

A NEW APPROACH FOR SELECTING BIOCONTROL BACTERIAL AGENTS AGAINST FUSARIUM

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Background: Fusariosis is a widespread infection by fungi of the genus *Fusarium*, affecting a wide range of crops and causing significant economic losses in global agriculture. Biological control using antagonistic microorganisms represents an effective and environmentally friendly strategy for managing fusariosis. In particular, bacteria are known for their ability to secrete fungicidal compounds while promoting root growth, to compete for iron, and to induce systemic resistance in plants. Conventionally, microorganisms with antifungal activity are identified through *in vitro* screening on agar media. However, this approach does not account for the influence of the host plant on microbial activity at the initial screening stage. Since environmental conditions can significantly affect microbial behavior, this may lead to the selection of strains that are active only in the absence of plants or the rejection of those that exhibit activity only in their presence.

The aim of this study was to develop a method for evaluating antimicrobial activity in the presence of agricultural plants and to compare the results with those from conventional screening.

Materials and methods: Wheat seeds (cv. Moldova 16), a highly phytopathogenic strain (*Fusarium solani* CNMN-FF-07), and four bacterial strains from the National Collection of Non-pathogenic Microorganisms (*Bacillus cereus* var. *fluorescens* CNMN-BB-07, *Bacillus velezensis* CNMN-BB-31, *Pseudomonas fluorescens* CNMN-PsB-01, and CNMN-PsB-02) were used as experimental materials. The bacterial strains exhibited antimicrobial activity against the phytopathogen, as determined by the agar block method, with inhibition zones of up to 23 mm.

Results: As a result, a novel methodology was developed for screening microorganisms capable of protecting plants against *Fusarium* infections. The method involves the germination and growth of bacterized seeds in test tubes containing semi-solid Knop agar medium. The treated seeds were placed on the surface of the medium, after which different concentrations of the phytopathogen were applied dropwise onto the seeds. The test tubes were subsequently sealed with air-permeable cotton plugs and incubated at room temperature for up to 14 days.

Conclusions: Of all tested bacteria, only *Bacillus cereus* var. *fluorescens* CNMN-BB-07 retained its antifungal activity in the presence of the host plant. These results highlight the importance of screening potential biocontrol agents under conditions that include the target plant, thereby ensuring the selection of strains effective in real plant–microbe–pathogen interactions.

Keywords: fusariosis, biocontrol, antimicrobial activity, plant protection

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