

**Atti del XXIX Congresso
della Divisione di Chimica Analitica
della Società Chimica Italiana**

Milazzo (Messina)

11-15 Settembre 2022

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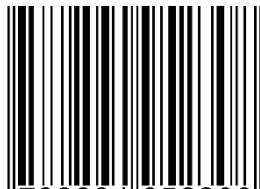
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VALORISATION OF SEAFOOD PROCESSING WASTE AS BIO-ADSORBENT MATERIAL FOR WATER REMEDIATION

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Environmental pollution caused by heavy metals is a global problem leading to adverse effects on ecosystems, biodiversity, and human health.^[1]

Among the most common physical and chemical approaches for heavy metals removal from water, adsorption is an effective and economic technique, offering flexibility in the design and operation, and a vast variety of adsorbent materials. The use of natural or waste materials as adsorbents has been largely studied to favour eco-friendly approaches in environmental remediation applications. Among the waste products generated by food industry, mollusc shells have composition and structure characteristics suitable for the removal of heavy metals dissolved in water bodies. Indeed, many studies had reported the capability of molluscan shell powder to adsorb heavy metals from water aqueous matrices.^[2]

In the present study, oyster shells were used to adsorb metals ions; these materials were characterised and their performances in the removal of metal ions from aqueous solutions were evaluated. To investigate the kinetics and the thermodynamics of the adsorption process, adsorption measurements were carried out at different metal concentrations. Inductively Coupled Plasma - Mass Spectrometer (ICP-MS) was employed to determine metal ions concentration in the solution before and after the contact with the adsorbent materials. Moreover, the adsorbent material was tested as a possible water remediation solution in a local enterprise that cultivates oysters and, consequently produces waste composed of shells, which were used in this study.

The results obtained showed high adsorption capacity of oyster shells towards the metals considered, highlighting a fast adsorption kinetics especially for cadmium. These findings show that mollusc shells are a suitable resource to prepare eco-compatible adsorbent materials for remediation technologies.

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