5th World Congress on Sustainable Waste Management

May 28-29, 2026 | Madrid, Spain

Physicochemical valorization of Sargassum fluitans and Sargassum natans for Kason lignin extraction and its application in the removal of heavy metals from contaminated water

Cristina Luna Salas

Instituto Tecnologíco de Ciudad Madero, Mexico

For decades, lignin has been an important subject of research for those working with organic matter, as it is the third most abundant biopolymer within it. Additionally, contamination by heavy metals such as copper (Cu), cadmium (Cd), and lead (Pb) represents one of the major environmental problems today due to their high toxicity, as well as their capacity for bioaccumulation, biotransformation, and persistence in the environment.The objective of this study was to physicochemically characterize sargassum (Sargassum) and evaluate its potential as a source of Klason lignin for the removal of heavy metals from water. The characterization was carried out using methods and techniques established under TAPPI standards, obtaining results of 12.79% moisture content, a hydrogen potential (pH) of 6.7, a density of 0.59 g/mL, and an ash content of 16.63%. The extraction of Klason lignin from sargassum (Sargassum) showed a yield of 24.24%. Subsequently, this lignin was used as an adsorbent material for the removal of copper (Cu), cadmium (Cd), and lead (Pb) from water samples with known concentrations. Through atomic absorption spectroscopy analysis, highly favorable results were obtained, with removal efficiencies of 99.48% for copper, 73.16% for cadmium, and 100% for lead.These results demonstrate that lignin extracted from sargassum has strong potential as an efficient adsorbent material, suggesting its application as a sustainable and low-cost alternative for the treatment of water contaminated with heavy metals.

Biography

Cristina Luna is an Environmental Engineer graduated from the Instituto Tecnológico de Ciudad Madero, with a strong interest in sustainable energy and the development of environmentally friendly technologies. Her academic and research work focuses on water treatment and remediation, particularly on the use of biomass as a resource for environmental applications.Her research interests are oriented toward innovative and sustainable solutions that address current environmental challenges, such as waste management and water pollution. Through her work, she seeks to contribute to the valorization of biomass while improving water quality and promoting sustainable development.