

**Research line:** Marine compounds for sensor and ion scavenging applications

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### Objectives

This research line intends to evaluate the potential of compounds of marine origin to specifically interact with metal ions. From this knowledge, new and improved sensing, separation and scavenging techniques for metal ions will be developed.

### Description

Marine systems have been fustigated by exogenous pollution and in some cases the presence of heavy metal ions is of great concern. These pollutants are introduced into the aquatic systems significantly as a result of various industrial operations. In order to use compounds of marine origin for wastewater treatment or to remediate sea water it is needed to evaluate the interaction between the marine origin compounds (e.g. chitosan, chondroitin sulfate or fucoidan) and heavy metal ions.

From this knowledge it will be possible to select the compounds of marine origin better fitted for metal ion separation, metal ion scavenging and metal ion sensing and to further use these compounds in sensor platforms for determination of metal ions in various samples (including sea water) and to prepare composite materials for retention and/or separation of metal ions.

### Techniques

Identification of specific interactions between metal ions and compounds of marine origin will be carried out by potentiometric titration, dialysis equilibria, voltammetric studies and atomic absorption studies.

Ion selective electrodes will be prepared, characterized and tested by potentiometry. Electrodes to be tested will incorporate compounds from marine origin. Sensitivity and selectivity towards different metal ions will be assessed.

Synthetic methods for silica particles and the formation of composites containing silica or a different kind of 3D matrix and compounds of marine origin will be developed and TEM, SEM, BET and other techniques will be used to characterize the prepared materials. Chromatographic /atomic absorption methods will be used to evaluate the retention and separation of cations by the composite materials.

