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 (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’\(^1\). 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’\(^2\) – 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, while at the same time demonstrating the direct impacts on the relevant species.

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.

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\(^{1}\) \text{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.