

## Abstract

Biological control is a method of applied ecology that uses one organism, or its product, to inhibit another pathogenic organism. This method in plant protection should be more environmentally friendly than commonly used pesticides. The rhizobacterium *Bacillus velezensis* FZB42, which can suppress the growth of other microorganisms, can be used as a biological control agent. *Xanthomonas campestris* pv. *campestris* is a phytopathogen that causes significant losses in agricultural production.

This diploma thesis proved an antagonistic effect of the bacterial strain *B. velezensis* FZB42 on the phytopathogenic bacteria *Xanthomonas campestris* pv. *campestris* SU in mixed culture. The study confirmed that the antibiotic effect of *B. velezensis* strain FZB42 against *X. campestris* pv. *campestris* SU in mixed culture depends on the inoculation ratios of both strains. The interaction of the two bacterial strains was characterized by metabolomics analysis, it was confirmed that *B. velezensis* FZB42 produces four dominant secondary metabolites: lipopeptides surfactin, fengycin, and bacillomycin and siderophore bacillibactin, which show antifungal and antibiotic activity. The inhibitory activity of *B. velezensis* strain FZB42 was further monitored by SEM analysis, which showed damage to *X. campestris* pv. *campestris* SU cells.

**Key words:** *Bacillus velezensis* FZB42; *Xanthomonas campestris* pv. *campestris*; biological control; metabolomics analysis; surfactin; fengycin; bacillomycin; bacillibactin; microscopic analysis