

Title: Harnessing bacterial endophytes for environmental resilience and agricultural sustainability

Author: Murad Muhammad, Abdul Wahab, Abdul Waheed , Heba Ibrahim Mohamed, Khalid Rehman Hakeem, Li Li, Wen-Jun Li

Abstract: In the current era of environmental disasters and the necessity of sustainable development, bacterial endophytes have gotten attention for their role in improving agricultural productivity and ecological sustainability. This review explores the multifaceted contributions of bacterial endophytes to plant health and ecosystem sustainability. Bacterial endophytes are invaluable sources of bioactive compounds, promising breakthroughs in medicine and biotechnology. They also serve as natural biocontrol agents, reducing the need for synthetic fertilizers and fostering environmentally friendly agricultural practices. It provides eco-friendly solutions that align with the necessity of sustainability since they can improve pest management, increase crop resilience, and facilitate agricultural production. This review also underscores bacterial endophytes' contribution to promoting sustainable and green industrial productions. It also presented how incorporating these microorganisms into diverse industrial sectors can harmonize humankind with ecological stability. The potential of bacterial endophytes has been largely untapped, presenting an opportunity for pioneering advancements in sustainable industrial applications. Their importance caught attention as they provided innovative solutions to the challenging problems of the new era. This review sheds light on the remarkable potential of bacterial endophytes in various industrial sectors. Further research is imperative to discover their multifaceted potential. It will be essential to delve deeper into their mechanisms, broaden their uses, and examine their long-term impacts.

Keywords: Bacterial endophytes Agricultural productivity, Ecological sustainability, Bioactive compounds, Biocontrol agents, Sustainable agriculture, Environmental sustainability

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