A review on mechanisms and prospects of endophytic bacteria in biocontrol of plant pathogenic fungi and their plant growth-promoting activities

ABSTRACT

Endophytic bacteria, living inside plants, are competent plant colonizers, capable of enhancing immune responses in plants and establishing a symbiotic relationship with them. Endophytic bacteria are able to control phytopathogenic fungi while exhibiting plant growth-promoting activity. Here, we discussed the mechanisms of phytopathogenic fungi control and plant growthpromoting actions discovered in some major groups of beneficial endophytic bacteria such as Bacillus, Paenibacillus, and Pseudomonas. Most of the studied strains in these genera were isolated from the rhizosphere and soils, and a more extensive study of these endophytic bacteria is needed. It is essential to understand the underlying biocontrol and plant growth-promoting mechanisms and to develop an effective screening approach for selecting potential endophytic bacteria for various applications. We have suggested a screening strategy to identify potentially useful endophytic bacteria based on mechanistic phenomena. The discovery of endophytic bacteria with useful biocontrol and plant growth-promoting characteristics is essential for developing sustainable agriculture.