

# EVALUATION OF ARSENIC EXPOSURE EFFECTS ON RICE GROWTH USING AN UNTARGETED LIPIDOMICS APPROACH

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## Introduction

There is an increasing interest in how arsenic is assimilated and metabolized in plants-base foods such as rice (*Oryza sativa japonica*), due to the potential health risk that its accumulation might cause through food chain [1]. Lipidomics is a powerful approach to study lipids species present in rice, with the aim of determining the affected metabolic pathways.

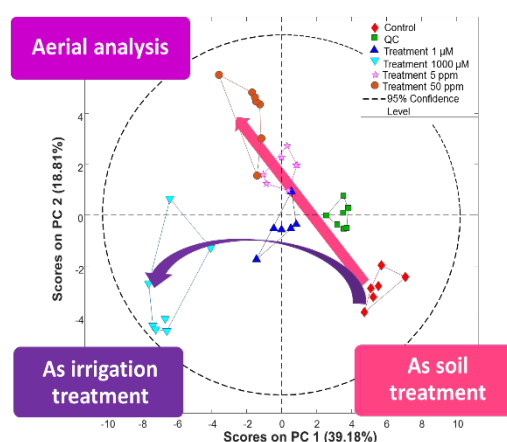
The main goals of this work were: 1) evaluate the effects in the lipidome produced on rice crops (*Oryza sativa L.*) by arsenic exposure, 2) assess the effect of two different treatments (irrigation or planting) at two concentration levels and 3) identify potential lipid markers for a better understanding of the metabolic pathways affected.

## Materials and methods

Two As exposures were applied during the first three weeks of rice growth in an environmental chamber: by irrigation (concentration 1 or 1000  $\mu\text{M}$ ; being 1  $\mu\text{M}$  the limit of acceptable As concentration in water by European legislation [2]), and directly applied to the soil before planting (concentration 5 or 50 ppm). Aerial parts of rice and roots were collected, grinded, lyophilized, extracted and analyzed separately. LC-MS analysis was conducted using a Kinetex C8 column (100 x 2.1 mm, 1.7  $\mu\text{m}$ ). UPLC system employed was a Waters Acquity connected to a Waters LCT Premier orthogonal accelerated Time of Flight (ToF), and electrospray in positive and negative mode as ionization source. Multivariate tools (PCA, PLS-DA, ASCA) were employed in data analysis.

## Results & Discussion

Results obtained show that only the highest As concentration levels (both in irrigation water or settled in soil) allowed the differentiation between samples. This complies with the European legislation, with permitted levels of the As exposure not showing relevant effects. Glycerophospholipids and acylglycerides are the main families of lipids pointed as potential biomarkers for the arsenic exposure.



## References

1. Zhao FJ., McGrath SP., Meharg AA., Annu Rev Plant Biol. 2010, 61, 535-59.
2. Navarro-Reig M., Jaumot, J., Tauler R., J Chromatogr A. 2018, 1568, 80-90.