A Decade of Protection with Mandatory Pasteurization

A spate of Salmonella outbreaks in the early 2000s focused the almond industry's attention on the threat that pathogenic bacteria can pose even to low-moisture foods—like almonds—that hadn't previously been considered at risk. With that knowledge, the Almond Board of California (ABC) saw it as imperative to work with researchers, regulators and almond growers and processors to understand the threat, measure its implications and develop protocols to mitigate it.

The result was a suite of best practices—including a groundbreaking almond pasteurization program—that passed its first decade of implementation in 2017. We talked to Tim Birmingham, ABC's director of quality assurance and industry services, to learn how the program was built, and what it means for almond safety going forward.

Q Almonds are low-moisture foods. Why worry about Salmonella?

BIRMINGHAM:

Even though low-moisture products like nuts, seeds and dried spices and seasonings don't support pathogen growth, you can still have low levels of Salmonella and other pathogens on these products, and it only takes one or two cells, particularly for the immunocompromised, to become ill.

Q Beyond almond growers and farmers, what partners did you gather to help build this program?

BIRMINGHAM:

We had the Food and Drug Branch Chief of the California Department of Public Health encouraging us to understand the threat and where it's coming from. And we were very lucky to find Dr. Linda Harris at U.C. Davis, who happened to be willing and able to help us dive into this issue. So everything aligned and we got rolling. And again, Dr. Harris really helped guide our research efforts, and the state was very supportive in letting us come up with mitigation strategies.

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Q What initial discoveries did the investigations make—and what lessons did you learn?

BIRMINGHAM:

A lot of the early work focused on how to control Salmonella—not just killing it on almonds, but getting growers up to speed on their role. That was the birth of our good-agricultural practices program, where we really dove into the practices that growers should employ not necessarily to eliminate contaminants, but to control and mitigate contamination at the orchard level. We really wanted to make it clear to the growers that they have a part to play in this.

Q Once you started looking at the role of processing, what conclusions did you draw?

BIRMINGHAM:

We did risk-assessment work to determine the appropriate criteria to protect consumer health, and result in less than one illness per year, which is the right place to be, and that turned out to be a four-log reduction—or 10,000 CFUs per gram of almond—in Salmonella. Then our work focused on what it would take to achieve that reduction for the different processes available—dry heat, moist heat, blanching-type processes, oil roasting, propylene oxide (PPO) treatment and some forms of steam pasteurization. We looked at this from a laboratory standpoint and found the combinations of time, temperature or PPO-time exposure required to kill Salmonella. In addition, we worked to develop a Process Authority network capable of validating equipment used for pasteurization of almonds. We developed validation guidelines and protocols to help those folks understand how to properly validate such equipment. Once the guidelines were in place and equipment validated we addressed ongoing quality and safety through audits of those companies conduting almond pasteurization. And that's how we came up with our pasteurization program.

Q How has the FDA responded to the pasteurization program?

BIRMINGHAM:

One of the benefits of our program is that we've had a lot of opportunity over the years to interact with the FDA and state regulatory agencies. They've been very interested in what we've done because it's worked. So we've hosted a number of FDA and state food safety folks, we've shared information with them and taken them to facilities to show them pasteurization in action. In turn they have been very willing to engage in discussion around Food Safety with us. It has been a very collaborative approach, built on the credibility of our pasteurization program, which I believe has positioned the industry well for compliance with FSMA Preventive Controls.

Q So what's next for almond safety?

BIRMINGHAM:

Our focus now is to continue refining the guidelines we've given industry for validating processes and equipment. We're also looking at almond products that are more prevalent now than in the past—flour, for instance—and making sure that we have validation guidelines that are applicable for them, as well. Beyond that, whole-genome sequencing technology can better fingerprint the pathogens we've found in the past to help us hone in on where they're coming from, and maybe potentially identify better mitigation strategies before they even get to the plant. So that's an area that's new and exciting. We're proud of the program, and the whole industry is very proud of taking the steps to go down this road.

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