

## NMR TOOLS FOR THE ANALYSIS OF BEER AND WINE

A. M. Gil, C. Almeida, J.Rodrigues, I.Duarte, A. Barros

CICECO-Department of Chemistry, University of Aveiro, 3810-193 Aveiro, Portugal.

[agil@dq.ua.pt](mailto:agil@dq.ua.pt)

NMR spectroscopy has long been recognised as a promising tool for the rapid compositional profiling of liquid foods and, in the last few years, developments have proceeded along two main lines: 1) the development of new methods to allow increasingly detailed and sensitive qualitative analysis and 2) the application of NMR methods to practical industrial problems.

This talk will start by presenting the state-of-the-art NMR methods for qualitative analysis of foodstuffs: hyphenated NMR (LC-NMR/MS) and diffusion-ordered spectroscopy (DOSY). Both methods will be discussed regarding their potential as well as their difficulties/disadvantages. Most examples given will refer to applications to beer and wine, although some reference to recent developments in DOSY/HR-MAS (High resolution magic angle spinning) to be applied to semi-solid intact foods will also be added. The second part of the talk will regard the application of high resolution NMR, in tandem with chemometrics, to the monitoring of beer quality and of the brewing process. As a recent example of a practical application, practical stumbling blocks and promising potential of the methods will be discussed.

### References:

1. Almeida, C. et al, "The composition of beer by  $^1\text{H}$  NMR spectroscopy: the effects of brewing site and date of production ", J Agric Food Chem, 54, 700-706, 2006.
2. Nilsson, M. et al, "High Resolution NMR and Diffusion Ordered Spectroscopy of Port Wine", J Agric Food Chem, 52(12), 3736-3743, 2004.
3. Gil, A.M. et al "Characterisation of the aromatic composition of some liquid foods by NMR spectroscopy and LC-NMR/MS", Anal Chim Acta, 488/1, 35-51, 2003.