Berardino Barbati

About me

I am an industrial chemist. I obtained my bachelor's degree in 2018 and my master's degree in 2021 with the highest honors.

I obtained my PhD in 2025 in chemical processes for industry and the environment, investigating in depth the optimization of soil and aquifer remediation processes using biosurfactants to solubilize and mobilize recalcitrant organic contaminants.

During my PhD, I published several scientific articles and attended many conferences in the field, where I had the opportunity to explore and gain a deeper understanding of the national and international panorama of contaminated site remediation.

Work experience

Postdoctoral Researcher | Chemistry Department - Sapienza University of Rome | 01/11/2021 - Current | Rome, Italy

MAIN ACTIVITIES

Development of experimental protocols for the laboratory-scale study of remediation processes, in the operative context of SEAR (Surfactant-Enhanced Aquifer Remediation) technology.

Physico-chemical characterization of different green bio-based surfactants, and batch and continuous column experiments for assessing their applicability in the mobilization of organic pollutants from secondary contamination sources. The enhanced solubilization of strongly adsorbed contaminants and the enhanced mobilization of contaminants in the form of residual pure phase are the main investigated mechanisms.

Lab-scale studies regarding the mobilization of organic pollutants from real contaminated matrices, particularly highly recalcitrant hydrocarbons from contaminated marine sediments and chlorinated solvents from aquifer samples.

Field activities on-site based on:

1)Operational assistance in the construction of boreholes, wells, and piezometers.

2)Collection of groundwater and soil samples for chemical and microbiological analysis.

MAIN RESPONSIBILITIES

Support and technical assistance to students for their master’s degree on topics related to my research project.

Management and organization of group experimental activities.

Experimental data analysis and processing.

Education & Training

PhD degree in Chemical Engineering | Department of Chemical Engineering, Materials and Environment, Sapienza Univerisity of Rome | 01/11/2021 - 31/10/2024

Detailed investigation of interaction mechanisms between organic contaminants and surfactants

Enhanced solubilization of strongly adsorbed organic contaminants through column experiment simulations

Enhanced solubilization of persistent and recalcitrant compounds from a historically contaminated marine sediment

in-situ generation of microemulsions between pure-phase organic compounds and surfactants solution for the enhanced remediation of contaminated matrices

Field of study Chemical engineering and environmental sciences | **Final grade:** PhD, Excellent grade | **Thesis:** Characterization of different synthetic and natural surfactants for applications in contaminated aquifers remediation using SEAR (Surfactant Enhanced Aquifer Remediation) technology

Master Degree in Industrial Chemistry | Chemistry Department, Sapienza University of Rome | 01/09/2018 - 01/10/2021 | Rome, Italy

The dynamics of pollutants in the subsoil with particular attention on different types of pollutants and their chemical-physical properties, the study of transport phenomena, and the formation and aging of secondary contamination sources.

Systems and technologies for the remediation of polluted environmental matrices, studying their principles of operation and applicability.

Management methods of a contaminated site with special attention to the regulatory aspect according to Italian D.Lgs 152/2006

Field of study Environmental Chemistry | **Final grade:** Master Degree. 110/110 Cum laude | **Thesis:** Synthetic and natural surfactants for applications in the remediation of contaminated aquifers: characterization and process study for technological implementation

Bachelor Degree in Industrial Chemistry | Chemistry Deparment, Sapienza University of Rome | 01/09/2015 - 01/10/2018 | Rome, Italy

Fluid dynamics and transport phenomena.

Unit operations (thermal exchange, distillation, gas-liquid adsorption, solvent extraction, sedimentation)

Field of study Industrial Chemistry | **Final grade:** Bachelor Degree, 110/110 | **Thesis:** Comparative evaluation of the fermentability of poly-hydroxy alkanoates (PHAs) from different sources as slow release electron donor sources for environmental applications

High school graduation | Liceo Scientifico Vitruvio Pollione | 01/09/2010 - 01/07/2015 | Avezzano (AQ), Italy

Final grade: 70/100

Language Skills

Mother tongue(s): **Italian**

	Understanding		Speaking		Writing
	Listening	Reading	Spoken production	Spoken interaction	
English	B2	C1	B2	B2	B2

Skills

Microsoft Excel | Microsoft Powerpoint | Microsoft Word | QGis: basic level | Sigma plot | RiskNet

Publications

Synthetic and Natural Surfactants for Potential Application in Mobilization of Organic Contaminants: Characterization and Batch Study

2022. Water, 14(8), 1182.
https://doi.org/10.3390/w14081182

Enhanced solubilization of strongly adsorbed organic pollutants using synthetic and natural surfactants in soil flushing: Column experiment simulation.

2023. Journal of Environmental Chemical Engineering, 11(5), 110758.
https://doi.org/10.1016/j.jece.2023.110758

Characterization and Application of Sodium Surfactin in Mobilization of Toluene and Perchloroethylene by Batch Configuration Test

2023. Chemical Engineering Transactions, 100(March), 547–552.
https://doi.org/10.3303/CET23100092

Preliminary study for Polycyclic aromatic Hydrocarbons mobilization from contaminated marine sediment using synthetic and natural surfactants

2024. Chemical Engineering Science, 298, 120317.
https://doi.org/10.1016/j.ces.2024.120317

Surfactant-Enhanced Mobilization of Polycyclic Aromatic Hydrocarbons from an Historically Contaminated Marine Sediment: Study of Surfactants' Concentration Effect and Continuous Test for Sediment Flushing Simulation

2024. Journal of Environmental Chemical Engineering, 12 (5), 113820.
https://doi.org/10.1016/j.jece.2024.113820

Alkylpolyglycosides—Based Formulations for Sustainable Remediation of Contaminated Aquifers: Lab-Scale Process Study for NAPL Solubilization Assessment

2025. Sustainability, 17 (5), 1939.
https://doi.org/10.3390/su17051939

Conferences & Seminars

SiCon2022 | 09/02/2022 - 11/02/2022 | Brescia

Oral presentation. Synthetic and natural surfactants for applications in the remediation of contaminated aquifers: characterization and process study for technological implementation.

9° conferenza sulla chimica sostenibile (FEDERCHIMICA) | 10/05/2022 - 10/05/2022 | Rome

Oral presentation. Synthetic and natural surfactants for environmental remediation: characterization and study of the mobilization of contaminants.

First Symposium for Young Chemists: Innovation and Sustainability" (SYNC2022) | 20/06/2022 - 23/06/2022 | Rome

Oral presentation. Alkyl-polyglycosides formulations for Contaminated Aquifer Remediation: Characterization and NAPLs Mobilization Study by Batch and Continuous Tests.

GRICU2022 | 03/07/2022 - 06/07/2022 | Ischia (Naples)

Oral presentation. Synthetic and natural surfactants for environmental applications using SEAR technology: process study by batch and column tests.

Surfactant In Solution 2022 (SIS2022) | 11/09/2022 - 16/09/2022 | Lublin (Poland)

Oral presentation. Synthetic and natural surfactants for environmental applications using SEAR technology: process study by batch and column tests.

SiCon2023 | 08/02/2023 - 10/02/2023 | Rome

Oral presentation. Alkyl polyglycoside formulations for the mobilization of strongly adsorbed hydrophobic organic contaminants.

ICheaP16 | 21/05/2023 - 24/05/2023 | Naples

Oral presentation. Characterization and Application of Sodium Surfactin in Mobilization of Toluene and Perchloroethylene by Batch Configuration Test.

ECOMONDO | 07/11/2023 - 10/11/2023 | Rimini

Oral presentation. Enhanced mobilization of polycyclic aromatic hydrocarbons from marine sediments in washing and flushing processes by surfactants.

SiCon2024 | 08/02/2024 - 10/02/2024 | Taormina (ME)

Oral presentation. Enhanced mobilization of polycyclic aromatic hydrocarbons from marine sediments in washing and flushing processes by surfactants.

BATTELLE 2024 Chlorinated Conference | 01/06/2024 - 07/06/2024 | Denver (Colorado)

Oral presentation. Surfactant enhanced mobilization of polycyclic aromatic hydrocarbons from marine sediment by washing and flushing processes.

Poster presentation. Synthetic and natural surfactants for NAPLs mobilization. Experimental approach for process study: from batch experiments to lab-scale soil flushing simulation.

Second Symposium for Young Chemists: Innovation and Sustainability" (SYNC2024) | 24/06/2024 - 28/06/2024 | Rome

Oral presentation. Surfactant enhanced mobilization of polycyclic aromatic hydrocarbons from marine sediment by washing and flushing processes.

AquaConSoil2025 | 16/06/2025 - 20/06/2025 | Liege (Belgium)

Oral presentation. Winsor III microemulsions for the mobilization of pure-phase organic pollutants from saturated porous media

Honours and Awards

Remtech Degree Awards | Remtech Expo - Groundwater Engineering Group - Politecnico di Torino | 01/09/2022

https://drive.google.com/file/d/1lmcC0qjfaUsJbk3EB80z8UrZH3AlxeY2/view?usp=sharing

Federchimica Degree Awards "Giorgio Squinzi" | Federchimica CONFINDUSTRIA | 01/09/2022

https://drive.google.com/file/d/1VDRZPq93UNuI7uxskyzizHTCeFVXxw-4/view?usp=sharing