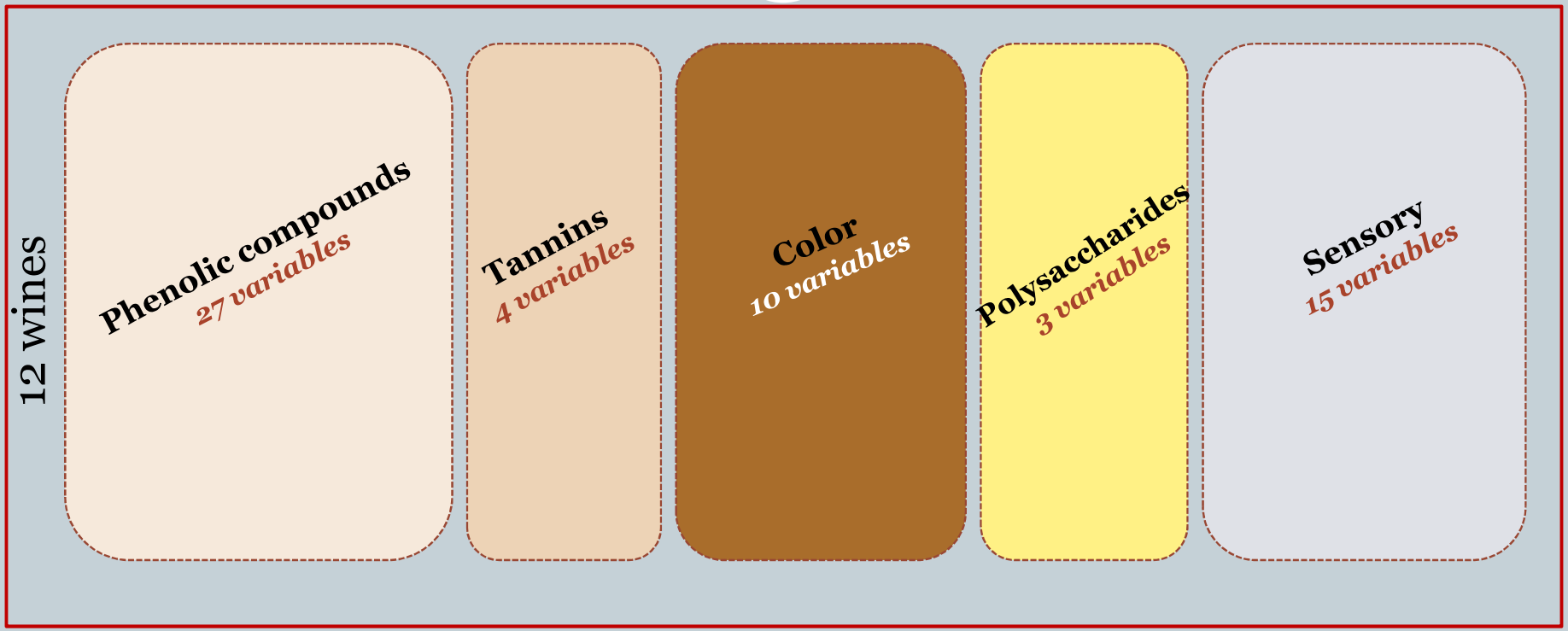
  ➔ enzyme-aided extraction

Wine samples



- Evaluate the winemaking techniques impact
- Explain wine qualities

Dataset



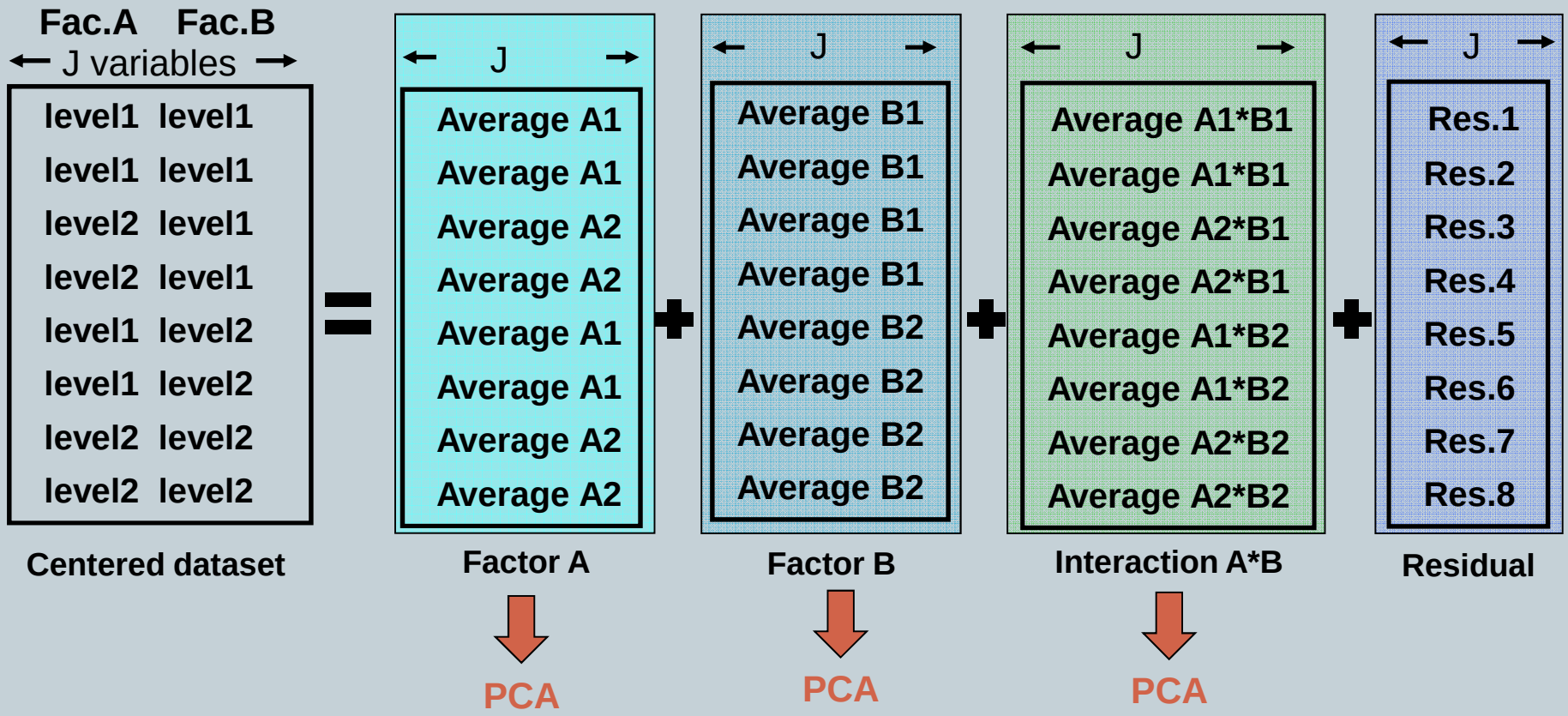
Performing statistical analysis

- ANOVA-Simultaneous Component Analysis (ASCA)
- Multiple Co-inertia Analysis (MCoA)

ANOVA-Simultaneous Component Analysis (ASCA)

Smilde et al, 2005

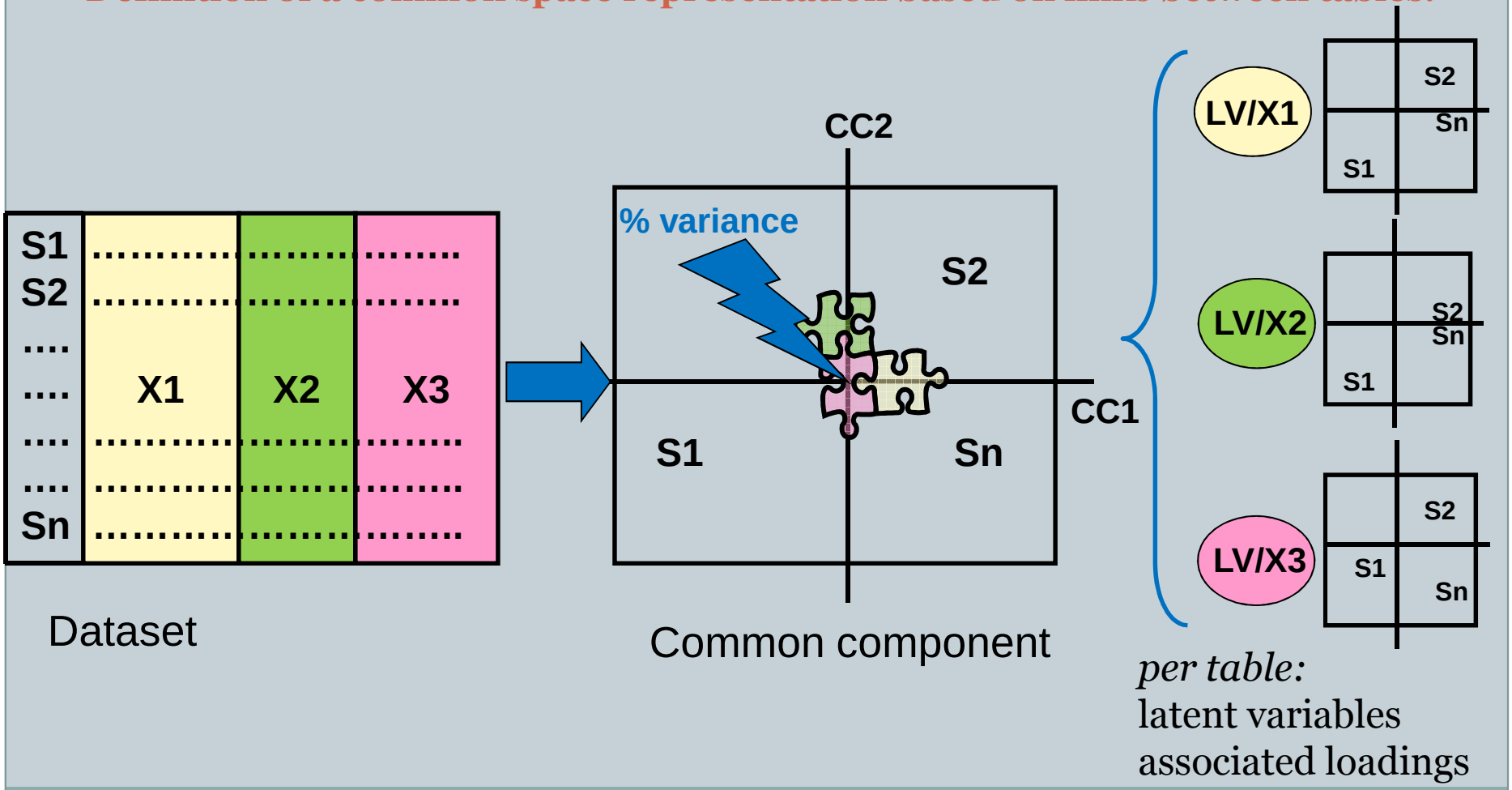
Separating the variation in dataset by contribution of the factors and interaction



Multiple Co-Inertia Analyse (MCoA)

Chessel et al, 1996

Definition of a common space representation based on links between tables.

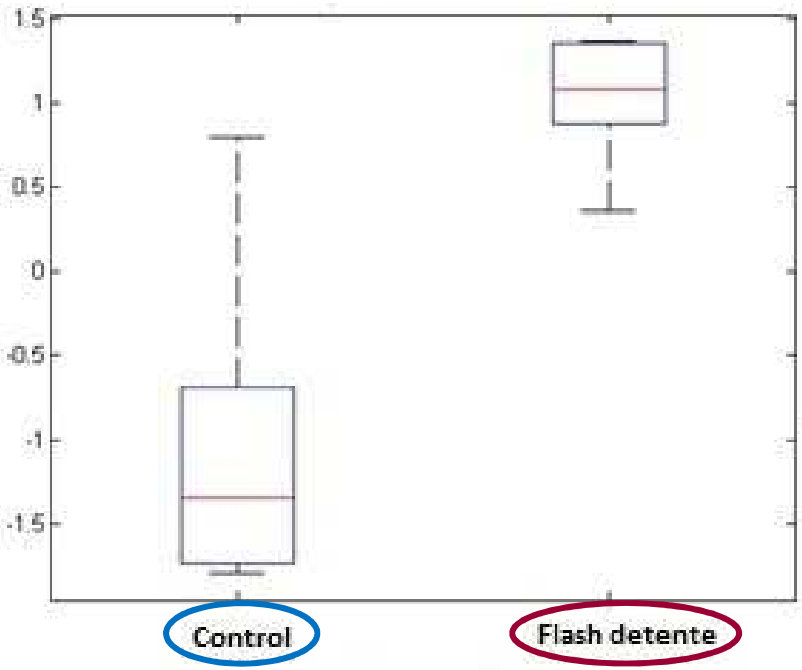


Results *ASCA on sensory data*

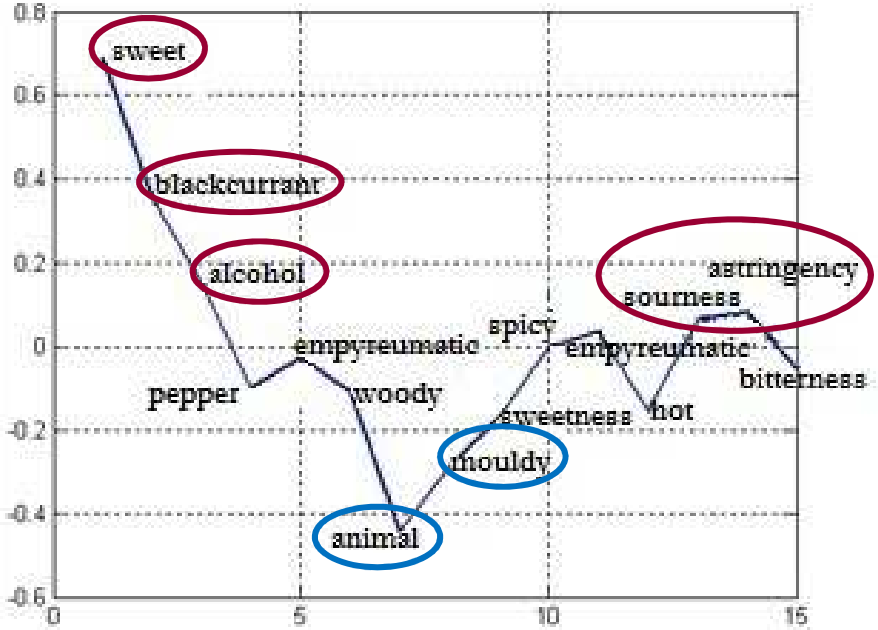
Factor	% associated variability
Flash Release	42.82 %
Enzyme	7.80 %
Interaction	3.33 %
Residual	46.05 %

Results *ASCA on sensory data*

Factor	% associated variability
Flash Release	**42.82 %**
Enzyme	7.80 %



Scores component 1



Eigenvectors component 1

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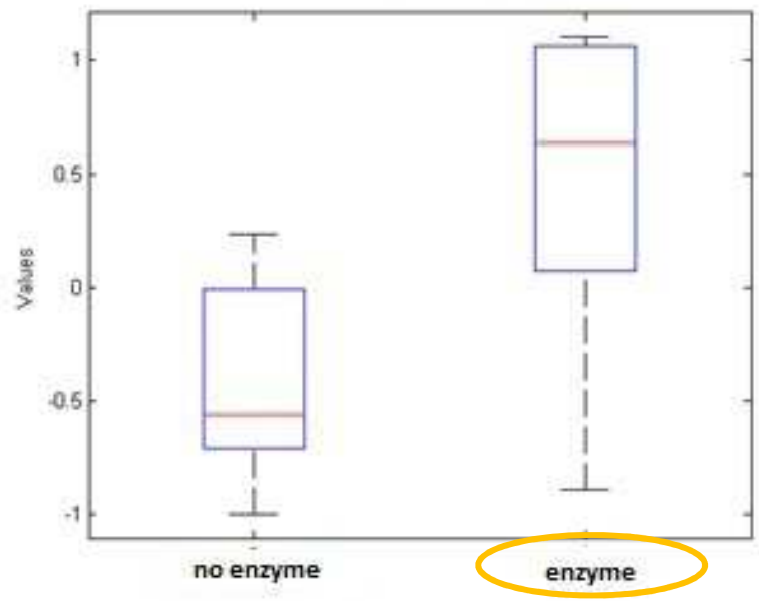
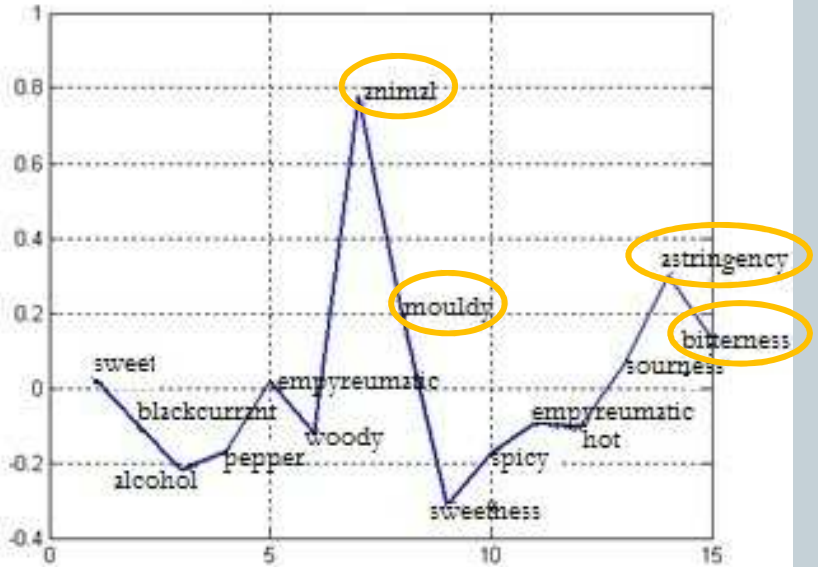
Enzyme	**7.80 %**



Scores component 1



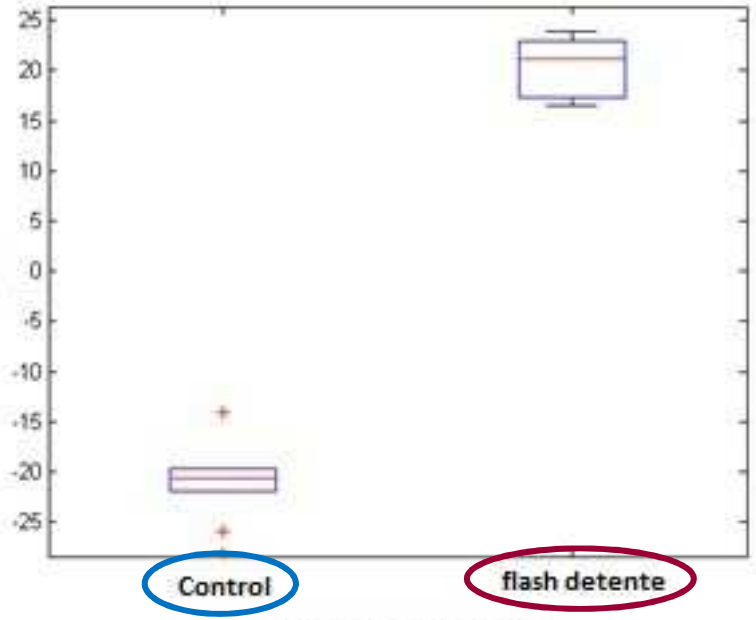
eigenvectors component 1

Results *ASCA on phenolic compounds*

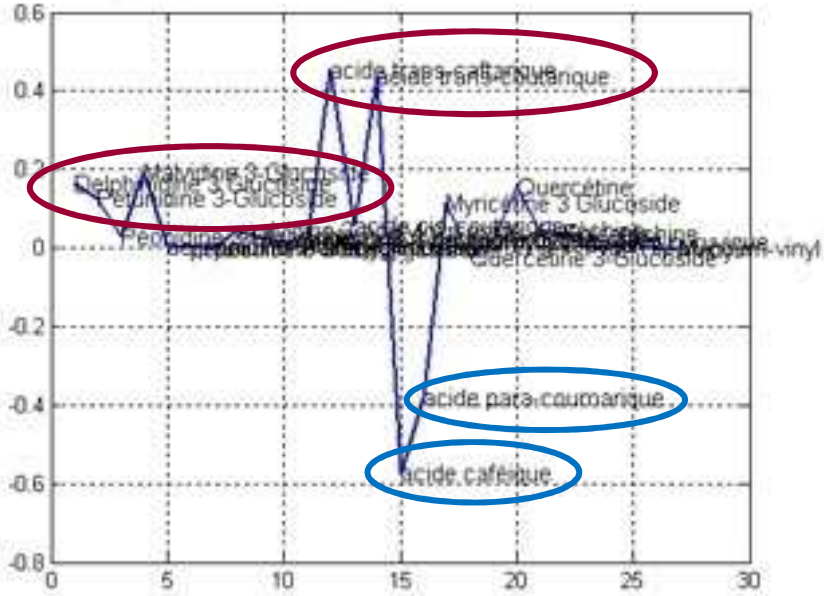
Factor	% associated variability
Flash Release	93.52 %
Enzyme	1.10 %
Interaction	3.32 %
Residual	2.06 %

Results *ASCA on phenolic compounds*

Factor	% associated variability
Flash Release	**93.52 %**
Enzyme	1.10 %



Scores component 1

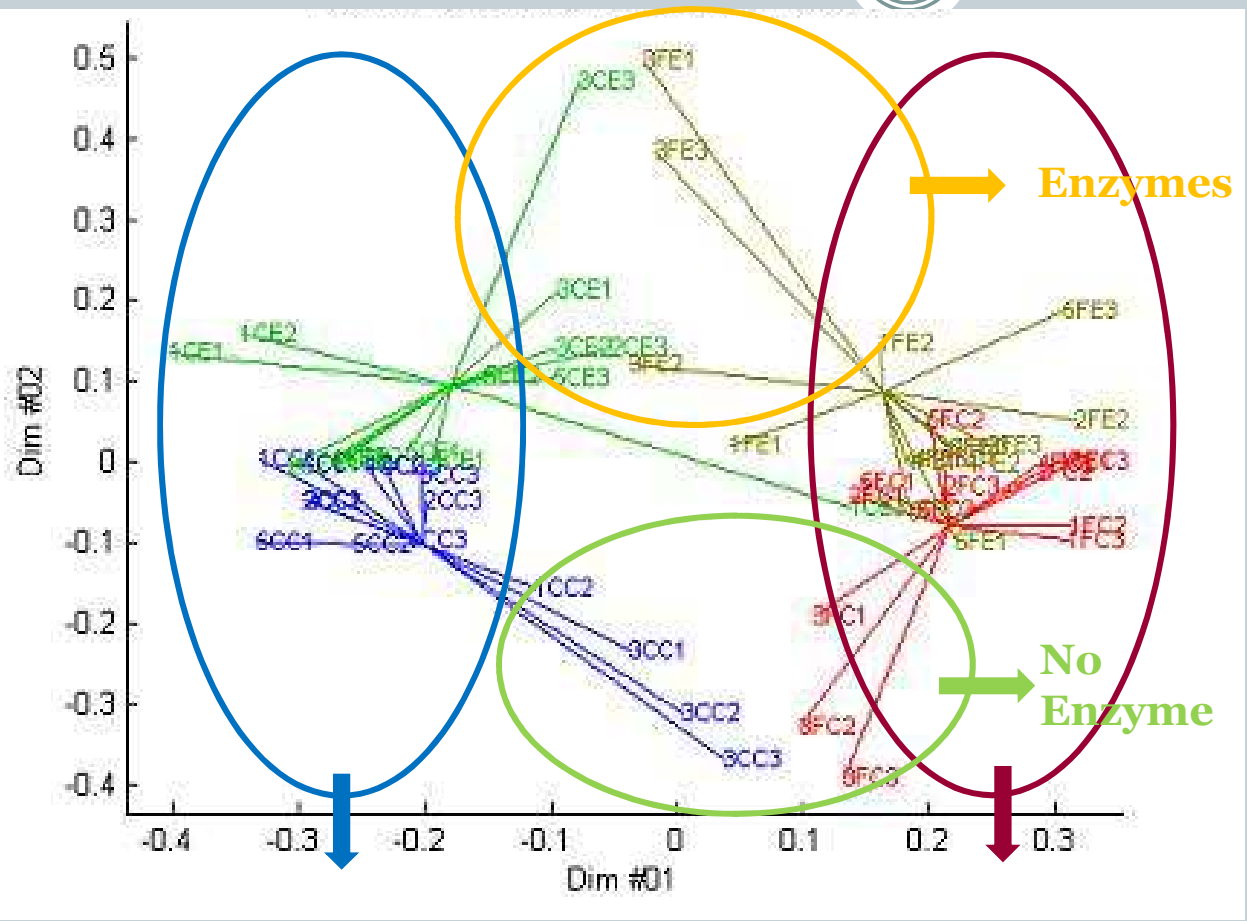


Eigenvectors component 1

Results *ASCA on tanins, color and polysaccharides*

Table	Factor	% associated variability	Conclusion

Results *Multiple Co-inertia Analysis*



Control **Flash detente**

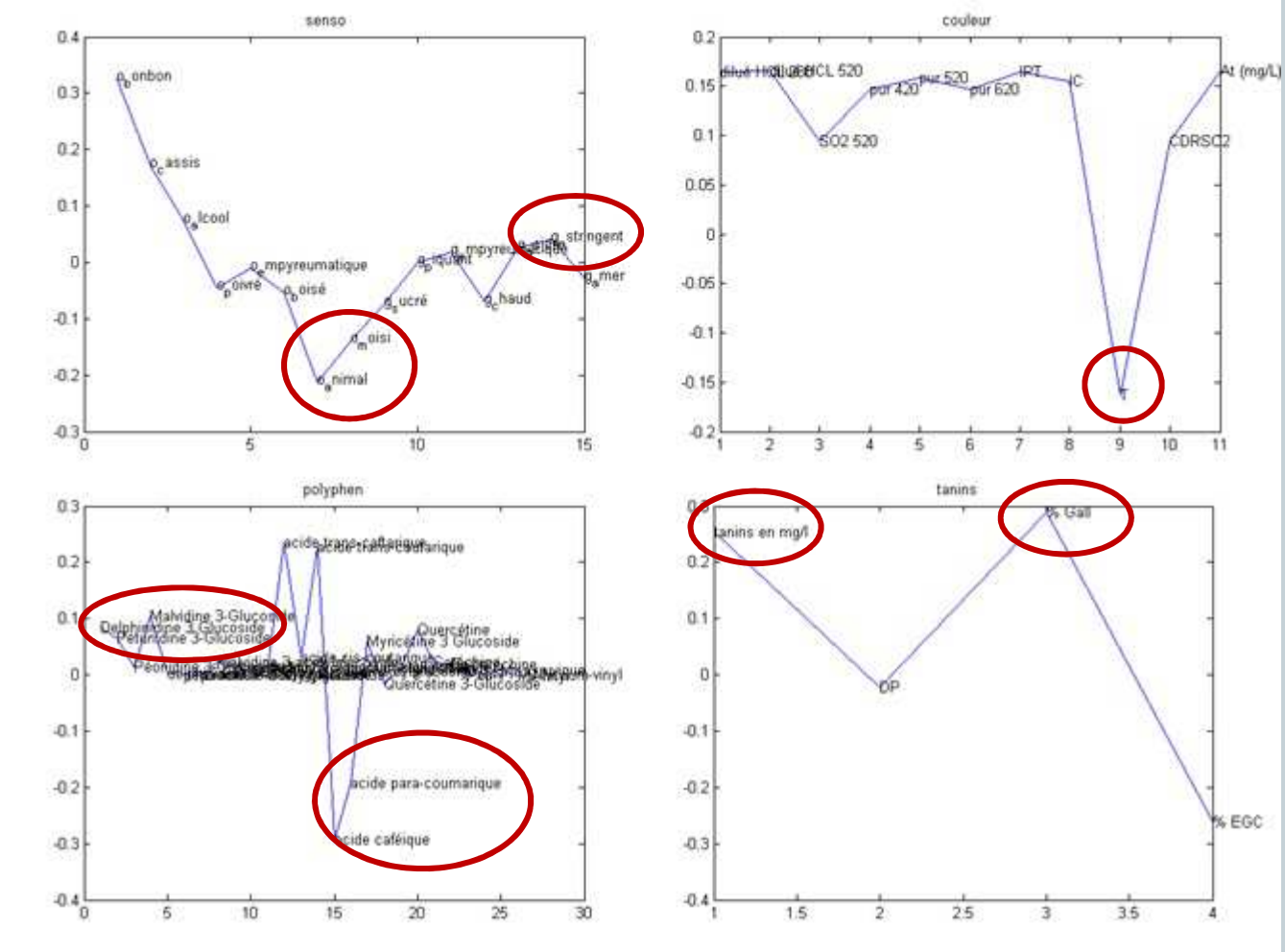
Component 1
- Flah release effect

Table	Variance CC1
1-sensory	0.82
2-color	0.90
3-polysaccharides	0.18
4-phenolic compounds	0.97
5-tannins	0.80

Component 2
- Enzyme effect

Table	Variance CC2
1-sensory	0.13
2-color	0.07
3-polysaccharides	0.55
4-phenolic compounds	0.00
5-tannins	0;08

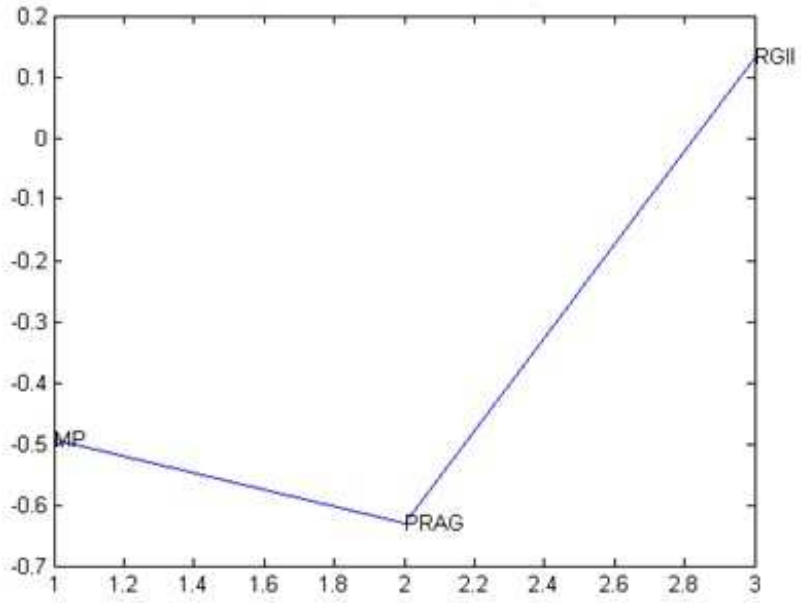
Results *Multiple Co-inertia Analysis*

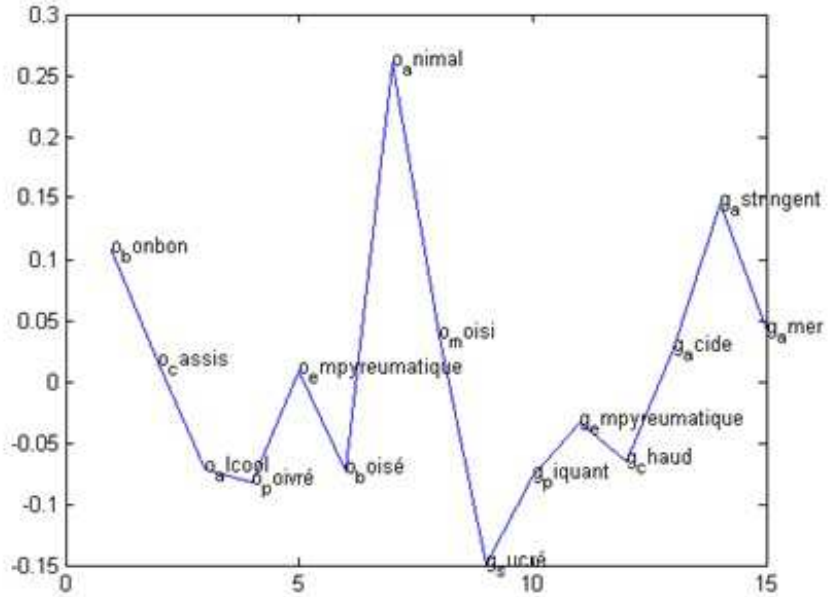


Component 1

Results *Multiple Co-inertia Analysis*

Component 2





Conclusion

- ASCA → factor analysis on each table.

  Easy interpretation

- MCoA→ synthesis all interpretable information

  → analyse relationships between variables

  - Anthocyanins → redder color
  - Tannins → increase the perception of astringency
  - Polysaccharides → correlated with the perception of astringency and bitterness

Thank for your attention

This work was carried out with the financial support of the European Union Commission

Aknowledgments

- Co-authors of this work
- Magali Bes (UE Pech Rouge) *for monitoring of winemaking*
- D. Bertrand (INRA, Nantes) *for Matlab code necessary for implementation of ACOM*
- Erick Picou (UMR SPO) *for his assistance in the coordination of sensory panel*