Peanut Butter: The New Hazardous Food? Or Could It Have Been Something Else?

“Alle Ding’ sind Gift und nichts ohn’ Gift; allein die Dosis macht, dass ein Ding kein Gift ist.”

This quote is attributed to Philippus Theophrastus Aureolus Bombastus von Hohenheim, who is better known to the world as Paracelsus, the “Father of Toxicology.” It means “All things are poison and nothing is without poison, only the dose permits something not to be poisonous.”

So, what does a quote about toxicology have to do with peanuts? In mid-February, the news reported that U.S. government officials were going to declare peanut butter a hazardous food. Even though we are on the tail end of an outbreak that sickened more than 660, resulted in nine confirmed deaths, and caused the Peanut Company of America—the company that processed the products in question—to declare bankruptcy, is peanut butter really a hazardous food?

Let’s take a look at the characteristics of foods, which are normally considered to be hazardous. Microorganisms of public health significance, or food pathogens, have certain basic needs. They require nutrients, usually proteins and carbohydrates, an environment with a pH greater than 4.5, and foods with a water activity of greater than 0.90. *Staphylococcus aureus* will grow at less than 0.90 (down to 0.86), but it does not produce enterotoxin, which is what causes people to become sick. This is why meat, poultry, seafood, milk, eggs, and most prepared foods provide such a wonderful potential growth environment for pathogens. But what about peanut butter? Peanut butter has a neutral pH and is loaded with proteins and carbohydrates, but it usually has a water activity of 0.85, so it is not a product that provides a happy growth medium for food pathogens. This is why it is distributed at ambient temperature and can be held at ambient temperatures after opening. The same can be said of most cereal and grain products.

Peanuts are rarely sold raw. Most are processed prior to sale or processing. Many years ago, almost all peanuts were processed by oil roasting or frying. However, concerns about oil-roasted products being higher in fat than dry-roasted products led many processors to switch to dry roasting. In reality, oil-roasted nuts contain only 1–2% more oil than dry-roasted nuts. Oil roasting is a more effective process for microbial control because the nuts are immersed in hot oil at 275°F or above. This is a much more effective process than heating in hot air. So, it is ironic that market forces drove the industry to go to a process that provided a less effective kill step.

The low water activity that was mentioned above will not allow microorganisms to grow, but there is a disadvantage to products with low water activity, especially those with a greater amount of fat. These kinds of products will protect microorganisms from heat. It will take much more heat to kill salmonella in peanut butter than it will in fluid milk or in gravy used with a pot pie. What this means is that peanuts must not only be properly processed to kill pathogens before being turned into peanut butter, but they must be protected from potential contamination after they have been subjected to the “kill step.” The kill step is on the peanuts, not the peanut butter!

So, what does a discussion on peanuts and peanut butter have to do with the cereal industry? In a word: “everything.” Processes that were designed to kill pathogens will be undone if the sanitary conditions in the plant allow the product to become contaminated after processing. Look at what happened with Malt-O-Meal not once but twice. Potato chips have even been implicated in a salmonella outbreak thanks to contaminated seasonings. The processes by which cereal-based products are manufactured include baking, extrusion, drum drying, and frying. These processes are usually designed to not only cook the product but may also be adequate to kill most pathogens. The efficacy of the process will depend upon the water activity of the product as noted above and the kind of process. Whatever kind of process is used, it is essential that all plants manufacturing both peanut products and cereal-based items ensure that:

- Their equipment is of good sanitary design;
- Both the physical plant and processing equipment are properly maintained;
- Cleaning programs have been validated as being effective;
- Post-process handling systems are designed to prevent cross-contamination; and
- There is a clear segregation of processed and unprocessed products.

These hazard analysis and critical control point (HACCP) prerequisites will help ensure that cross-contamination will not be an issue. Unfortunately, breakdowns in one or more of these systems contributed to contamination of the product that led to the most recent outbreak. And, if either a pathogen or spoilage organism establishes itself in a plant, the potential for recontamination will be even higher. In addition, once that organism establishes itself, it is very, very hard to get rid of it.

So, let’s get back to our original question. Is peanut butter a hazardous product? Most peanut butter products (and cereal-
based foods) have a final water activity of less than 0.85, so they will not support the growth of food pathogens. However, if they are manufactured with contaminated ingredients or become contaminated after processing, they may cause an illness.

We should also address peanuts themselves. Have peanuts been associated with foodborne illnesses in the past? Are pathogens, such as salmonella, part of the normal microbial flora found on peanuts? Peanuts are grown in the soil, which is the source of many potential pathogens. I don’t have access to historical data that indicates that salmonella and other pathogens are present on raw peanuts, but it would be logical to assume that they are, especially given that the pathogen has now established itself in different plants. So, let’s assume that raw peanuts are contaminated and must be processed to ensure that the salmonella threat is removed. Can we say the same about grains and cereals?

I would venture to say that it is not peanut butter, but peanuts that are potentially hazardous. They must be processed in such a way as to ensure that salmonella is destroyed. The peanut industry may well have to follow the lead of the almond industry, in which processes for peanuts are developed and validated by process authorities. In fact, FDA issued a guidance document on March 9, 2009, that said just this. The document suggests that peanuts be purchased only from sources that have processed the product to achieve a 5-log reduction of salmonella. However, once something is processed, the challenge is keeping it safe. Just because a food will not support the growth of a pathogen, doesn’t mean it will not make someone sick.

Peanut butter has been a staple for children and adults for many, many years. There is no reason that it shouldn’t remain as such. However, to paraphrase our old buddy Paracelsus, even safe foods may become unsafe if the dose of pathogens is high enough. So, make sure that peanuts, cereal grains, and other products are not only properly processed, but that your processing and handling systems are clean and sanitary and are designed to ensure products do not become contaminated after processing.

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