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Food Safety – The basics – Biological Hazards

What every food processor and food handler – and everybody at home should know about the safe handling of foods

Abstract

Some common sense, and some not-so common tips about the safe handling of foods, the potential hazards and the way to minimize illness and injury. We assume that everyone knows the basics when it comes to ensuring food safety in food production and food handling facilities. And yet, it is extremely common that simple mistakes and behaviours result in potentially dangerous and sometimes even lethal results.

Keywords: bacteria, allergens, contamination, hygiene, sanitation, recall, education

The easiest way to break down the potential problems with foods is to consider how food can become dangerous. There are three main categories: biological, physical and chemical. This first article will discuss the controls need to limit biological contamination.

Most people consider the biological category the most obvious and the most important – bacteria. And some of the more dramatic recalls have their origin in contamination by bacteria. Other biological contaminants can include pests (insect contamination, rodents), and cross contamination with potential allergens

When considering the food safety, it must be kept in mind that the majority of *recalls* in North America are related to potential undeclared allergens, not bacteria or chemical contamination. A food label communicates to the consumer some vital information: the ingredients. When that information is inaccurate or incomplete, the consumer is exposed to an unwarranted risk. A manufacturer's label should declare potential allergens clearly. Whether allergens are present in the product, occur on the same processing line, or within the same processing facility, they could cause severe allergic reactions to the consumer. Some allergens can trigger responses at levels of a few parts per billion.

Major allergens include: Peanuts, tree nuts, sesame seeds, milk, eggs, fish, shellfish, crustaceans, soy, wheat & sulphites. All products derived from these allergens are likely allergenic as well and should therefore be declared (i.e. caseinates and whey from milk, albumen from egg, lecithin from soy)

Many bacteria that can cause illness are killed in the process of preparing the foods, if the food is cooked, heated or pasteurized before it is consumed. In foods where heating does not take place, the processor must take care to ensure that bacteria are not introduced in the processing. Those bacteria that aren't killed must be inhibited from growing further and causing illness. This can be accomplished using the correct levels of sugar, salt, acid or preservative or a combination of those ingredients, or through freezing or dehydration.

In all food processing, limiting bacterial contamination is done through a series of steps:

- ◆ Inspection and testing of raw materials
- ◆ Temperature control of perishable raw materials
- ◆ Proper sanitation of the processing equipment and the plant

- ◆ Hygiene of production workers
- ◆ Processing the foods to reduce the levels of bacteria, or to stop them from growing
- ◆ Separation of raw and processed products
- ◆ Packaging of products to prevent re-contamination
- ◆ Inspection and testing of finished products
- ◆ Temperature control during storage of perishable finished products

Simple in theory, but many of the steps above have inherent pitfalls.

Inspection and testing of raw materials is a cumbersome and time-consuming process relying on statistical approaches to test a portion of the incoming materials. It is not possible to test all raw materials. Manufacturers may have the resources to do all testing in-house, but this is not likely with smaller businesses, who will rely on testing facilities and labs to conduct testing for them. Often, the time frame between receipt of raw materials and processing is not sufficient to allow for testing to be completed, so processors may choose to produce their products and wait with shipping the finished goods until testing is completed. In reality, even this is not always done. It is not uncommon for a processor to find out that raw materials were contaminated until after the goods have been shipped.

Temperature control of raw materials is simple and relies on the processor to ensure that the fridges and freezers work, and that the thermometers used in coolers and processing are carefully calibrated on a regular basis.

Sanitation involves a process of removing accumulated residues from the processing and packaging equipment, washing with detergent and scrubbing to remove any film, rinsing with clean water, then sanitizing, using chemicals or steam. Critical points in this process involve ensuring that particularly hard to reach areas will easily get overlooked or inadequately washed and sanitized.

Production worker education & hygiene is possibly the most critical aspect for every food handling operation. People are a company's most important asset. A company's investment in solid training of food handlers will pay back in a reduction of waste, a reduction of quality problems and a significantly lower risk of food safety issues. By ensuring that the company's workers are treated with respect, the company earns a quality inspector at the price of a production worker.

Critical aspects of food handler hygiene include:

- ◆ Personal hygiene – regular bathing, how to control coughs, sneezes, when to report illnesses, especially those readily transmitted by foods
- ◆ Proper hand washing techniques
- ◆ Instruction in the use of plant clothing, footwear, hair covering and gloves. In many instances employees will wear gloves when handling foods, however, will they remove the gloves once they leave the processing area? Will they use the same gloves to carry the garbage out, or wipe spills?
- ◆ Education of workers in:
 - food microbiology (how bacteria, yeasts, moulds and viruses grow, multiply and propagate),
 - sanitation,
 - storage and
 - handling of foods
- ◆ Establishing clear communications channels with employees which allows employees to report problems and expect quick and effective response
- ◆ Education in the separation of raw materials and finished goods, including the separation of processing equipment and utensils.

Resource

FTC International Consulting Ltd. is a food consulting corporation catering to manufacturers, distributors and wholesalers in most areas of food technology, food safety, food product labeling and regulatory compliance. The company is based in Pitt Meadows, BC Canada. Tel: 604-288-2719 [URL:www.ftcinternational.com](http://www.ftcinternational.com) email: contact@ftcinternational.com

About the author

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