Plant Pathology Seminar

Monday, October 14, 2019

1:30 PM

162 Food Safety & Toxicology

"Utilizing Bacteriophage as a Biocontrol for Fire Blight"

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Fire blight, caused by the bacterium *Erwinia amylovora*, is a destructive disease of pome fruit trees including apple (*Malus* sp.) and pear (*Pyrus* sp.). The primary infection of *E. amylovora* is through host flowers, where *E. amylovora* cells grow to large populations on the stigmas (10^{6-7} cells per flower), migrate to the hypanthium, and cause blossom blight. After flower infection, *E. amylovora* cells spread further systemically in the host and can cause shoot blight and canker symptoms. Management of fire blight has relied heavily on the application of antibiotics, including streptomycin and oxytetracycline. However, the reliance on these antibiotics for fire blight control has resulted in the selection of antibiotic resistant *E. amylovora* isolates, urging the need of developing alternative disease management strategies. The use of lytic bacteriophage, bacteria-specific viruses that attach to bacterial cells and reproduce through lytic cycles, has shown great potential in human medicine, the food production industry, and now plant agriculture. However, the efficacy of bacteriophage treatments under study in agriculture has varied drastically, largely due to phage sensitivity to multiple environmental variables, especially UV light from sunlight exposure. In this study, the UV sensitivity of two bacteriophage that infect *E. amylovora* several natural UV protectants that could be used to enhance phage survival during field application were investigated., Peptone (50 mg/ml, 10mg/ml, and 5 mg/ml), carrot juice (fresh squeezed and pasteurized; 10% and 1%), and Surround (Kaolinite Clay; 0.012 g/ml and 0.0012 g/ml) were tested as UV protectants. In addition to *in vitro* trials tested under UV-C light, pathogen-inoculated field experiments were also conducted with bacteriophage treatments. Field experiments were sampled for bacterial population dynamics as well as monitored for blossom blight severity. The first-year experiment of this study suggests that while there are still many factors to consider such as climate and limitation to bacteriophage and host strain availability by location, the utilization of bacteriophage as a biocontrol for fire blight holds potential to work as a bacterial control in supplement with other bacterial control methods.

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