

Importance of Halophytes in a Sustainable Bioeconomy

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Abstract: Halophytes are salt-tolerant plant species that flourish in environments characterized by high salinity. They are typically found in salt marshes, coastal dunes, and inland salt flats, where their root systems are regularly exposed to saline water. Utilizing the full properties and potential of halophytes supports the concept of nonconventional application, while contributing to achieving the goals of the circular economy strategy and paving the way to an integrated bioeconomy sector. This paper considers the development of halophytes as plants with multiple uses in related and/or varied fields and emphasizes the importance of creating market demand for the utilization of halophytes. The ecological significance of halophytes is underscored by their remarkable adaptability to diverse ecosystems, particularly in the context of climate change. Halophytic species contribute substantially to the preservation of coastal environments by stabilizing sand dunes, thereby mitigating erosion and preventing the intrusion of seawater into adjacent freshwater ecosystems. They have the potential to be used as a sustainable source of food, fuel, fodder, fiber, essential oils, and pharmaceuticals, among many other uses. Owing to their abilities to withstand high salinity and drought, accumulate high quantities of secondary metabolites, and require low maintenance during the growth stage, halophytes have enormous potential for land reclamation, improving soil fertility, and producing feedstock, which can help mitigate the negative effects of global climate change. Among multiple environmental benefits of halophytes, this paper features the phytoremediation of salt-affected soils, soil improvement, carbon sequestration, and biodiversity conservation. By considering these factors and adopting sustainable management practices, halophytes can be a valuable tool for restoring degraded saline lands, enhancing food security, and promoting a more sustainable agricultural system.

Keywords: halophytes; climate change; salinity; bioresources; circular bioeconomy.

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