Green Waste and Plant Growth-Promoting Rhizobacteria: A Dynamic Duo for Bioremediation and their Strengthened Collaboration

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Abstract

These are forced to enter into the food chain as they tend to accumulate in the agricultural soils. In order to eliminate these pollutants from the soils the bioremediation will be an e f cient tool and this can be achieved by plant growth promoting rhizobacteria and by green wastes. In this study the plant growth promoting rhizobacteria (PGPR) and green wastes are evaluated for their e fectiveness in bioremediation the toxic contaminants. Green wastes are rich sources of naturally occurring polyphenols which are potential eliminating agents of these pollutants, they can perform metal chelation, reduction, antibiotic properties, adsorption, complexation and by supplying the nutrients. The increasing anthropogenic and technogenic activities to compensate the raising population and unending demands of humans ended in severe pollution and detrimental damage to the environment. This environmental pollution due to lethal pollutants, toxic heavy metals and organic wastes has been drastically a fecting the ecosystem of the living organisms. Green wastes are rich sources of naturally occurring polyphenols which are potential eliminating agents of these pollutants, they can perform metal chelation, reduction, antibiotic properties, adsorption, complexation and by supplying the nutrients. However

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process [8]. Furthermore, the presence of green waste promotes the establishment and colonization of PGPR in the rhizosphere, the zone of soil surrounding plant roots [9]. e root exudates released by plants act as a food source for the bacteria, fostering their growth and multiplication. As the PGPR population increases, the bioremediation e ciency also escalates, leading to a faster and more comprehensive cleanup of polluted environments [10].

e combined use of green waste and plant growth promoting rhizobacteria holds immense promise for bioremediation e orts. eir enhanced synergy o ers an environmentally friendly, cost-e ective, and sustainable approach to restore contaminated ecosystems. By harnessing the power of nature's allies, we can turn waste into a valuable resource and combat pollution e ectively. Hence, the farmers are forced to apply harmful inputs to their crop elds which in turn leave the unavoidable toxic pollutants into the ecosystem. In fact, the reclamation of the degraded soil is an expensive way and needs multifactorial actions from various aspects. ese pollutants are threat to Mother Nature and all living organisms. erefore, elimination of these pollutants must be achieved unconditionally; bioremediation