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Antagonistic activity of bacterial isolates against *Cercospora beticola* in laboratory conditions

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Abstract

Cercospora beticola Sacc. is the most economically significant sugar beet disease. In years suitable for developing the disease, the yield of the root and the total sugar content can be reduced by up to 50%. The application of chemical fungicides is a standard measure in the control of *C. beticola*. Still, the emergence of resistance have led to a decrease in available commercial agents'effectiveness. This study aimed to examine the efficacy of antagonistic bacterial isolates to control this pathogen under laboratory conditions. The antagonistic activity of four autochthonous bacterial isolates (*Bacillus amyloliquefaciens* (Priest *et al.*) Borriss *et al.* B002, *Bacillus subtilis* (Ehrenberg) Cohn Z3, *Lactobacillus plantarum* (Orla-Jensen) Bergey *et al.* L2 and *Pediococcus pentosaceus* Mees L5B) against three isolates of *C. beticola* (K1-2, K1-3, T2L2) was examined by dual cultivation method. In a bioassay, sugar beet leaves first were sprayed with a suspension of bacteria (2.8×10^{10} CFU/ml) after 24 hours of suspension of spores *C. beticola*. In the control, the leaves were sprayed only with the suspension of spores *C. beticola*. In each variant, there were six sugar beet leaves. After seven days, results were assessed by the Horsfall and Barratt (1945) scale. In the dual cultivation method, the highest percentage of inhibition (21.9 to 24%) was observed in the treatment with *B. subtilis* Z3 against all three isolates of *C. beticola*; *B. amyloliquefaciens* B002 and *L. plantarum* L2 showed a slightly lower percentage of inhibition, while *P. pentosaceus* L5B did not show any antagonistic activity against *C. beticola* isolates. In bioassay, isolates of *B. subtilis* Z3, *B. amyloliquefaciens* B002 and *L. plantarum* L2 had excellent preventive action against *C. beticola*. Their efficiency ranged from 87.48 to 99.17% compared to the control. These results indicate that the tested bacterial strains have good potential to control *C. beticola*, which can be an excellent alternative to chemical fungicides.

Key words: sugar beet, *Cercospora beticola*, biocontrol, antagonistic bacteria