ABSTRACT FOR THE GENERAL PUBLIC

Fungal diseases are widespread among all plant species and are responsible for a range of serious plant diseases. Intensive agricultural production requires the use of many pesticides including fungicides to ensure high yield and high quality products. However, the use of this type of compounds to fight soil borne pathogens is raising concerns because they act nonspecifically and are toxic to many organisms, including humans. Moreover, their long-term use leads to the destruction of ecosystems and environmental pollution. Therefore, it became necessary to search for alternative methods of plant protection, including those based on interactions between pathogens and microorganisms that could control them. Recently, special attention has focused on endophytic bacteria that colonize plant tissues and establish a symbiotic relationship with the host. These microorganisms are involved in the control of plant pathogens through a variety of mechanisms, such as competition for space and nutrients, production of enzymes degrading cell walls of pathogens, production of antibiotics or induction of the host plant defense mechanisms. Therefore, inoculation of plants with beneficial endophytes can inhibit disease symptoms caused by viral, insect, fungal, and bacterial pathogens. Because of these facts, it is extremely important to explore the endophyte-pathogen interactions. The aim of this project is to understand the mechanisms of the antagonistic interaction between endophytic bacteria and fungal pathogens at the molecular level. First, we are planning to determine the effect of phytopathogenic fungi on the expression of genes determining antimicrobial activity of two endophytic bacteria from the genus *Bacillus* and *Pseudomonas*. The next stage of the research will be to establish collection of mutants, which allow us to identify specific mechanisms involved in biological activity of these bacteria against specific pathogen. The transcriptome studies will allow for understanding global response of endophytic bacteria to specific phytopathogens and hence for more efficient application of these bacteria as biocontrol agents. The results of the basic research proposed in the project will enable to develop an effective microbial inoculant providing plant protection towards pathogenic fungi.