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# Nano-MALDI: Nano-surface based detection of oxidized biomolecules

## PROJECT DESCRIPTION

The analysis of oxidized lipids and proteins in complex mixtures is technically challenging due to the very low amount of target analytes being present in a lipid bulk mixture, which hampers both their selective enrichment (e.g. via chromatographic technique) and qualitative analysis. One possibility for solving this issue is the use of highly efficient separation techniques based on nano-materials in combination with sensitive methods of detection such as mass spectrometry (MS). This project will apply a combination of these techniques for the analysis of low-abundant oxidized phospholipids (OxPLs) in complex biological and industrial samples. A consequence of oxidative modifications of lipids and proteins is the formation of reactive carbonyl groups (e.g. aldehydes, ketones, carboxyls). These groups will be detected by MALDI-MS after addition of MS-tags as labeling reagents specific for carbonyls. The enrichment of target analytes and chemical reactions will be carried out on magnetic core-shell nanoparticles with different types of metal oxide surfaces being selective for phosphate groups.

It is aimed to analyze the nanoparticles carrying the target analytes directly with MALDI-MS, which simplifies the procedure and enhances sensitivity. In a parallel project submitted by French collaborators to their local agency, similar technique will be established for the analysis of carbonylated proteins. Overall, the methodological core of this project is based on high degree of multidimensionality in terms of selective enrichment and detection of analytes. It is expected that upon miniaturization and automation this method can be used for high-throughput and cost-efficient detection of oxidized phospholipids in biological and industrial samples.

## PARTNERS

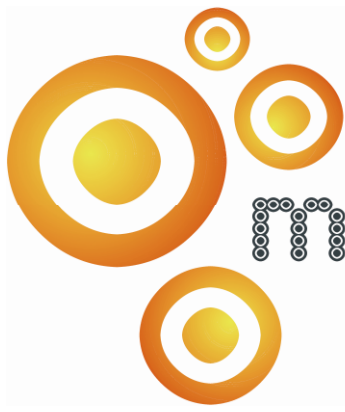
**Project coordinator:** MUV, Austria

**Project partners:** UV, Austria

FTC, Austria

IMPT, France

YELEN, France



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### PROJECT DURATION AND TOTAL PROJECT COST:

Duration: 01/01/2011 – 31/12/2013

Cost: 919,644 Euro

### CONTACT:

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