

Quorum Quenching Functional Enzymes to Inhibit Bacterial Soft Rot

Background

Many bacteria, including harmful, disease-causing ones, utilize a mechanism called “quorum-sensing” that allows them to communicate with each other and identify when they have sufficient presence to accomplish objectives that are beneficial to them. In many cases, this activity creates negative food qualities in vegetables for consumers and economic losses for farmers. Such is the situation with *Pectobacterium carotovorum* and related organisms, common potato pathogens that cause bacterial soft rot, particularly during storage.

This disease has no current “solution”; farmers battle it through best practices and short-term treatments. A novel control mechanism attacks acyl-homoserine lactones (AHLs) to disrupt quorum-sensing, thereby limiting the activity of undesirable bacteria. This control process is known as “quorum quenching” (QQ) and promises to provide an alternative way to control disease, using beneficial bacteria to produce the needed enzymes.

Technology

Lactonases from several isolates that can disrupt quorum sensing by QQ have been purified, identified and expressed in *E. coli* hosts. Activity has been verified in the laboratory and optimization efforts are underway. The enzymes they have produced can inhibit soft rot in potatoes without negative effects for producers or consumers. Application of the beneficial lactonases is easily accomplished during the processing of potatoes and other plant matter prior to storage or transportation.

Research and Development Status

Researchers from the University of Wisconsin – Oshkosh are validating their findings under applied circumstances and believe that this approach offers an attractive, safe and lower-cost method for control of soft potato rot. Experiments are allowing them to collect data that can be used to scale up the technology and implement it in the food industry.

Commercial Applications & Key Technical Feature

T200005 provides a new approach to controlling *P. carotovorum* and similar pathogens. While potatoes are commonly attacked by these organisms, other vegetables, fruits and ornamental plants can also suffer infection and subsequent losses and should be treatable by the same lactonases. WiSys is seeking a strategic partner interested in focusing the necessary applied research and providing a route to market for the commercialization and use of engineered organisms.

The key feature of a new treatment system based on this technology is the post-harvest application of the expressed lactones, purified and free of bacterial producers, to inhibit bacterial soft rot during storage and shipping.

Intellectual Property

A U.S. provisional patent application has been filed for this invention. For more information, please contact our licensing team at licensing@wisys.org.