



*Determination of interactions between nutrients in *Oryza sativa* L. naturally enriched in Se: tissue localization and characterization using XRF and atomic absorption*

Ana Margarida C. Marques¹, Inês Luís¹, Ana R. F. Coelho¹, Cláudia C. Pessoa¹, Diana Daccak¹, Fernando C. Lidon¹, Paula S. Afonso², Maria M. Simões¹, Ana Sofia Almeida², Carlos Galhano¹, José C. Ramalho⁴, Mauro A. M. Guerra¹, Roberta G. Leitão¹, Paula Marques¹, Ana I. F. Ribeiro⁴, Fernando H. Reboredo¹, Maria F. Pessoa¹, Maria M. Silva⁵, Paulo Legoinha¹, Nuno Leal¹ and Isabel P. Pais²

¹Faculdade de Ciências e Tecnologia-UNL, Portugal

²Instituto Nacional de Investigação Agrária e Veterinária, Portugal

³Centro Operativo e Tecnológico do Arroz, Portugal

⁴Instituto Superior de Agronomia-UL, Portugal

⁵Escola Superior de Educação Almeida Garrett, Portugal

Abstract

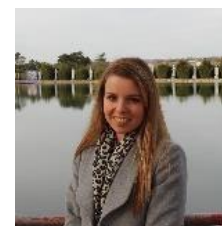
Selenium (Se) was first considered as toxic, being today considered as an antioxidant trace mineral important for health and development. Lack of selenium in humans has been associated with high risk of mortality, deficient immune functions, cognitive decline, Keshan disease and white muscle disease. The growing demand for efficient, bioeconomic and sustainable strategies to increase Se content in rice is therefore justified, as is the study of the technical and nutritional implications inherent to its production and industrial processing for food products.

Se biofortification is a strategy that promotes nutrient enhancement in food crops and can increase nutrient uptake and accumulation in the human body. The technical itinerary was implemented, using two commercial varieties of rice (Ariete and Ceres) and two advanced lines of INIAV National Rice Genetic Improvement Program (OP1505 and OP1509). Five selenium concentrations were tested in the forms of selenate and sodium selenite by foliar application. It was verified using the EDXRF M4 Tornado™ system, by spectral mapping, the preferential location of Se in rice. As such, it was found that Se was preferentially accumulated in the inner zone of rice grain. The contents of C, H and O, present in the different treatment concentrations, were also quantified. The average of Se biofortification index in variety Ceres was 16,3 % and the opposite was verified in variety Ariete, by atomic absorption.



Biography:

Ana Margarida Coelho Marques is a PhD student at FCT-UNL, in Portugal. Her research focuses on the biofortification of *Oryza sativa* L. in Selenium. She has extensive experience and mastery of various analytical procedures and methods such as: X-ray fluorescence, atomic absorption spectrophotometry, MDA, pigment determination, xanthophylls, carotene, lutein and sugars.



Speaker Publications:

1. Oliveira, K., Pataco, I., Mourinho, M., Santos, C., Pelica, J., Leitão, A., Pais, I., Campos, P., Reboredo, F., Pessoa, M., Ramalho, J., Lidon, F., 2015. Selenium Biofortification in Rice - A pragmatic perspective. *Emirates Journal of Food and Agriculture*. 27(3), 231-234, DOI: 10.9755/ejfa.v27i3.19285.
2. Deng, X., Liu, K., Li, M., Zhang, W., Zhao, X., Zhao, Z., Liu, X., 2017. Difference of selenium uptake and distribution in the plant and selenium form in the grains of rice with foliar spray of selenite or selenate at different stages. *Field Crops Research*. 211, 165–171. DOI: 10.1016/j.fcr.2017.06.008

23rd Euro-Global Summit on Food and Beverages; Webinar - April 20-21, 2020

Abstract Citation:

Ana Margarida C. Marques, Determination of interactions between nutrients in *Oryza sativa* L. naturally enriched in Se: tissue localization and characterization using XRF and atomic absorption, Euro Food 2020, 23rd Euro-Global Summit on Food and Beverages; Webinar - April 20-21, 2020.

(<https://europe.foodtechconferences.org/abstract/2020/determination-of-interactions-between-nutrients-in-oryza-sativa-l-naturally-enriched-in-se-tissue-localization-and-characterization-using-xrf-and-atomic-absorption>)