Stockpile Management to Reduce Aflatoxin Potential

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PROJECT SUMMARY

Objectives:

- Develop guidelines for harvest and stockpiling that minimize the potential for growth of *Aspergillus* spp. (*A. flavus* and *A. parasiticus*) that can result in aflatoxin contamination.
- Determine variability of nut moisture content of crop on the orchard floor/windrow during harvest to develop appropriate sampling methods.
- Assess different methods of measuring water activity and moisture content of the in-hull crop taken from orchard the floor/windrow and from stockpiles.
- Determine the impact of different tarp types on temperature, humidity and mold development in stockpiles.

Background:

Results from this ongoing study developing stockpiling guidelines show almonds should not be stockpiled if either the hull moisture content exceeds 13% or the kernel moisture content exceeds 6%. Above these moisture levels, *Aspergillus* can grow with resulting aflatoxin contamination.

Key management guidelines developed from this research are the following:

Field moisture sampling. If sampling prior to sweeping, take representative samples from tree trunks to the middles and along rows; take worst-case samples from the north side of trees, adjacent to trunks. If sampling from the windrows, take representative samples from top to bottom; take worst-case samples from the bottom of windrows.

Stockpile orientation and shape. Best orientation is long axis north to south to minimize condensation and mold growth, which tends to be worse on the north side of piles. Smooth the tops to minimize concentration of condensate in "valleys."

Tarp type and moisture. Clear produces the highest temperature fluctuations and condensation and is probably adequate for dry piles but still may lead to moisture migration towards surfaces leading to more variability in kernel moisture content. . White on black minimizes temperature fluctuations and condensation and hence should help to minimize food safety risk. If piles are stacked too wet, uncover in the daytime when relative humidity is lower and recover at night when it is high.

A focus of current efforts is developing simplified methods to measure water activity and moisture content of in-hull almonds either from the field or in stockpiles. From this, develop appropriate guidelines which relate water activity of the in-hull samples - the actual determining factor for mold growth - to moisture content of kernels and hulls.

Project Cooperators and Personnel: Jim Thompson, Sam Metcalf, UC Davis; Themis Michailides, David Morgan, UC Kearney Ag Center

For More Details, Visit

- Poster location 25, Exhibit Hall, Session 1 at the conference; or on the web (after January 2011) at AlmondBoard.com/AICposters
- 2009-10 Annual Report CD (09-AFLA2-Lampinen); or on the web (after January 2011) at AlmondBoard.com/ResearchReports