

Food contaminant

From Wikipedia, the free encyclopedia

Food contamination refers to the presence in food of harmful chemicals and microorganisms which can cause consumer illness. This article addresses the chemical contamination of foods, as opposed to microbiological contamination, which can be found under foodborne illness.

The impact of chemical contaminants on consumer health and well-being is often apparent only after many years of processing. Prolonged exposure at low levels (e.g., cancer). Chemical contaminants present in foods are often unaffected by thermal processing (unlike most microbiological agents). Chemical contaminants can be classified according to the source of contamination and the mechanism by which they enter the food product.

Contents

- 1 Agrochemicals
- 2 Environmental contaminants
- 3 Pesticides and carcinogens
- 4 Hair in food
- 5 Processing contaminants
- 6 Emerging food contaminants
- 7 Safety and regulation
- 8 Food contaminant testing
- 9 See also
- 10 References
- 11 External links

Agrochemicals

Agrochemicals are chemicals used in agricultural practices and animal husbandry with the intent to increase crops and reduce costs. Such agents include pesticides (e.g., insecticides, herbicides, rodenticides),

Food safety



Terms

Foodborne illness

Hazard analysis and critical control points (HACCP) • Hazard analysis and risk-based preventive controls (HARPC)

Critical control point

Critical factors

FAT TOM

pH

Water activity (a_w)

Bacterial pathogens

Clostridium botulinum

Escherichia coli

Listeria

Salmonella

Vibrio cholerae

Viral pathogens

Enterovirus

Hepatitis A

Norovirus

Rotavirus

Parasitic pathogens

Cryptosporidium

plant growth regulators, veterinary drugs (e.g., nitrofurans, fluoroquinolones, malachite green, chloramphenicol), and bovine somatotropin (rBST).

Entamoeba histolytica

Giardia

Trichinella

Environmental contaminants

Environmental contaminants are chemicals that are present in the environment in which the food is grown, harvested, transported, stored, packaged, processed, and consumed. The physical contact of the food with its environment results in its contamination. Possible sources of contamination include:

- **Air:** radionuclides (¹³⁷Caesium, ⁹⁰Strontium), polycyclic aromatic hydrocarbons (PAH)
- **Water:** arsenic, mercury
- **Soil:** cadmium, nitrates, perchlorates
- Polychlorinated biphenyls (PCB), dioxins, and polybrominated diphenyl ethers (PBDE) are ubiquitous chemicals
- **Packaging materials:** antimony, tin, lead, perfluorooctanoic acid (PFOA), semicarbazide, benzophenone, isopropyl thioxanthone (ITX), bisphenol A
- **Processing/cooking equipment:** copper, or other metal chips, lubricants, cleaning, and sanitizing agents
- **Naturally occurring toxins:** mycotoxins, phytohaemagglutinin, pyrrolizidine alkaloids, grayanotoxin, mushroom toxins, scombrototoxin (histamine), ciguatera, shellfish toxins (see shellfish poisoning), tetrodotoxin, among many others.

Pesticides and carcinogens

There are many cases of banned pesticides or carcinogens found in foods.

- Greenpeace exposed in 2006 in China that 25% of surveyed supermarkets agricultural products contained banned pesticides. Over 70% of tomatoes that tested were found to have the banned pesticide Lindane, and almost 40% of the samples had a mix of three or more types of pesticides. Fruits were also tested in this investigation. Tangerines, strawberries, and Kyofung grapes samples were found contaminated by banned pesticides, including the highly toxic Methamidophos. These fruits can also be found in Hong Kong market.^[1] Greenpeace says there exists no comprehensive monitoring on fruit produce in the Hong Kong as of 2006.
- In India, soft drinks were found contaminated with high levels of pesticides and insecticides, including lindane, DDT, malathion and chlorpyrifos.^[2]
- News of Formaldehyde, a carcinogen was found in Vietnamese national dish, Pho, broke in 2007 Vietnam food scare. Vegetables and fruits were also found to have banned pesticides. "Health agencies have known that Vietnamese soy sauce, the country's second most popular sauce after fish sauce, has been chock full of cancer agents since at least 2001", thundered the *Thanh Nien* daily. "Why didn't anyone tell us?"^[3] The carcinogen in Asian sauces is 3-MCPD and its metabolite 1,3-DCP, which has been an ongoing problem before 2000 affecting multiple continents.
- 2005 Indonesia food scare, carcinogenic formaldehyde was added as a preservative to noodles, tofu, salted fish, and meatballs
- 2008 Chinese milk scandal

Hair in food

There is a heavy stigma attached to the presence of hair in food in most societies. There is a risk that it may induce choking and vomiting, and also that it may be contaminated by toxic substances.^[4] Views differ as to the level of risk it poses to the inadvertent consumer.^{[5][6][7]}

In most countries, people working in the food industry are required to cover their hair because it will contaminate the food.^{[8][9]} When people are served food which contains hair in restaurants or cafés, it is usual for them to complain to the staff.^[10] Despite this, it is not a valid ground on which to sue the restaurant in the United States^[11] but in the United Kingdom it breaks the regulations of the UK Food Safety Act 1990, and people can sue over this.^[12]

There are a range of possible reasons for the objection to hair in food, ranging from cultural taboos to the simple fact that it is difficult to digest and unpleasant to eat. It may also be interpreted as a sign of more widespread problems with hygiene. The introduction of complete-capture hairnets is believed to have resulted in a decrease in incidents of contamination of this type.^[13]

Sometimes protein from human hair is used as a food ingredient,^[14] in bread and other such similar products. Such use of human hair in food is forbidden in Islam.^[15] Historically, in Judaism, finding hair in food was a sign of bad luck.^[16]

Processing contaminants

Processing contaminants are generated during the processing of foods (e.g., heating, fermentation). They are absent in the raw materials, and are formed by chemical reactions between natural and/or added food constituents during processing. The presence of these contaminants in processed foods cannot be entirely avoided. Technological processes can be adjusted and/or optimized, however, in order to reduce the levels of formation of processing contaminants. Examples are: nitrosamines, polycyclic aromatic hydrocarbons (PAH), heterocyclic amines, histamine, acrylamide, furan, benzene, trans fat, 3-MCPD, semicarbazide, 4-hydroxynonenal (4-HNE), and ethyl carbamate. There is also the possibility of metal chips from the processing equipment contaminating food. These can be identified using metal detection equipment. In many conveyor lines, the line will be stopped, or when weighing the product with a Check weigher, the item can be rejected for being over- or underweight or because small pieces of metal are detected within it.

Emerging food contaminants

While many food contaminants have been known for decades, the formation and presence of certain chemicals in foods has been discovered relatively recently. These are the so-called emerging food contaminants like acrylamide, furan, benzene, perchlorate, perfluorooctanoic acid (PFOA), 3-monochloropropane-1,3-diol (3-MCPD), 4-hydroxynonenal, and (4-HNE).

Safety and regulation

Acceptable Daily Intake (ADI) levels and tolerable concentrations of contaminants in individual foods are determined on the basis of the "No Observed Adverse Effect Level" (NOAEL) in animal experiments, by using a safety factor (usually 100). The maximum concentrations of contaminants allowed by legislation are often well below toxicological tolerance levels, because such levels can often be reasonably achieved by using good agricultural and manufacturing practices.

Regulatory officials, in order to combat the dangers associated with foodborne viruses, are pursuing various possible measures.

- The EFSA published a report in 2011 on “scientific opinion regarding an update of the present knowledge on the occurrence and control of foodborne viruses”.
- This year, an expert working group created by the European Committee for Standardization (CEN), is expected to publish a standard method for the detection of norovirus and hepatitis A virus in food.
- The CODEX Committee on Food Hygiene (CCFH) is also working on a guideline which is now ready for final adoption.
- European Commission Regulation (EC) No 2073/2005 of 15 November 2005 indicates that “foodstuffs should not contain micro-organisms or their toxins or metabolites in quantities that present an unacceptable risk for human health”, underlining that methods are required for foodborne virus detection.^[17]

Food contaminant testing

To maintain high quality of food and comply with health, safety and environmental regulatory standards it is best to rely on food contaminant testing through an independent third party such as laboratories, certification companies or similar. For manufacturers the testing for food contaminants can minimize the risk of noncompliance in relation to raw ingredients, semi-manufactured foods and final products. Also, food contaminant testing assures consumers safety and quality of purchased food products and can prevent foodborne diseases, and chemical, microbiological, or physical food hazards.^[18]

The establishment of ADIs for certain emerging food contaminants is currently an active area of research and regulatory debate.

See also

- *Bad Bug Book* from the U.S. Food and Drug Administration
- *The Joint FAO/WHO Expert Committee Report on Food Additives*

References

1. "Greenpeace Exposes Guangzhou Pesticide Contamination". *ChinaCSR*. June 13, 2006.
2. TribhuMRatta (Nov 5, 2008). "Ban the Colas!". *MeriNews*.
3. "Toxic soy sauce, chemical veggies -- food scares hit Vietnam". *AFP*. Hanoi: Google News. Sep 11, 2007.

4. Valdes Biles P.; Ziobro G. C. (August 2000). "Regulatory Action Criteria for Filth and Other Extraneous Materials IV. Visual Detection of Hair in Food". *Regulatory Toxicology and Pharmacology*. Academic Press. **32** (1): 73–77. doi:10.1006/rtp.2000.1403. ISSN 0273-2300. PMID 11029271.
5. "Food Quality issue 08 09 2005".
6. "Kitsap County Health" (PDF).
7. John Lucey (06-01-2006). "Management Should Serve as Role Models for Good Work Habits and Acceptable Hygienic Practices". *Food Quality*. Archived from the original on 2007-07-14. Check date values in: |date= (help)
8. "Ohio Department of Agriculture".
9. "CCFRA newsletter".
10. "Looking under the tables". *The Gazette*. September 20, 2006.
11. "Foreign Objects in Food".
12. "lancaster.gov.uk". Archived from the original on 2009-03-06.
13. "IFST.org" (PDF).
14. Justin Rowlett (10 Jan 2007). "Does your daily bread contain human hair?". *BBC News*.
15. Amir Khan (1996). "Halaal/Haram Food Awareness". Archived from the original on Oct 22, 2009.
16. Howard Schwartz (1991). *Lilith's Cave: Jewish Tales of the Supernatural*. ISBN 0-19-506726-6.
17. Commission Regulation (EC) No 2073/2005 (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:338:0001:0026:EN:PDF>), Official Journal of the European Union, 15 November 2005, Retrieved 7 April 2015
18. Study finds novel method to test food for contamination (<http://www.foodproductiondaily.com/Quality-Safety/Study-finds-novel-method-to-test-food-for-contamination>)

External links

- Office of Food Additive Safety (<http://www.cfsan.fda.gov/~dms/opaofas.html>) at the US Food and Drug Administration's website
- Chemical Risks in Food (<http://www.who.int/foodsafety/chem/en/>) from the World Health Organization
- Briefing on GM Food Contamination (http://www.foe.co.uk/resource/briefing_notes/food_contamination.pdf)
- Pesticides and Chemical Contaminants (<http://www.cfsan.fda.gov/~lrd/pestadd.html>) from the US Food and Drug Administration's website

Retrieved from "https://en.wikipedia.org/w/index.php?title=Food_contaminant&oldid=747680001"

Categories: Food safety | Foodborne illnesses | Nutrition

-
- This page was last modified on 3 November 2016, at 19:22.
 - Text is available under the Creative Commons Attribution-ShareAlike License; additional terms may apply. By using this site, you agree to the Terms of Use and Privacy Policy. Wikipedia® is a registered trademark of the Wikimedia Foundation, Inc., a non-profit organization.