

Antagonistic Potential of Epiphytic Bacteria Isolated in Kazakhstan against *Erwinia amylovora*, the Causal Agent of Fire Blight

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Abstract : Fire blight is a very harmful for commercial apple and pear production quarantine bacterial disease. To date, several different methods have been proposed for disease control, including the use of copperbased preparations and antibiotics, which are not always reliable or effective. The use of bacteria as biocontrol agents is one of the most promising and eco-friendly alternative methods. Bacteria with protective activity against the causal agent of fire blight are often present among the epiphytic microorganisms of the phyllosphere of host plants. Therefore, the main objective of our study was screening of local epiphytic bacteria as possible antagonists against *Erwinia amylovora*, the causal agent of fire blight. Samples of infected organs of apple and pear trees (shoots, leaves, fruits) were collected from the industrial horticulture areas in various agro-ecological zones of Kazakhstan. Epiphytic microorganisms were isolated by standard and modified methods on specific nutrient media. The primary screening of selected microorganisms under laboratory conditions to determine the ability to suppress the growth of *Erwinia amylovora* was performed by agar-diffusion-test. Among 142 bacteria isolated from the fire blight host plants, 5 isolates, belonging to the genera *Bacillus*, *Lactobacillus*, *Pseudomonas*, *Paenibacillus* and *Pantoea* showed higher antagonistic activity against the pathogen. The diameters of inhibition zone have been depended on the species and ranged from 10 mm to 48 mm. The maximum diameter of inhibition zone (48 mm) was exhibited by *B. amyloliquefaciens*. Less inhibitory effect was showed by *Pantoea agglomerans* PA1 (19 mm). The study of inhibitory effect of *Lactobacillus* species against *E. amylovora* showed that among 7 isolates tested only one (*Lactobacillus plantarum* 17M) demonstrated inhibitory zone (30 mm). In summary, this study was devoted to detect the beneficial epiphytic bacteria from plants organs of pear and apple trees due to fire blight control in Kazakhstan. Results obtained from the in vitro experiments showed that the most efficient bacterial isolates are *Lactobacillus plantarum* 17M, *Bacillus amyloliquefaciens* MB40, and *Pantoea agglomerans* PA1. These antagonists are suitable for development as biocontrol agents for fire blight control. Their efficacies will be evaluated additionally, in biological tests under in vitro and field conditions during our further study.

Keywords : antagonists, epiphytic bacteria, *Erwinia amylovora*, fire blight

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