# How freeing the complexity of process systems in order to modeling global quality of products

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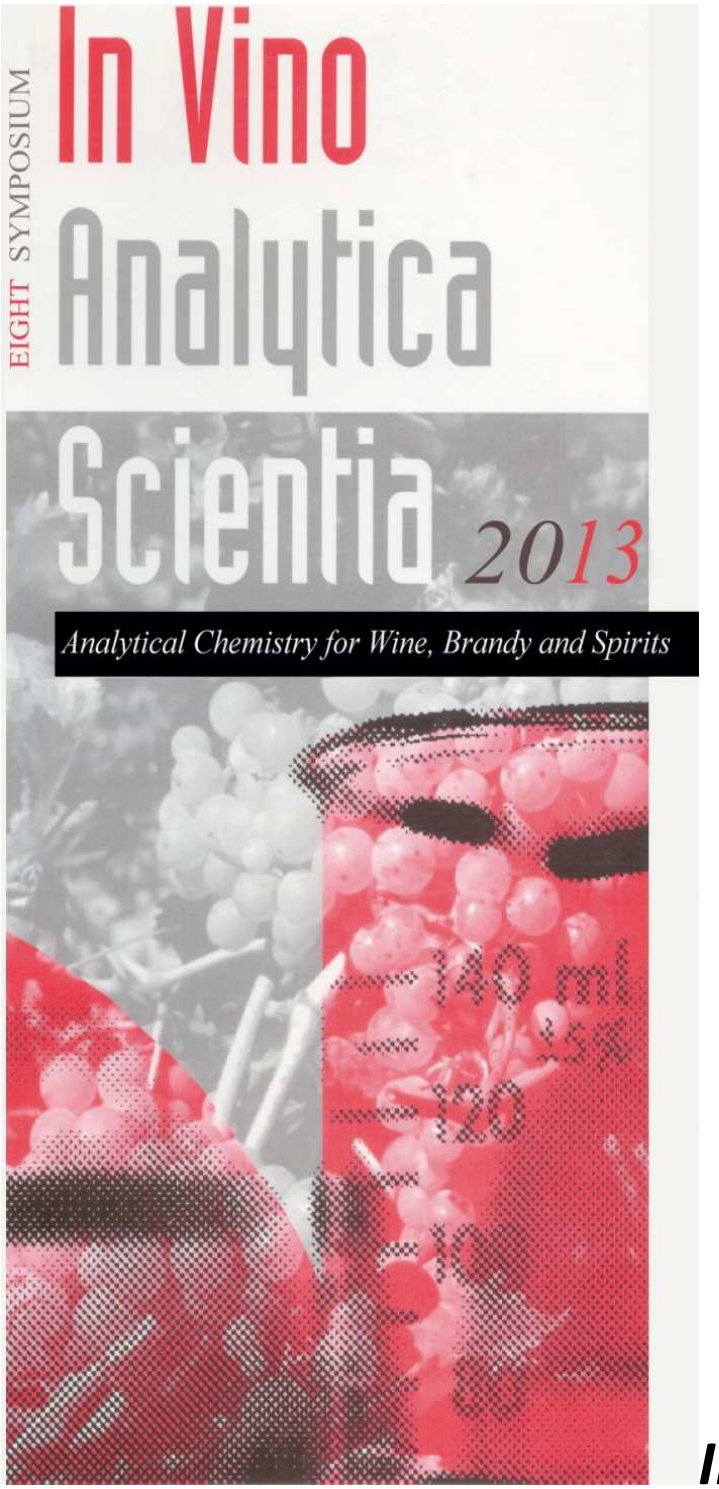


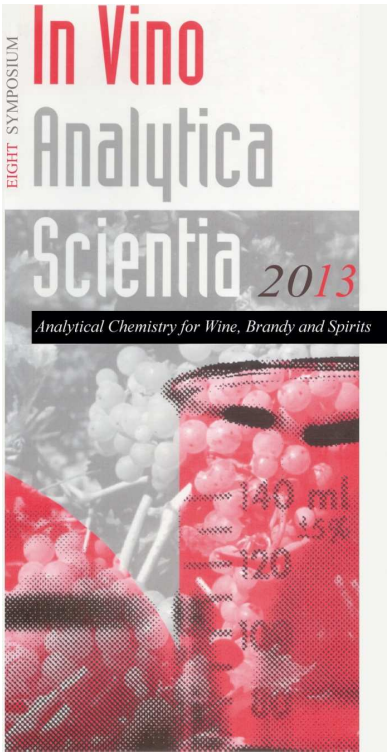

# *IN VINO ANALYTICA*

# *SCIENTIA SYMPOSIUM 2013*

## University of Reims, Faculty of Sciences

**Book of Abstracts**

**Edited by Philippe JEANDET**




**The 8th Edition of *IN VINO ANALYTICA SCIENTIA SYMPOSIUM* will be held at the Faculty of Sciences of Reims 2-5 july 2013.**

## Aims and Scope of the Meeting

This symposium is a continuation of a successful series of conferences. This international meeting aims to gather researchers, enologists and professionals dedicated to the different aspects of production: from environmental concerns to vines, grapes, and final products, establishing a forum to discuss and present the latest developments of Analytical Chemistry

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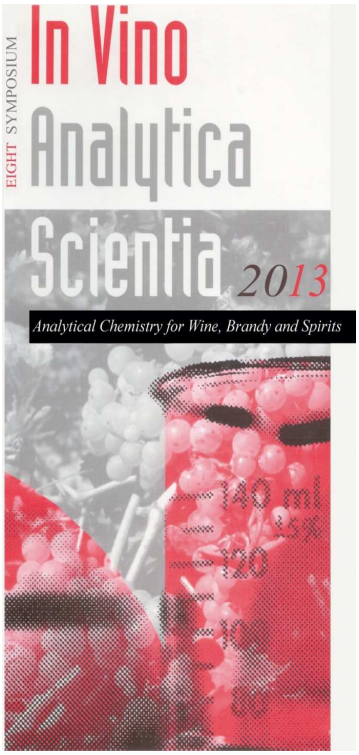


# **P82:** How Free the Complexity of Process Systems in Order to Modeling Global Quality of Products. Application to Wine Style Prediction.

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Bayesian Network, partial least squares, fuzzy inference systems, typicality

**Contribution**

Global quality of wines is impacted by a large number of interacting factors including environmental characteristics, cultural and oenological practices. Traditional statistics cannot give accurate results. Scientific works used expert know how or experimentations where processes were fragmented. Now, in order to better understand the process as the whole that could be greater than the sum of its parts, we discuss here new approaches integrating knowledge from experts and automatic learning on data that can be used to model global quality of wines. We focus on three relevant technics: (i) Bayesian network **[1]** that is a graphical model encoding probabilistic relationships among variables of interest. Bayesian network can be used to learn causal relationships, and can be used to predict the consequences of process ; (ii) PLS path modeling **[2]** that is a statistical approach for modeling complex multivariable relationships among observed and latent variables, particularly when variables cannot be directly measured and are interconnected ; (iii) fuzzy inference systems **[3]** that have been proven effective in dealing with complex nonlinear systems containing uncertainties that are otherwise difficult to model. These approaches are applied to a case study, to model styles of red wines in a French vineyard in the middle Loire valley.

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