The Torch
Vol. 3 (4)

The efficacy of the antagonistic activity of Bacillus sp. against fungal plant pathogens

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Numerous pathogenic fungi cause diseases in agricultural plants and act as an economic concern owing to the losses they induce. Similarly, the antagonistic microorganism Bacillus sp., among others, has been utilised as a biological control agent to decrease the need for chemical fungicides in the control and management of fungal plant diseases. Chemical pesticides have been used to address these challenges and limits of fungal plant disease control. Furthermore, improper usage of chemical pesticides has been linked to several issues, including environmental pollution, increase in food residue, the danger of intoxication, enhanced pathogen resistance to synthetic fungicides, and loss of natural biodiversity in the agroecosystems. This challenge has prompted researchers to look for novel ways to manage fungal plant diseases that are both ecologically and commercially feasible while having a low environmental impact. Several microorganisms, such as fungi, bacteria, and actinomycetes have antagonistic activity and have been considered for suppressing fungal pathogens. The Bacillus genera have been shown to play a big role in this situation because of their antagonistic activity. According to studies, the most efficient and utilised bacterial species has been B. subtilis. The Bacillus sp. can grow in a wide range of temperatures and produce antibiotics that inhibit the growth of fungal pathogens that cause plant and crop diseases. The preponderance of the microbial population in the soil, which is the main natural reservoir of antagonistic bacteria, contributes to minimising diseases in crop plants and uncultivated plants by maintaining a dynamic balance between different varieties of microorganisms. Microbial control agents such as the Bacillus species are growing more popular, potentially reducing the need for synthetic pesticides that are neither beneficial to the environment nor the farmers.

Keywords: Bacillus sp., Antagonistic activity, Fungi, Pathogen, Plant diseases

Citation:
April Mae T Lara. The efficacy of the antagonistic activity of Bacillus sp. against fungal plant pathogens. The Torch. 2022. 3(4).
Available from:
https://www.styvalley.com/pub/magazines/torch/read/the-efficacy-of-the-antagonistic-activity-of-bacillus-sp-against-fungal-plant-pathogens.