

Ana Paula Mucha

Principal Investigator of the EcoBioTec Group
(Bioremediation and Ecosystems Functioning)
CIIMAR - Interdisciplinary Centre of Marine and Environmental Research,
University of Porto
Rua dos Bragas 289, P 4050-123 Porto, Portugal
Phone: 223401822
E-mail: amucha@ciimar.up.pt
Web page: <http://www.ciimar.up.pt/member.php?id=4>
orcid.org/0000-0003-0024-7145



Expertise

Ana Paula Mucha has a research position at CIIMAR, University of Porto, Portugal, being the Principal Investigator of the EcoBioTec Group (Bioremediation and Ecosystems Functioning). She focuses her research on the development of biotechnology tools for ecosystems recovery, based on the ability of autochthonous microorganisms and plants to remove contaminants, through bioremediation and phytoremediation processes. She has relevant expertise in microbiology, microbial ecology and interaction of microorganisms with contaminants. She authored ca. 50 SCI papers including high profile journals such as *Bioresource Technology* or *Environmental Science and Technology*. Also, she is the Scientific Coordinator of the CMIA (Environmental Monitoring and Interpretation Centre) of Vila do Conde, and regularly gives talks to the general public and school students in the frame of outreach programs and projects. Moreover, she has been involved in several national and international projects, being the national representative of the COST Action “European Network on Ecological Functions of Trace Metals in Anaerobic Biotechnologies”.

Academic degrees

2002 – PhD. in Aquatic Sciences at Institute of Biomedical Sciences Abel Salazar (ICBAS), University of Porto, Portugal.

1997 – MSc Degree in Ecology, Management and Modelling of Aquatic Resources at Faculty of Sciences and Technology, New University of Lisbon, Portugal.

1993 – Degree in Aquatic Sciences at Institute of Biomedical Sciences Abel Salazar (ICBAS), University of Porto, Portugal.

Current position

2012 - ...: Auxiliary Researcher at CIIMAR, Principal Investigator of the EcoBioTec Group (Bioremediation and Ecosystems Functioning).

Participation in research projects

- Principal Investigator of the project “SpilLess - First line response to oil spills based on native microorganisms cooperation”, started in February 2017 (Ref: EASME/EMFF/2016/1.2.1.4/010).
- Team member of the project “CORAL - Sustainable Ocean Exploitation: Tools and Sensors”, started in January 2016 (NORTE-01-0145-FEDER-000036).

- Team member of the project “INNOVMAR - Innovation and Sustainability in the Management and Exploitation of Marine Resources”, started in January 2016 (NORTE-01-0145-FEDER-000035).
- Team member of the project “MarinEye – A prototype for multitrophic oceanic monitoring” financial support from Iceland, Liechtenstein and Norway through the EEA Grants (PT02_Aviso4_0017), started in October 2015.
- Core team member of the project “CientAmostra - Certificação científica para a realização de campanhas de amostragem”, started in October 2014, (Funded by PROMAR - Desenvolvimento Sustentável das Zonas de Pesca Grupo de Acção Costeira Litoral Norte (31-04-01-FEP-237)).
- Management Committee member of COST Action: ES1302 – “European Network on Ecological Functions of Trace Metals in Anaerobic Biotechnologies”, started in November 2013.
- Team member of the project “ECORISK - Ecological risk assessment of oils and hazardous and noxious substances in the NW Portuguese coast”, started in January 2013 (NORTE-07-0124-FEDER-000054).
- Principal investigator of the project “PHYTOBIO - Phytoremediation and bioremediation of contaminants in salt marshes: plant – microorganisms interactions”, started in June 2010 (PTDC/MAR/099140/2008).
- Core team member of the project "NITROTOX – Interference of Metals and PAHs in Nitrate Removal Biological Processes: Denitrification vs Anammox", started in October 2011 (PTDC/AAC-AMB/113973/2009).
- Team member of the project "CHOLERA-Towards the understanding of Vibrio cholerae dynamics and controls in tropical African wells (Guinea-Bissau)", started in March 2010 (PTDC/AAC-CLI/103539/2008)
- Core team member of the project “OILDEBEACH - Buried oil in the intertidal beach zone: coupling between beach morphodynamic, natural degradation, forcing mechanisms and biological activity", started in October 2008 (ERA-AMPERA/0003/2007).
- Team member of the project "Rhizosphere Biogeochemistry and its Relevance for Endpoints and Phytoremediation" started in September 2005 (POCTI/CTA/48386/2002).
- Team member of the project of JNICT (PEAM/C/GEN/245/93) "Processos de transferência de carbono, nutrientes e metais pesados entre o ambiente sedimentar e a água, em zonas costeiras" (1994-96).
- Team member of the project of IHRH "Avaliação da vulnerabilidade da capacidade de recepção das águas e zonas costeiras em Portugal" (1994).

Publications in peer review journals

1. Portugal F.S., Dias J.M., Ribeiro H., Magalhães C., **Mucha A.P.**, Danko A.S. Anaerobic Biodegradation of Ethylic and Methylic Biodiesel and their Impact on Benzene Degradation, CLEAN - Soil, Air, Water, 45, 1600264. (<http://dx.doi.org/10.1002/clen.201600264>)
2. Fernandes J.P., **Mucha A.P.**, Francisco T., Gomes C.R., Almeida C.M.R. Interaction between silver nanoparticles and salt marsh plants – implications for phytoremediation processes and effects in microbial community dynamics, 2017, Marine Pollution Bulletin, 119: 176–183

(<http://dx.doi.org/10.1016/j.marpolbul.2017.03.052>).

3. Almeida C.M.R., Ferreira A.C.F., Santos F., Lourinha I., Basto M.C.B., **Mucha A.P.** Can veterinary antibiotics affect constructed wetlands performance during treatment of livestock wastewater? 2017, *Ecological Engineering* 102: 583–588 (<http://dx.doi.org/10.1016/j.ecoleng.2017.02.035>)
4. Fernandes J.P., Almeida C.M.R., Andreotti F., Barros L., Almeida T., **Mucha A.P.** Response of microbial communities colonizing salt marsh plants rhizosphere to copper oxide nanoparticles contamination and its implications for phytoremediation processes, *Science of the Total Environment*, accepted (<http://dx.doi.org/10.1016/j.scitotenv.2017.01.015>).
5. Alexandrino D.A.M., **Mucha A.P.**, Almeida C.M.R., Gao W., Jia Z., Carvalho M.F. Biodegradation of the veterinary antibiotics enrofloxacin and ceftiofur and associated microbial community dynamics. 2017, *Science of the Total Environment*, accepted (<http://dx.doi.org/10.1016/j.scitotenv.2016.12.1410048-9697>).
6. Montenegro I.P.F.M., **Mucha A.P.**, Reis I., Rodrigues P., Almeida C.M.R. Copper effect in petroleum hydrocarbons biodegradation by microorganisms associated to *Juncus maritimus* - role of autochthonous bioaugmentation, 2017, *International Journal of Environmental Science and Technology*, accepted (<http://dx.doi.org/10.1007/s13762-016-1215-9>)
7. Almeida C.M.R., Santos F., Ferreira A.C.F., Gomes C.R., Basto M.C.B., **Mucha A.P.** Constructed wetlands for the removal of metals from livestock wastewater – Can the presence of veterinary antibiotics affect removals? 2017, *Ecotoxicology and Environmental Safety*, 137: 143-148 (<http://dx.doi.org/10.1016/j.ecoenv.2016.11.021>).
8. Bôto M., Almeida C.M.R., **Mucha A.P.** Potential of Constructed Wetlands for Removal of Antibiotics from Saline Aquaculture Effluents, 2016, *Water*, 8: 465 (<http://dx.doi.org/10.3390/w8100465>).
9. Montenegro I.P.F.M., **Mucha A.P.**, Reis I., Rodrigues P., Almeida C.M. Effect of petroleum hydrocarbons in copper phytoremediation by a saltmarsh plant (*Juncus maritimus*) and the role of autochthonous bioaugmentation, 2016, *Environmental Science and Pollution Research*, 23:19471 – 19480 (<http://dx.doi.org/10.1007/s11356-016-7154-7>).
10. Ribeiro H., Mucha A.P., Azevedo I., Salgado P., Teixeira C., Almeida C.M.R., Joye S.B., Magalhães C. Differential effects of crude oil on denitrification and anammox, and the impact on N₂O production, 2016, *Environmental Pollution* (<http://dx.doi.org/10.1016/j.envpol.2016.05.045>).
11. Rodil I.F., **Mucha A.P.**, Fernandes J.P. Disentangling the effects of solar radiation, wrack macroalgae and beach macrofauna on associated bacterial assemblages, 2015, *Marine Environmental Research* (<http://dx.doi.org/10.1016/j.marenvres.2015.10.002>).
12. Andreotti F., **Mucha A.P.**, Caetano C., Rodrigues P., Gomes C.R., Almeida C.M.R. Interactions between salt marsh plants and Cu nanoparticles—Effects on metal uptake and phytoremediation processes, 2015, *Ecotoxicology and environmental safety*, 120: 303-309.
13. Fernandes J.P., Almeida C.M.R., Basto M.C.P., **Mucha A.P.** Response of a salt marsh microbial community to antibiotic contamination, 2015, *Science of The Total Environment*, 532: 301-308.
14. Fernandes J.P., Almeida C.M.R., Pereira A.C., Ribeiro I.L., Reis I., Carvalho P.N., Basto M.C.P., **Mucha A.P.**

Microbial community dynamics associated with veterinary antibiotics removal in constructed wetlands microcosms, 2015, *Bioresource Technology*, 182: 26–33 (<http://dx.doi.org/10.1016/j.biortech.2015.01.096>).

15. Nunes da Silva M., **Mucha A.P.**, Rocha A.C., Gomes C.R., Almeida C.M. Response of two salt marsh plants to short- and long-term contamination of sediment with cadmium, 2015, *Journal of Soils and Sediments*, 15: 722–731 (<http://dx.doi.org/10.1007/s11368-014-1041-y>).
16. Ribeiro H., Almeida C.M., Magalhães C.M., Bordalo, A.A. **Mucha A.P.** Salt marsh sediment characteristics as key regulators on the efficiency of hydrocarbons bioremediation by *Juncus maritimus* rhizospheric bacterial community, 2015, *Environmental Science and Pollution Research*, 22: 450 – 462 (<http://dx.doi.org/10.1007/s11356-014-3388-4>).
17. Oliveira T., **Mucha A.P.**, Reis I., Rodrigues P., Gomes C.R., Almeida C.M.R. Copper phytoremediation by a salt marsh plant (*Phragmites australis*) enhanced by autochthonous bioaugmentation, 2014, *Marine Pollution Bulletin*, 88: 231–238 (<http://dx.doi.org/10.1016/j.marpolbul.2014.08.038>).
18. Fernández-Fernández S., Bernabeu A.M., Rey D., **Mucha A.P.**, Almeida C.M.R., Bouchette F. The effect of sand composition on the degradation of buried oil, 2014, *Marine Pollution Bulletin*, 86: 391–401 (<http://dx.doi.org/10.1016/j.marpolbul.2014.06.040>).
19. Teixeira C., Nunes da Silva M., Rocha A.C., Gomes C.R., Almeida C.M., **Mucha A.P.** Development of autochthonous microbial consortia for enhanced phytoremediation of salt-marsh sediments contaminated with cadmium, 2014, *Science of the Total Environment*, 493: 757–765.
20. Almeida C.M.R., **Mucha A.P.**, Nunes da Silva M., Salgado P., Necrasov T., Magalhães C.M. Salt marsh plants as key mediators on the level of cadmium impact on microbial denitrification, 2014 *Environmental Science and Pollution Research*, 21:10270–10278.
21. Nunes da Silva M., **Mucha A.P.**, Rocha A.C., Silva C., Carliá C., Gomes C.R., Almeida C.M.R. Evaluation of the ability of two plants for the phytoremediation of Cd in salt marshes, 2014, *Estuarine Coastal and Shelf Science*, 14: 78-84.
22. Ribeiro H., **Mucha A.P.**, Almeida C.M.R., Bordalo A.A. Potential of phytoremediation for the removal of petroleum hydrocarbons in contaminated salt marsh sediments, 2014, *Journal of Environmental Management*, 137: 10-15
23. Nunes da Silva M., **Mucha A.P.**, Rocha A.C., Teixeira, C., Gomes C.R., Almeida C.M.R., A strategy to potentiate Cd phytoremediation by saltmarsh plants - autochthonous bioaugmentation, 2014, *Journal of Environmental Management*, 134: 136-144.
24. Reis I., Almeida C.M.R., Magalhães C.M., Cochofel J., Guedes P., Basto M.C., Bordalo A.A., **Mucha A.P.** Bioremediation potential of microorganisms from a sandy beach affected by a major oil spill, 2014, *Environmental Science and Pollution Research*, 21: 3634–3645.
25. Pontes J., **Mucha A.P.**, Santos H., Reis I., Bordalo A., Basto M.C., Bernabeu A., Almeida C.M.R. Potential of bioremediation for buried oil removal in beaches after an oil spill, 2013, *Marine Pollution Bulletin*, 76: 258–265.

26. Ribeiro H., Almeida C.M., **Mucha A.P.**, Teixeira C., Bordalo, A.A. Influence of natural rhizosediments characteristics on hydrocarbons degradation potential of microorganisms associated to *Juncus maritimus* roots, 2013, *International Biodeterioration & Biodegradation*, 84: 86-96.
27. Almeida C.M, Reis I., Couto N., Bordalo A.A., **Mucha A.P.** Potential of the microbial community present in an un-impacted beach sediment to remediate petroleum hydrocarbons, 2013, *Environmental Science and Pollution Research*, 20: 3176-3184.
28. **Mucha A.P.**, Teixeira C., Reis I., Magalhães C., Bordalo A.A., Almeida C.M. Response of a salt marsh microbial community to metal contamination, 2013, *Estuarine, Coastal and Shelf Science*, 130: 81-88.
29. Carvalho P.N., Araújo J.L., **Mucha A.P.**, Basto M.C., Almeida C.M.R. Potential of constructed wetlands microcosms for the removal of veterinary pharmaceuticals from livestock wastewater, 2013, *Bioresource Technology*, 134: 412–416.
30. Ribeiro H., **Mucha A.P.**, Almeida C.M. R., Bordalo A.A., Bacterial community response to petroleum contamination and nutrient addition in sediments from a temperate salt marsh, 2013, *Science of the Total Environment*, 458-460: 568–576.
31. Azevedo I., Ramos S., **Mucha A.P.**, Bordalo A.A. Applicability of ecological assessment tools for management decision-making: A case study from the Lima estuary (NW Portugal), 2013, *Ocean & Coastal Management*, 72: 54-63.
32. Ribeiro H., **Mucha A.P.**, Almeida C.M., Bordalo, A.A. Influence of different salt marsh plants on hydrocarbon degrading microorganisms abundance throughout a phenological cycle, 2013, *International Journal of Phytoremediation*, 15:715–728.
33. Almeida R., **Mucha A.P.**, Teixeira C., Bordalo A.A., Almeida C.M. Biodegradation of petroleum hydrocarbons in estuarine sediments: metal influence, 2013, *Biodegradation*, 24: 111-123.
34. Machado A., Magalhães C., **Mucha A.P.**, Almeida C.R.M., Bordalo A.A. Microbial communities within saltmarsh sediments: Composition, abundance and pollution constraints, 2012, *Estuarine, Coastal and Shelf Science*, 99: 145-152
35. **Mucha A.P.**, Almeida C.M., Magalhães C., Vasconcelos M.T., Bordalo A. Salt Marsh Plant-microorganism interaction in the presence of mixed contamination, 2011, *International Biodeterioration and Biodegradation*, 65: 326-333.
36. Ribeiro H., **Mucha A.P.**, Almeida C.M., Bordalo, A. Hydrocarbon degradation potential of salt marsh plant microorganisms associations, 2011, *Biodegradation*, 22:729–739.
37. Almeida C.M.R., **Mucha A.P.**, Vasconcelos M.T.S.D. Role Of Different Salt Marsh Plants On Metal Retention In An Urban Estuary (Lima Estuary, NW Portugal), 2011, *Estuarine, Coastal and Shelf Science*, 91: 243-249.
38. **Mucha A.P.**, Almeida C.M.R., Bordalo A., Vasconcelos M.T.S.D. LMWOA (low molecular weight organic acid) exudation by salt marsh plants: natural variation and response to Cu contamination, 2010, *Estuarine Coastal and Shelf Science*, 88: 63-70.
39. Almeida C.M.R., Dias A.C., **Mucha A.P.**, Bordalo A.A., Vasconcelos M.T.S.D. Influence of surfactants on the Cu phytoremediation potential of a salt marsh plant, 2009, *Chemosphere* 75: 135–140.

40. Almeida C.M.R., Dias A.C., **Mucha A.P.**, Bordalo A.A., Vasconcelos M.T.S.D. Study of the influence of different organic pollutants on Cu accumulation by *Halimione portulacoides*, 2009, *Estuarine Coastal and Shelf Science* 85: 627 – 632.
41. **Mucha A.P.**, Almeida C.M.R., Bordalo A.A., Vasconcelos M.T.S.D. Salt marsh plants (*Juncus maritimus* and *Scirpus maritimus*) as sources of strong Cu-complexing ligands in estuarine environments, 2008, *Estuarine Coastal and Shelf Science* 77: 104-112.
42. Almeida C.M.R., **Mucha A.P.**, Delgado M.F.C., Caçador M.I., Bordalo A.A., Vasconcelos M.T.S.D. Can PAHs influence Cu accumulation by salt marsh plants?, 2008, *Marine Environmental Research* 66: 311–318.
43. Almeida C.M.R., **Mucha A.P.**, Bordalo A.A., Vasconcelos M.T.S.D. Influence of a salt marsh plant (*Halimione portulacoides*) on the concentrations and potential mobility of metals in sediments, 2008, *Science of the Total Environment* 403:188-195.
44. Almeida C.M.R., **Mucha A.P.**, Vasconcelos M.T.S.D. Comparison of the role of the sea club-rush *Scirpus maritimus* and the sea rush *Juncus maritimus* in terms of concentration, speciation and bioaccumulation of metals in the estuarine sediment, 2006, *Environmental Pollution* 142: 151-159.
45. Almeida C.M.R., **Mucha A.P.**, Vasconcelos M.T.S.D. Chemical bioavailability of metals in estuarine sediments, 2006, *Setac Globe*, January – February, pp 33-35.
46. Almeida C.M.R., **Mucha A.P.**, Vasconcelos M.T.S.D. Variability of metal contents in the sea rush *Juncus maritimus*–estuarine sediment system through one year of plant’s life, 2006, *Marine Environmental Research* 61: 424-438.
47. **Mucha A.P.**, Almeida C.M.R., Bordalo A.A., Vasconcelos M.T.S.D. Exudation of organic acids by a marsh plant and implications on trace metal availability in the rhizosphere of estuarine sediments, 2005, *Estuarine Coastal and Shelf Science* 65:191-198.
48. Almeida C.M.R., **Mucha A.P.**, Vasconcelos M.T.S.D. The role of a salt marsh plant on trace metal bioavailability in sediments – estimation by different chemical approaches, 2005, *Environmental Science and Pollution Research* 12: 271-277.
49. **Mucha A.P.**, Vasconcelos M.T.S.D., Bordalo A.A. Spatial and seasonal variations of the macrobenthic community and metal contamination in the Douro estuary (Portugal), 2005, *Marine Environmental Research* 60: 531-550.
50. Almeida C.M.R., **Mucha A.P.**, Vasconcelos M.T.S.D. Influence of the sea rush *Juncus maritimus* on metal concentration and speciation in estuarine sediment colonized by the plant, 2004, *Environmental Science and Technology* 38: 3112-3118.
51. **Mucha A.P.**, Bordalo A.A., Vasconcelos M.T.S.D. Sediment quality in the Douro River Estuary based on trace metals contents, macrobenthic community and elutriate sediment toxicity test (ESTT), 2004, *Journal of Environmental Monitoring* 6: 585-592.
52. **Mucha A.P.**, Vasconcelos M.T.S.D., Bordalo A.A. Vertical and spatial variability of macrobenthic community and metals at lower Douro estuary, Portugal, 2004, *Estuarine Coastal and Shelf Science* 59: 663-673.

53. **Mucha A.P.**, Leal M.F.C., Bordalo A.A., Vasconcelos M.T.S.D. Comparison of the response of three microalgae species exposed to elutriates of estuarine sediments based on growth and chemical speciation, 2003, *Environmental Toxicology and Chemistry* 22: 576-585.
54. **Mucha A.P.**, Vasconcelos M.T.S.D., Bordalo A.A. Macrobenthic community in the Douro estuary: relations with trace metals and natural sediment characteristics, 2003, *Environmental Pollution* 121: 169-180.
55. **Mucha A.P.**, Costa M.H. Macrozoobenthic community structure in two Portuguese estuaries: Relationship with organic enrichment and nutrient gradients, 1999, *Acta Oecologica* 20: 363–376.