Prevention of Preharvest and Postharvest Fungal Infections in Almonds by Application of Natural Compounds as Chemosensitizers

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PROJECT SUMMARY

Objectives:

- Identify natural compounds effective as antifungal and anti-mycotoxigenic compounds
- Identify the most efficient molecular targets for newly discovered compounds using functional genomic approaches.
- Determine an effective method for delivery of newly discovered compounds, leading to a target-specific strategy for fungal pathogen control in the field or during processing and storage.
- Test and compare the efficacy of treatments to control *Alternaria* leaf spot in areas with historically high levels of fungal infection

Background:

This research group has identified a number of compounds that either on their own or when combined with traditional fungicides may reduce fungal infections in almonds. Some of the compounds also may inhibit the production of aflatoxins by *Aspergillus* species. The current effort is to assess the efficacy in the lab of the identified compounds.

Discussion:

By screening a range of compounds in a yeast-based bioassay, several have been identified that control fungal pathogens that infect almonds.

The yeast bioassay also allows the assessment which biochemical pathway may be inhibited by the compound, helping to focus future screening efforts.

Compounds effective in the yeast bioassay, where then tested for their efficacy in inhibiting growth of several *Aspergillus* species, as well as some of the foliar diseases. Some of the compounds work through direct contact, some are volatile compounds that inhibit fungal growth and/or enhance the efficacy of traditional fungicides.

For example, salicylaldehyde (SA), a volatile natural compound, exhibited potent antifungal and antimycotoxigenic activities to *Aspergillus flavus* and *A. parasiticus*. Co-application of SA with strobilurin resulted in complete growth inhibition of *Aspergillus* at much lower doses than treatment of either agent, alone. Therefore, compounds such as SA can enhance antifungal activity of commercial antifungal agents required to achieve effective fungal control.

Future efforts include trying to determine an effective method for delivery of these newly discovered natural compounds so that they can be used for almond fungal pathogen control, especially under stockpile conditions.

Project Cooperators and Personnel Jong Kim, Western Regional Research Center, USDA/ARS; Brad Higbee, Paramount Farming Company

For More Details, Visit

- 2009-10 Annual Report CD (09-PATH8-Campbell); or on the web (after January 2011) at AlmondBoard.com/ResearchReports