

# LabEx DRIIHM

Dispositif de Recherche Interdisciplinaire sur les Interactions Hommes-Milieux



CNRS - Observatoires Hommes-Milieux - Investissements d'avenir

*Projet de recherche*

## **NAMELESs - Nanomaterials for the Remediation of agriculture Metal contaminated soils surrounding the Estarreja chemical complex**

### **Session**

2017

### **Co-porteur(s)**

Anabela Cachada, Nuno Durães, Carla Patinha, Andres Rodríguez-Seijo

### **Type de projet**

Projet OHM

### **OHM(s) concerné(s)**

- OHMI Estarreja

### **Mots-clés**

[AGRICULTURAL SOILS](#) [BIOAVAILABILITY](#) [FOOD SECURITY](#) [INDUSTRIAL ACTIVITY](#) [NANOPARTICLES](#)  
[POTENTIALLY TOXIC ELEMENTS](#) [SOIL](#) [RISK ASSESSMENT](#).

Biologie, Chimie, Écologie

Estarreja Chemical Complex (ECC) is the second largest chemical complex in Portugal and has been classified by the Portuguese Environmental Agency as a "site of priority actions in terms of rehabilitation". Previous studies found that potentially toxic elements (PTEs) in Estarreja agricultural

soils are associated with labile fractions, which results in their bioaccumulation and translocation in plant tissues of commercial interest, and a potential risk of transfer to the food web.

Since nanotechnology has been presented as a promising technique for immobilising PTEs in soils, and particularly for reducing available contents, this project aims at evaluating the ability of nanoparticles to reduce PTEs mobility and their uptake by plants. The ability of nanoparticles to reduce the mobility of PTEs will be assessed through selective chemical extractions and by ecotoxicological assays.

Thus, this project proposes to study the effectiveness of the use of nanoparticles usually employed into remediation strategies of contaminated soils to determine the changes in the mobility of potentially toxic elements assess the ecotoxicity of nanoparticles in laboratory conditions and evaluate the reduction of bioaccumulation and translocation of PTEs by plant species.

## **Porteur**

Ruth Pereira

Ruth Pereira, PhD and Habilitation in Biology, is since 2011 Assistant Professor at the Department of Biology of the Faculty of Sciences, University of Porto, and director of GreenUPorto – Sustainable Agrifood Research Centre. Her main research interests are related with risk assessment of contaminated sites, and of new chemical substances and terrestrial ecotoxicology. As a result of her research activity she is the author/co-author of about 120 research papers published in international journals indexed in Science Citation Index (h-index 29). She is/was the supervisor of 5 post-doctoral students, 14 doctoral students, (10 concluded) and several MSc students and Biology internship students. Thirteen PhD students and all the Post-doctoral students awarded grants from FCT and one from UNESCO. Ruth Pereira was Principal investigator and member of the Research Team of several national and international funded projects. She was an adviser on Risk Assessment, at the European Commission (SANCO) and more recently she is member of the national committee at ISO WG SC4 – Ecotoxicological Assays and SC7 – Impact Assessment. Further, she integrated European panels for the evaluation of project proposals, as well as scientific panels at FCT for the evaluation of grants and final project reports.

## **Participants**

Cachada

Anabela

Anabela Cachada is a postdoc researcher at CIIMAR and CESAM, working in the area of Risk Assessment and Environmental Chemistry. It has a degree in Environmental Engineering and of the Natural Resources (University of Trás-os-Montes e Alto Douro, Portugal), a Master in Geochemistry (University of Aveiro, Portugal), and a PhD in Chemistry (University of Aveiro, Portugal). Her field of expertise is on the behavior of organic

contaminants in different environmental compartments, and she is particularly interested in the risk assessment of organic contaminated soils and in the evaluation of organic contaminants bioavailability and bioaccessibility in soils. She has developed several works on the development of methodologies for the determination of organic contaminants in different environmental matrixes. She participated in 13 multidisciplinary research projects (including two European funded projects), with 26 papers published in international scientific periodicals with referees....

Durães

Nuno

Nuno Miguel dos Santos Durães is graduated in Geology (2005), has a post-graduation in Prospection and Evaluation of Geological Resources – Mineral Resources branch (2006) and a PhD in Geosciences (2011) by Faculty of Sciences, University of Porto. At this moment, he is a Post-doc research fellow from Foundation for Science and Technology (FCT – Portugal) at GEOBIOTEC – Department of Geosciences, University of Aveiro, developing work dedicated to biogeochemical interaction processes of REE in plants. His research has been devoted to supergenic and environmental geochemistry, biogeochemistry and mineralogy areas. He has author of 12 articles published in SCI journals, 6 articles in national and international journals, 16 abstracts and extended-abstracts in congresses book chapters and 28 communications in national and international conferences. He has a member of 4 scientific projects and reviewer of SCI-journals.

Patinha

Carla

Carla Patinha is technician at Department of Geoscience and researcher of GEOBIOTEC. She holds a PhD degree in Geosciences (2002), University of Aveiro. Since obtaining her PhD degree published 36 papers in international peer review journals. C Patinha has also published about 100 papers in International Conferences Proceedings. She has been participating and coordinating several national and international R&D Projects. Present research interests include research on human bioaccessibility, solid-phase distribution of potentially harmful elements to human health, saline soils and their management and study geochemical records of environmental changes: climate changes and human activities.

Rodríguez-Seijo

Andrés

Andrés Rodríguez Seijo, PhD since 2016 (by the Universidade de Vigo) in the area of Soil Science had a Licenciatura (equivalent to BSc+MSc) in Biology in 2012, and a Master's at Terrestrial Ecosystems, Sustainable Use and Environmental Implications in 2013, both by the same University. His expertise is focused on the behaviour of lead and potentially toxic elements on mine, urban and shooting ranges soils, and their study through several techniques: soil extractions, phytoremediation strategies, application of lead isotopes as tracers, TOF-SIMS analyses to know the behaviour with soil components, use of nanoparticles to reduce available contents and application of ecotoxicological techniques. He's author/co-author of 15

articles in SCI journals (h index of 3), two book chapters and 19 communications to national and international conferences. He was the co-supervisor of 2 MSc students, participated in two local and regional projects and a Spanish national project about soil...