FICHE PROJET

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ECOTREE

ECOTREE aims at developing a general understanding of REE ecotoxicity to predict the possible risks associated with the current anthropogenically-driven increase in their concentrations in aquatic ecosystems.



Inspiration

Increasing geopolitical concerns surround the sustainable use of Rare Earth Elements (REEs). Given that REEs are essential for the uninterrupted function of our economy and information flux, plans to reduce the European Union (EU) complete dependence from foreign supply range from recycling and recovery to (re)opening of mining sites are under consideration. This would not be without danger for the environment. Ad instance, some chemical elements, like thee Gadolinium, are used in hospitals. The dissemination goes all around and has an impact on the ecosystems. Patterns are changing and we don't know what it means for the environment including humans.

So far, no regulatory thresholds for REE concentrations and emissions to the environment have been set because information on risks from REE is scarce. However, evidence gathers that REEs have to be acknowledged as new, emerging contaminants with manifold ways of entry into the environment.

Innovation

ECOTREE aims at developing a general understanding of REE ecotoxicity, lean on an Adverse Outcome Pathway (AOP) approach to predict the possible risks associated with the current anthropogenically-driven increase in their concentrations in aquatic ecosystems.

ECOTREE's innovation is based on a unique holistic and multi- and interdisciplinary approach outside a mining context covering large parts of the REE life cycle, from the geochemistry of anthropogenic REEs, their dynamics and speciation in (waste)water systems and their environmental impacts through a Life Cycle Assessment (LCA) perspective. In other words, the project team plans to generate results for a complete understanding of the relationship between REE occurrence in water systems, their dynamics and speciation, the exposure pathway of aquatic species and their environmental impacts developed in an AOP framework.

LIST researchers will bring their expertise in water and LCA to evaluate how much chemicals are in water and under what form. And together with their partners, they will work closely following a disciplinary approach on a toxicology study focusing on invertebrate crustacés. LIST will do cell culture in vitro as well as fresh water experimentation with shrimps. The whole LCA will be studied with the objective to follow the value chain: from the release in agriculture to the distribution effects in order to know where they go.

Impact

Results of ECOTREE experiments will provide new knowledge to fill critical gaps on the potential environmental impact of REEs on freshwater ecosystems. It will provide environmental managers and policy makers with information that can be directed towards hazard classification of material containing REEs as well as risk assessments of impacts in contaminated environments.

ECOTREE may support Luxembourg manufacturing industry and contribute to develop safe materials. The results of the project will benefit to the society in the end. They can be considered a decisive step that, towards the ecotoxicological mechanistic understanding of REEs in the freshwater ecosystems and based on AOP approach, will help to define appropriate strategies for better management of their predicted increased contamination.

Partenaires

Université de Lorraine (FR) , Laboratoire interdisciplinaire des environnements continentaux (LIEC- UMR 7360) (FR) , Laboratoire Réactions et Génie des Procédés (LRGP – Unité mixte de recherche du CNRS UMR 7174) (FR) , Laboratoire Mer, Molécules, Santé (MMS) (FR)

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Contact

5, avenue des Hauts-Fourneaux
L-4362 Esch-sur-Alzette
tél : +352 275 888 - 1 | LIST.lu

Dr Arno GUTLEB (arno.gutleb@list.lu)

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