The Acid Mine Drainage Treatment System Efficiency through *Selenastrum capricornutum* toxicity tests

V. Osta1, E. Bonnail1, A. M. Sarmiento2, T. A. DelValls1

1 Department of Physical Chemistry. Marine Science Faculty, University of Cádiz. Poligono Rio S. Pedro s/n, 11510 Puerto Real, Cádiz (Spain)
2 Department of Geodynamics and Paleontology. Faculty of Experimental Sciences. Campus El Carmen. 21071 Huelva (Spain)

Victoria.osta@uca.es & estefania.bonnail@uca.es

**INTRODUCTION**

The European project LIFE-ETAD (LIFE12 ENV/ES/000250) funds the construction of the first experimental plant for treating AMD from Esperanza Mine (SW Spain) under the name “Tratamiento Ecológico de Drenaje ácido de Mina” (‘Acid Mine Drainage Ecological treatment').

**Aim:** the current study presents data obtained from toxicity bioassays carried with *Selenastrum capricornutum* in 2014 and 2015 before and after the treatment system in order to check the water quality improvement of the plant.

**MATERIALS and METHODS**

**Water Sampling**

[Diagram showing AMD, Treatment System Plant, and Old River with samples OR1 and OR2]

**Toxicity tests**

[Graph showing Selenastrum capricornutum toxicity tests]

**Treatments (x3)**

- ME1 (100%)
- ME1 (12.5%)
- ME1 (6.25%)
- OR1 (100%)
- OR2 (100%)
- Control

**RESULTS**

- **Chlorophyll**
  - Chlorophyll a
  - Chlorophyll b
  - Chlorophyll c

**CONCLUSIONS**

- The treatment system plant implies a improvement of the water quality raising the pH from 2.8 to 6.7 and removing metals as can be seen in the table.

- *Selenastrum sp.* experimented a growth in accordance to the toxicity of the environment. This growth does not seem significant after the treatment, however, once is dumped into the environment, is can be observed a decrease of the toxicity between 2014 and 2015.

- The efficiency of the water treatment plan is better monitored though the production of chlorophyll a. The algae showed greater photosynthetic activity after the treatment, without significant difference with OR2.