

Food Safety Program, for Processors and Distributors

FACT SHEET #26

Chemical Hazards

A chemical hazard is any substance that can cause a health problem when ingested or inhaled. They include toxins, dangerous chemicals, residue of excess chemicals used in processing food products. If your facility follows Good Manufacturing Practices (GMPs), you can prevent chemical hazards.

Types of Hazards

- **Naturally occurring** – These are toxins produced by plants, animals or microorganisms (ex: aflatoxins in peanuts, poisonous neurotoxins in mushrooms, scrombotoxins in fish).
- **Intentionally added** – These are chemicals added to food that are beyond the acceptable limits established by the Food and Drugs Act and its regulations (ex: food additives like sodium nitrate).
- **Unintentionally added** – These are chemicals that accidentally contaminate food being processed (ex: sanitation or maintenance chemicals, pesticides or environmental pollutants).
- **Food allergens** – These substances in food can cause a dangerous reaction in people who are allergic (ex: peanuts, fish, dairy products).

Risk of Hazards

Chemical hazards may lead to acute foodborne illness, or chemical poisoning. These illnesses can be caused when abnormally high doses of chemicals are consumed (ex: nitrites). Risk factors include:

- **Exposure** – The amount of chemical concentration in food and the amount of the food ingested will determine the exposure risk.
- **Toxicity** – The amount of chemical or toxin that is consumed affects the risk level.

Potential Hazards

There are many potential sources of chemical hazards in food processing. Regular, formal hazard analysis will help you determine the risk levels that could affect your product. A proper analysis will consider potential hazards, including:

- **Incoming materials** – Contaminated with toxins producing bacteria or mould, pesticides, veterinary drugs, non-food grade chemicals/ink used in packaging materials.
- **Allergens** – Undeclared allergens on ingredient labels or cross-contamination with allergens are a potential risk.
- **Food contact surfaces** – Use of unapproved materials may lead to migration of chemical to food.
- **Non-food chemicals** – Sanitation or maintenance chemicals (used or stored near food contact surfaces), dyes or inks from coding machines, water treatment chemicals, etc. are all potential risks.
- **Employees** – Employee errors in adding excessive food additives or unapproved ingredients into the process are a potential risk.

Limits

The Canadian Food and Drug Regulations refer to [maximum allowable levels \(or tolerances\) of specific chemicals in food](#). These tolerances are listed in Section B.15.003.

Health Canada also lists [maximum allowable levels of specific chemicals in food](#).

Hazard Control and Prevention

The most effective chemical hazard control is prevention. Establishing an effective chemical control program in your facility can reduce or eliminate chemical hazards in food.

Successful chemical control program should include:

- Train employees to follow safe handling and application procedures for sanitation, maintenance or pesticides chemicals.
 - An industry best practice is to use only chemicals listed in the [Reference Listing of Accepted Construction, Packaging Materials and Non-Food Chemical Agents](#) published by the Canadian Food Inspection Agency (CFIA), or with a Letter of No Objection from Health Canada.
 - Store chemicals in designated areas away from food, ingredients, packaging and food contact surfaces.
- Make it standard practice for staff, after maintenance, to properly clean and remove all chemical residues from food contact surfaces.
 - Do not use excessive grease or lubricants on equipment. Regularly re-evaluate all procedures to ensure they effectively remove chemicals.
 - Ensure chemical containers and measuring tools are clearly labeled or colour coded, and that they are used only for chemicals.
 - Use designated tools for handling allergens and scheduling products using allergens last in the production cycle.
 - Store allergens to prevent cross-contamination with other ingredients (ex: tightly close containers, use separate storage room, or ensure adequate physical separation).
 - Receive incoming materials and raw ingredients from reputable suppliers that effectively control chemical hazards, so you prevent the introduction of these hazards in your plant.
 - Ensure restricted ingredients and additives are correctly measured. Regularly re-evaluate all recipes to ensure they meet the Food and Drug Act and its regulations.
 - Follow good storage practices (ex: uncontrolled moisture levels during grain storage can produce mycotoxins).

For information on the Food Safety Program contact the [CVO/Food Safety Knowledge Centre](#).
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For general information, contact your local [GO Centre](#).