



**36th International
Symposium
on Capillary
Chromatography
and
9th GCxGC
Symposium**

**Chairman
Prof. L. Mondello
Honorary Chairman
Prof. P. Sandra**

May 27 - June 1, 2012

*Palazzo dei Congressi,
Riva del Garda
Italy*

ABSTRACT BOOK

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The Forum on Microcolumn Separations

ABSTRACT BOOK
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and
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RAPID AND EXTENSIVE QUANTITATION OF SIMPLE PHENOLIC COMPOUNDS FROM WOOD USING HPLC COUPLED WITH FUSED CORE™ BASED COLUMN AND COULOMETRIC ARRAY ELECTROCHEMICAL DETECTOR

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Oenological barriques are produced with several kind of oak wood, but the traditional species in Europe are *Quercus robur*, *Quercus petraea/sessilis* (in Spain also *Q. pyrenaica*), whereas *Quercus alba* is widely used in North America (but also *Q. bicolor*, *Q. macrocarpa*, *Q. prinus*, *Q. lyrata* ...), where, however, barrel's production is traditionally more geared to whiskey ageing.

Lignin, one of the most abundant component of wood (20-35% dry weight) is a three-dimensional polymer characterized by guaiacyl and syringyl structures, and a gentle heating (toasting) promotes the syntheses of guaiacyl (eg: coniferaldehyde, vanillin and vanillic acid) and syringyl compounds (eg: sinapaldehyde, syringaldehyde, and syringic acid). With an extra heating (charring) lignin can break down into much simpler structures as the steam volatile phenols responsible for the smoky aroma and the 'phenolic' flavour (eg: guaiacol, phenol, eugenol/isoegenol, ethylguaiacol, o/p -cresols). Even if the choice of the preferred barrel is primarily depending on both sensorial and economical evaluations, however, still today the lack of cheap and time-saving methods makes difficult to establish the actual compositional impact of this decision on the aged wine regarding the simple phenolic composition. The use of an HPLC-Coulometric Array Electrochemical detector equipped with eight porous graphite working electrodes (set at potentials between 100 and 800 mV) and a pentafluorophenylpropyl fused-core particles column (Supelco, Ascentis Express® F5 150x3mm, 2.7mm) allowed the investigation of 57 phenolic analytes in 40 minutes. 30 compounds were quantifiable in wines treated with 6 different wood materials (3 French and 3 American oaks). Notably, the most important ones were ellagic acid, syringic acid, homovanillic acid, vanillic acid, coniferaldehyde, syringaldehyde, sinapaldehyde, vanillin and tyrosol. The wine samples (2 mL) were only 0.45 mm PTFE filtered before analysis.