

Science for Environment Policy

Seaweed could effectively monitor metal pollution in coastal waters

Seaweed may prove to be a valuable tool to monitor metal pollution in coastal waters, new research has found. Spiral wrack seaweed (*Fucus spiralis*), which is common to rocky coastlines across western Europe, was found to contain concentrations of metals that rose and fell in line with concentrations in the surrounding seawater. This makes it a good candidate for inclusion in the European environmental specimen banks as part of an environmental monitoring network under the Marine Strategy Framework Directive.

Industry, harbour activity and urban waste can all result in the release of metals such as chromium, cadmium, copper, manganese and zinc into water systems. High levels of these metals pose a serious threat to a variety of aquatic [wildlife](#) as well as other animals such as seabirds. Problems can include the death of both young and adults, abnormal development and infertility. In an effort to reduce these pollutants, the [Marine Strategy Framework Directive](#)¹ (MSFD) requires Member States to monitor their water bodies. Examining the levels of metals in the tissues of animals and plants such as blue mussels (*Mytilus edulis*) and spiral wrack can be preferable to taking direct water measurements, as these biomonitors give researchers a quick and cost-effective way to view pollutant accumulations over long time spans, while at the same time demonstrating the direct impacts on the relevant species.

For this study, researchers selected 20 locations along the coastline of north west Portugal in April 2013. Each location was divided into two areas; one had a high risk of metal contamination, and the other was further away from human activity, as a reference. Samples of seawater and spiral wrack were taken from each area, analysed and compared. Spiral wrack was shown to be a very efficient accumulator of cadmium, manganese and zinc, meaning it could provide useful data on water quality for these pollutants.

Overall, the water quality along the north west coast of Portugal was found to be mostly 'class I – unpolluted', with some areas identified as 'class II – moderately polluted'². This is a great improvement on 2010, when the same research team found the north west coast of Portugal to fall in between the categories of 'class III' and 'class IV' – remarkably and highly polluted. However, the researchers suggested that these comparisons should be treated with caution. They highlighted two important factors, besides a reduction in pollution, which could have influenced this observed improvement in water quality. Firstly, the most recent study was conducted over one month in springtime, but previous research has shown that levels of metal contaminants can vary seasonally. Secondly, the guidelines that were used to classify the levels of pollution in spiral wrack were originally intended for blue mussels. Spiral wrack and other seaweeds may have significantly different metal uptake ratios compared to filter feeders such as blue mussel, which led the researchers to call for the creation of a guideline specific to seaweed.

The MSFD specifies that Member States must regularly monitor their water bodies. Spiral wrack could prove to be a useful tool in fulfilling this objective, and its widespread distribution in countries that border the Atlantic would make it a valuable addition to European environmental specimen banks.



18 June 2015

Issue 417

[Subscribe](#) to free
weekly News Alert

Source: Reis, P.A., Cassiano, J., Veiga, P., Rubal, M. & Sousa-Pinto, I. (2014). *Fucus spiralis* as monitoring tool of metal contamination in the Northwest Coast of Portugal under the European Framework Directives. *Environmental Monitoring and Assessment* 186: 5447-5460. DOI 10.1007/s.10661-014-3794-6.

Contact:
pedroareis@ciimar.up.pt

Read more about:
[Biotechnology](#),
[Chemicals](#)

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission.

To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

1. http://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm

2. This classification comes from the guidelines of the Norwegian Pollution Control Authority.