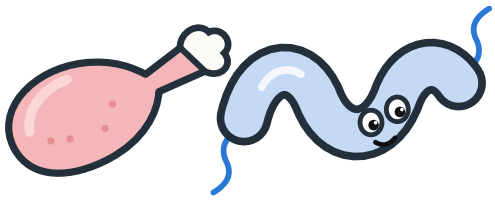
MICRO-ORGANISMS 01

Campylobacter

Bacterium



WHAT IT DOES

Diarrhoea and fever; one registered case in four ends up in hospital

WHERE IT IS FOUND

Poultry meat (especially chicken), unpasteurised milk, unwashed vegetables, contaminated water

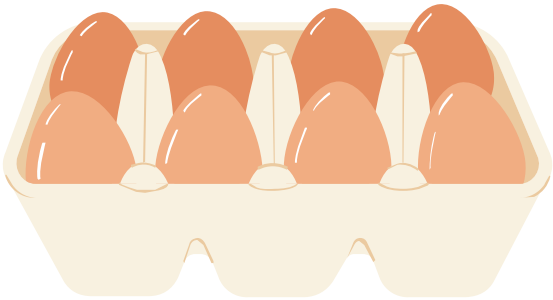
HOW OFTEN IT IS FOUND: About a third of samples of fresh chicken of Latvian origin carry it

HOW OFTEN IT IS EATEN: Chicken gets cooked, and heat kills them; live ones only now and then

MICRO-ORGANISMS 02

Salmonella

Bacterium



WHAT IT DOES

Diarrhoea and fever; often needs hospital care

WHERE IT IS FOUND

Eggs and egg products, chicken and pork, undercooked dishes

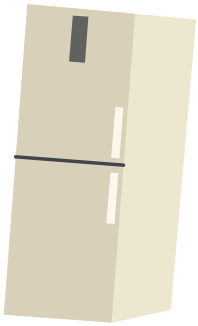
HOW OFTEN IT IS FOUND: Rarely found in Latvian eggs and poultry, thanks to control programmes

HOW OFTEN IT IS EATEN: Eggs and meat, almost daily

MICRO-ORGANISMS 03

Listeria monocytogenes

Bacterium



WHAT IT DOES

Dangerous in pregnancy and old age; can be fatal

WHERE IT IS FOUND

Cold-smoked fish (salmon), ready-to-eat meals, soft cheese, deli meat, bagged salad

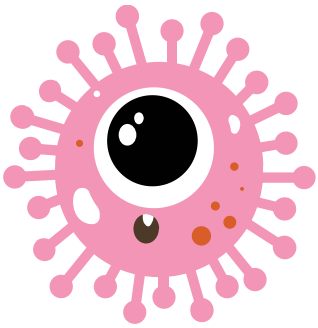
HOW OFTEN IT IS FOUND: Over 100 bacteria per gram is rare: up to 3 % of ready-to-eat samples in 2024

HOW OFTEN IT IS EATEN: Ready-to-eat food and cheese, often

MICRO-ORGANISMS 04

Norovirus

Virus



WHAT IT DOES

Vomiting and diarrhoea for a few days

WHERE IT IS FOUND

Prepared dishes, frozen berries, shellfish, ice, person to person

HOW OFTEN IT IS FOUND: Frozen berries: dozens of norovirus alerts in Europe in 2006–2024

HOW OFTEN IT IS EATEN: Eaten daily, including away from home

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure





MICRO-ORGANISMS

Salmonella

02

Second most common infection passed from animals to people in the European Union (EU); eggs are the leading source. In 2023 Latvia's notification rate was among the lowest in the EU, under a third of the average, so here it sits under “rarely”.

HOW MUCH IS TOO MUCH?

No safe dose; what counts is how many multiplied while the food stood warm.

Source: European Food Safety Authority (EFSA) and European Centre for Disease Prevention and Control (ECDC), One Health Zoonoses Report 2024; ECDC, Salmonellosis: Annual Epidemiological Report 2023; Food and Veterinary Service of Latvia (PVD), Salmonella control programme for 2025

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure





MICRO-ORGANISMS

Campylobacter

01

The most reported foodborne illness in Europe. Latvia reports about 5× fewer cases than the European Union average. Latvian researchers think most cases go unreported, so this does not mean safer chicken.

HOW MUCH IS TOO MUCH?

There is no safe dose: a few hundred bacteria are enough. What matters is cooking and a clean board.

Source: European Food Safety Authority (EFSA) and European Centre for Disease Prevention and Control (ECDC), One Health Zoonoses Report 2024; ECDC, Annual Epidemiological Report; Tedersoo and colleagues, 2022, Poultry Science; Meistere and colleagues, 2019, Eurosurveillance

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure





MICRO-ORGANISMS

Norovirus

04

The biggest cause of outbreaks by number of people affected in 2024, yet almost never fatal in healthy adults. The textbook “often, mild consequences” case.

HOW MUCH IS TOO MUCH?

No safe dose; a few dozen virus particles can infect.

Source: European Food Safety Authority (EFSA) and European Centre for Disease Prevention and Control (ECDC), One Health Zoonoses Report 2024; Velebit and colleagues, 2025, Foods

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





MICRO-ORGANISMS

Listeria monocytogenes

03

About 55 times rarer than Campylobacter infection, yet kills more people. Almost every case is hospitalised. Unlike most bacteria it grows at refrigerator temperature.

HOW MUCH IS TOO MUCH?

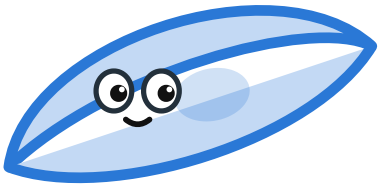
The limit in ready-to-eat food is 100 bacteria per gram if the producer can show it will not be exceeded; otherwise none may be found in 25 grams. For a healthy adult, 100 per gram is no concern; in pregnancy it is.

Source: European Food Safety Authority (EFSA) and European Centre for Disease Prevention and Control (ECDC), One Health Zoonoses Report 2024; Regulation (EU) 2024/2895

MICRO-ORGANISMS 05

Toxoplasma gondii

Parasite



↑ WHAT IT DOES

Usually symptomless; can harm the foetus in pregnancy

→ WHERE IT IS FOUND

Undercooked meat, cured meat, unwashed vegetables, cat faeces

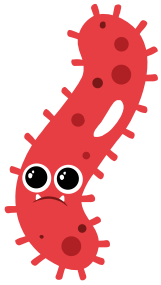
HOW OFTEN IT IS FOUND: Studies find nearly one sheep in three and one pig in four infected

HOW OFTEN IT IS EATEN: Meat often; unwashed vegetables sometimes

MICRO-ORGANISMS 06

Shiga toxin-producing E. coli

Bacterium: Shiga toxin-producing Escherichia coli (STEC)



↑ WHAT IT DOES

Can cause kidney failure, especially in children

→ WHERE IT IS FOUND

Minced beef, raw milk, unwashed vegetables, sprouts, flour, contaminated water

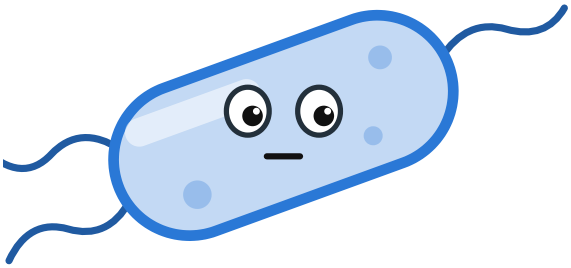
HOW OFTEN IT IS FOUND: Even in flour: live STEC in one in ten ready-made doughs in Germany

HOW OFTEN IT IS EATEN: Minced meat, several times a month

MICRO-ORGANISMS 07

Yersinia enterocolitica

Bacterium



↑ WHAT IT DOES

Abdominal pain; can mimic appendicitis

→ WHERE IT IS FOUND

Raw or undercooked pork, especially minced; salad and raw vegetables; unpasteurised milk

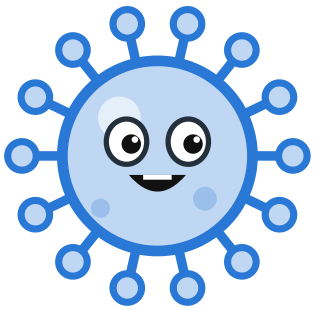
HOW OFTEN IT IS FOUND: Common in pigs, but rare in pork in shops

HOW OFTEN IT IS EATEN: Pork is eaten often

MICRO-ORGANISMS 08

Hepatitis E virus

Hepatitis E virus (genotype 3)



↑ WHAT IT DOES

Often no signs; sometimes tiredness, nausea, jaundice

→ WHERE IT IS FOUND

Raw or undercooked pork, pig liver, liver sausage and pâté, wild boar

HOW OFTEN IT IS FOUND: Relatively common in pork; thorough cooking destroys it

HOW OFTEN IT IS EATEN: Pork often, undercooked pork less often

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure



MICRO-ORGANISMS

Shiga toxin-producing E. coli

06

Rare but dangerous, especially for young children. In 2011 Germany publicly blamed Spanish cucumbers; the real source was sprouts. Spanish growers lost about $200 million a week while wrongly accused.

HOW MUCH IS TOO MUCH?

No safe dose; fewer than 100 bacteria are enough, so cooking decides, not quantity.

Source: European Food Safety Authority (EFSA) and European Centre for Disease Prevention and Control (ECDC), 2024; Food Safety News, 2015

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × SOMETIMES

severity × exposure

MICRO-ORGANISMS

Toxoplasma gondii

05

Ranked first of 20 pathogens by the Norwegian Scientific Committee for Food and Environment (VKM) in 2021, above Campylobacter and Salmonella. Usually symptomless, but consequences in pregnancy can be permanent.

HOW MUCH IS TOO MUCH?

No safe dose; what counts is whether the meat was hot enough or frozen.

Source: Norwegian Scientific Committee for Food and Environment (VKM), Report 2021:10; Advisory Committee on the Microbiological Safety of Food (ACMSF, United Kingdom), Toxoplasma risk profile

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure



MICRO-ORGANISMS

Hepatitis E virus

08

In Europe most human infections are hepatitis E virus genotype 3, and the main source is raw or undercooked pork and liver, and wild boar. Freezing does not kill the virus; only thorough cooking does.

Most infected people notice nothing. In Germany and France about one person in five has antibodies, so they have had the infection. People with liver disease or weak immunity can fall seriously ill. Europe reported more than 21,000 cases and 28 deaths in 2005–2015.

HOW MUCH IS TOO MUCH?

Cook pork, liver and wild boar through. Freezing does not kill the virus. With liver disease, avoid raw pork sausages.

Source: European Food Safety Authority (EFSA), hepatitis E virus, 2017; European Centre for Disease Prevention and Control (ECDC), hepatitis E in Europe 2005–2015, 2017; German Federal Institute for Risk Assessment (BfR), questions and answers on hepatitis E virus, 2016; Szabo et al., 2015

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure



MICRO-ORGANISMS

Yersinia enterocolitica

07

In 2023 it was the fourth most reported infection passed from animals to people in the European Union. The main source is raw or undercooked pork, but salads have caused outbreaks too. Hands, knives and boards also carry the bacteria from raw meat to other food. It can mimic appendicitis: another example of reported numbers depending on how hard you look.

HOW MUCH IS TOO MUCH?

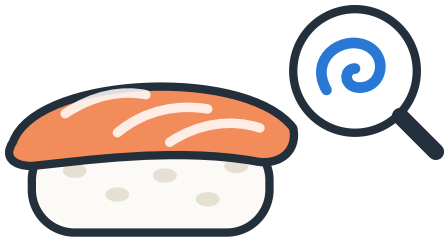
No safe dose; cooking and clean hands, knives and boards decide.

Source: European Food Safety Authority (EFSA) and European Centre for Disease Prevention and Control (ECDC), One Health Zoonoses Report 2023; ECDC, Yersiniosis: Annual Epidemiological Report 2022; German Federal Institute for Risk Assessment (BfR), 2013

MICRO-ORGANISMS 09

Anisakis: fish parasites

Anisakis (roundworm larvae)



WHAT IT DOES

Sharp stomach pain like an ulcer; allergy in some

WHERE IT IS FOUND

Raw or lightly salted fish, sushi, ceviche, home-salted herring from unfrozen fish

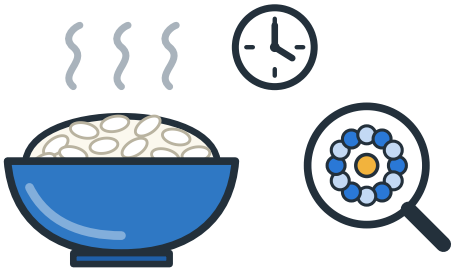
HOW OFTEN IT IS FOUND: Larvae are in many sea fish, but only live larvae can infect

HOW OFTEN IT IS EATEN: Live larvae rarely: restaurants freeze fish meant to be eaten raw

MICRO-ORGANISMS 10

Cereulide

a toxin of Bacillus cereus



WHAT IT DOES

Nausea and vomiting half an hour to six hours after eating

WHERE IT IS FOUND

Rice, pasta and porridge left warm for hours; in 2025 and 2026, recalled infant formula

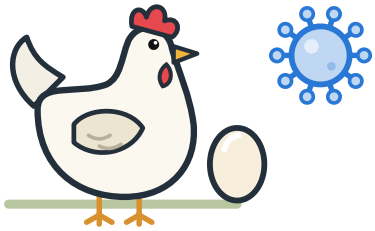
HOW OFTEN IT IS FOUND: The toxin forms in food left warm for hours; reheating does not destroy it

HOW OFTEN IT IS EATEN: Rice and pasta are eaten often; ones left warm for hours, now and then in many homes

MICRO-ORGANISMS 11

Bird flu in eggs, meat and milk

influenza A virus (H5N1)



WHAT IT DOES

If a person is infected, the illness can be a severe pneumonia that can kill

WHERE IT IS FOUND

Eggs, chicken and other poultry meat, raw milk from sick animals

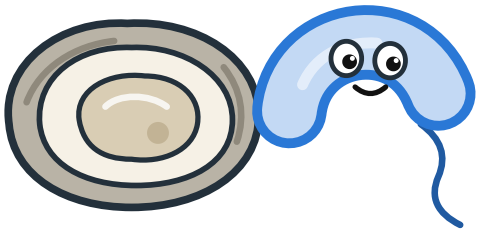
HOW OFTEN IT IS FOUND: Sick flocks are culled; heat and pasteurisation destroy the virus

HOW OFTEN IT IS EATEN: Eggs and meat are eaten often; the virus very rarely reaches a buyer in them

MICRO-ORGANISMS 12

Vibrio bacteria in seafood

Vibrio parahaemolyticus · Vibrio vulnificus



WHAT IT DOES

Diarrhoea, cramps, vomiting; in people with liver disease or weak immunity it can turn into sepsis

WHERE IT IS FOUND

Raw oysters; lightly cooked mussels, prawns and other seafood

HOW OFTEN IT IS FOUND: Found in about 20 % of seafood tested; cooking kills the bacteria

HOW OFTEN IT IS EATEN: In Latvia raw seafood is eaten rarely

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





MICRO-ORGANISMS

10

Cereulide

Cereulide is made by the bacterium Bacillus cereus. Its spores are in soil, dust and many dry foods, and they survive boiling. If cooked food stays warm for hours, the bacteria multiply and release the toxin. After that neither boiling nor frying destroys it.

In December 2025 several countries began recalling infant formula: cereulide was in an oil added to it. Seven European countries reported infants who fell ill. Most had mild symptoms; some went to hospital with dehydration. In Latvia distributors recalled several batches as a precaution.

HOW MUCH IS TOO MUCH?

For infants the European Food Safety Authority (EFSA) set an acute reference dose in February 2026: 0.014 µg per kilogram of body weight. Put cooked food in the fridge within two hours.

Source: European Food Safety Authority (EFSA), 2026; EFSA and European Centre for Disease Prevention and Control (ECDC), 2026; Food and Veterinary Service of Latvia (PVD), 2026

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure





MICRO-ORGANISMS

09

Anisakis: fish parasites

Anisakis are roundworm larvae living in sea fish. The European Food Safety Authority (EFSA) found that no sea fishing area is free of them. A Polish study in 2016 found them in 14 % of Baltic herring. Brief salting, marinating and cold smoking do not reliably kill them.

Freezing (–20 °C for 24 hours) or heating to 60 °C for at least 1 minute does. The allergens remain. Spain, with the highest rate in Europe, has an estimated 7,700–8,320 cases a year, mostly from marinated anchovies.

HOW MUCH IS TOO MUCH?

First freeze fish that will be eaten raw or lightly salted: –20 °C for 24 hours or –15 °C for 4 days. Or cook to 60 °C in the centre.

Source: European Food Safety Authority (EFSA), parasites in fishery products, 2010 and 2024; French food safety agency ANSES, Anisakis, 2008; Bao et al., 2017; Różycki et al. (Baltic Sea, 2016 samples)

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure





MICRO-ORGANISMS

12

Vibrio bacteria in seafood

Vibrio bacteria live in warm, brackish seawater, and shellfish take them up as they filter it. In 2024 the European Food Safety Authority (EFSA) pooled the data: Vibrio parahaemolyticus was in about 20 % of seafood tested, Vibrio vulnificus in about 6 %.

As the sea warms, these bacteria become more common, and EFSA names the Baltic Sea among the waters where the risk grows most. In a healthy person the infection usually ends with diarrhoea. In people with liver disease or weak immunity Vibrio vulnificus can cause sepsis. Thorough cooking kills the bacteria.

HOW MUCH IS TOO MUCH?

Cook seafood through. People with liver disease or weakened immunity should not eat raw oysters.

Source: European Food Safety Authority (EFSA), Vibrio bacteria in seafood, 2024

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





MICRO-ORGANISMS

11

Bird flu in eggs, meat and milk

Since 2020 the bird flu virus H5N1 has killed millions of wild birds and poultry in Europe. People catch it rarely, and those who do were in close contact with sick animals. The European Food Safety Authority (EFSA) says there is no convincing evidence that bird flu can be caught from food.

In the United States the virus appeared in dairy cows in 2024 and was found in raw milk; pasteurisation destroys it. In Latvia bird flu was found at a backyard holding in November 2025. The Food and Veterinary Service (PVD) reminded people that the virus is unlikely to be in eggs.

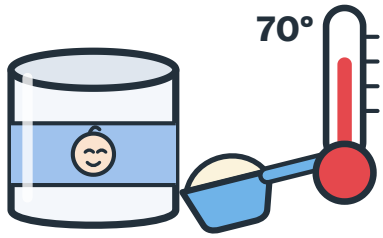
HOW MUCH IS TOO MUCH?

Cook eggs and poultry through. Do not drink raw milk from a farm where animals are ill. Do not touch dead wild birds.

Source: European Food Safety Authority (EFSA), avian influenza, 2026; EFSA, H5N1 in dairy cattle, 2025; Latvian Public Media (LSM), 2025: Food and Veterinary Service of Latvia (PVD); Wageningen University, 2026

Cronobacter: bacteria in formula powder

Cronobacter sakazakii



WHAT IT DOES

In newborns, sepsis or meningitis; some of those who fall ill die

WHERE IT IS FOUND

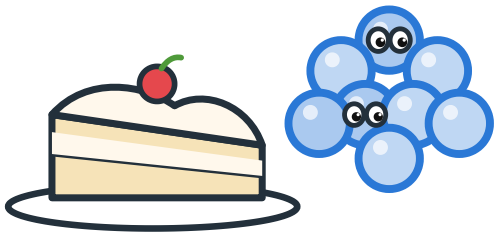
Powdered infant formula: it is not sterile

HOW OFTEN IT IS FOUND: The powder rarely holds the bacteria, and few; in warm prepared formula they multiply

HOW OFTEN IT IS EATEN: Many babies are fed formula; illness is very rare

Staphylococcal toxins

Staphylococcus aureus enterotoxins



WHAT IT DOES

Sudden nausea, violent vomiting and cramps a few hours after eating

WHERE IT IS FOUND

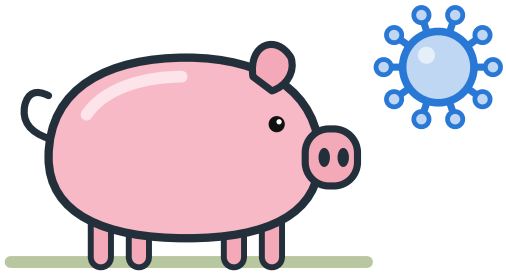
Hand-made food that stood in the warm: salads, sandwiches, cream cakes, sliced meat

HOW OFTEN IT IS FOUND: Many people carry the bacteria on the skin and in the nose; the toxin forms in food left warm

HOW OFTEN IT IS EATEN: At parties and picnics, now and then

African swine fever

African swine fever virus



WHAT IT DOES

Harmless to people. For pigs and wild boar it is a deadly disease

WHERE IT IS FOUND

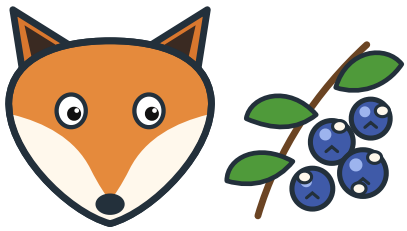
Pork and wild boar meat; sausages, cured fat and other pork products

HOW OFTEN IT IS FOUND: Sick pigs are culled; their meat does not reach the market

HOW OFTEN IT IS EATEN: Pork is eaten often

Fox tapeworm

Echinococcus multilocularis (eggs)



WHAT IT DOES

The parasite's larvae grow slowly in the liver for years, like a tumour; untreated, the disease is fatal

WHERE IT IS FOUND

Unwashed forest berries, mushrooms and garden greens; unwashed hands after working the soil or stroking a dog

HOW OFTEN IT IS FOUND: In Latvia the parasite was found in 17 % of foxes and 8 % of raccoon dogs

HOW OFTEN IT IS EATEN: Many pick berries and mushrooms; eggs on them are rare

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





MICRO-ORGANISMS

14

Staphylococcal toxins

Staphylococcus aureus lives on the skin, in the nose and in wounds. In cooking it gets into the food. If the food then stands in the warm for hours, the bacteria multiply and release a toxin. Reheating kills the bacteria, but the toxin stays.

So people fall ill from food that is handled a lot and not heated again: salads, sandwiches, cream cakes. The vomiting starts suddenly and is violent, but usually ends within a day. It is more dangerous for small children and old people, who lose fluid fast.

HOW MUCH IS TOO MUCH?

Do not leave prepared food at room temperature for more than two hours. Do not cook for others with a festering cut on your hand.

Source: Centers for Disease Control and Prevention (CDC) of the United States, staphylococcal food poisoning, 2024

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





MICRO-ORGANISMS

13

Cronobacter: bacteria in formula powder

Powdered infant formula is not sterile: production cannot free it of bacteria completely. Cronobacter survives for months in the dry. It usually does no harm to older children and adults, but in a newborn it can cause sepsis and meningitis.

Illness is very rare: the Centers for Disease Control and Prevention (CDC) of the United States receive 2 to 4 reports of severely ill infants a year. About 20 % of such infants die there, about 40 % worldwide. EU rules require that the formula samples tested hold none of these bacteria.

HOW MUCH IS TOO MUCH?

The World Health Organization (WHO) advises mixing the powder with water of at least 70 °C, cooling it and feeding at once. Pour away what is left.

Source: Centers for Disease Control and Prevention (CDC) of the United States, Cronobacter, 2025; World Health Organization (WHO), guidelines on powdered infant formula, 2007; Regulation (EC) No 2073/2005

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





MICRO-ORGANISMS

16

Fox tapeworm

The fox tapeworm lives in the gut of foxes, raccoon dogs and sometimes dogs. Its eggs reach the soil, low-growing berries and the animals' fur with their droppings. People are infected by swallowing the eggs: with contaminated food, water or soil, or in direct contact with an animal.

The disease develops slowly: the World Health Organization (WHO) speaks of 5 to 15 years without signs. By then there is a tumour-like growth in the liver. In Latvia researchers found the parasite in 17 % of foxes and 8 % of raccoon dogs in 2010–2015, and in the Baltic countries they call it a growing concern. Few people fall ill.

HOW MUCH IS TOO MUCH?

There is no limit: swallowed eggs cause the disease. Wash forest berries and greens, wash your hands after gardening and after stroking a dog, and deworm the dog regularly.

Source: Bagrade et al., Parasites & Vectors, 2016; World Health Organization (WHO), echinococcosis, 2021; Latvian Public Media (LSM), 2018

RISK ASSESSORS PUT IT HERE

MILD × RARELY

severity × exposure





MICRO-ORGANISMS

15

African swine fever

African swine fever is a viral disease of pigs and wild boar only. The European Food Safety Authority (EFSA) says this virus is harmless to humans. It appeared in the Baltic states and Poland in 2014 and has not gone.

The worry is for the pigs, not for the eater. The virus survives in raw, frozen and smoked meat, and people can carry it far: in a sausage in a travel bag, or in food scraps that a wild boar finds. So the pigs of an infected farm are culled, and moving meat out of affected areas is restricted.

HOW MUCH IS TOO MUCH?

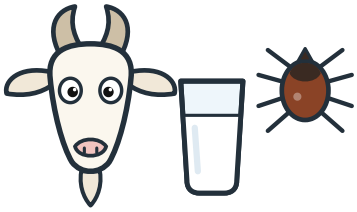
No limit is needed for human health. For the pigs' sake: do not take meat products out of affected areas, do not feed food waste to pigs and do not leave it in the forest.

Source: European Food Safety Authority (EFSA), African swine fever, 2026

MICRO-ORGANISMS 17

Tick-borne encephalitis from raw milk

tick-borne encephalitis virus



WHAT IT DOES

Fever, then inflammation of the brain and its membranes; some are left with damage to the nervous system

WHERE IT IS FOUND

Unpasteurised goat, sheep or cow milk and cheese made from it

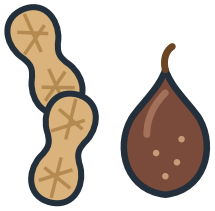
HOW OFTEN IT IS FOUND: The virus is in the milk only for a while after the tick bite; pasteurisation destroys it

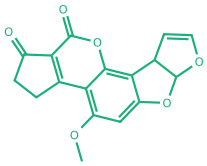
HOW OFTEN IT IS DRUNK: Few people drink raw milk, goat milk fewer still

MYCOTOXINS 18

Aflatoxins

$C_{17}H_{12}O_6$ aflatoxin B1





WHAT IT DOES

Damages DNA; causes liver cancer in humans

WHERE IT IS FOUND

Nuts (peanuts, pistachios, almonds), dried figs, maize, dried spices, milk (aflatoxin M1)

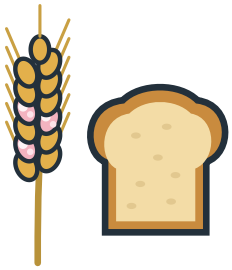
HOW OFTEN IT IS FOUND: In European Union checks most samples show no measurable amount

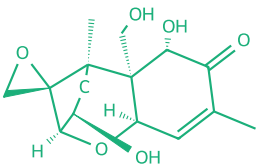
HOW OFTEN IT IS EATEN: Grain products and milk, every day; nuts and figs, now and then

MYCOTOXINS 19

Deoxynivalenol (DON)

$C_{15}H_{20}O_6$ “vomitoxin”





WHAT IT DOES

Nausea, vomiting, loss of appetite

WHERE IT IS FOUND

Bread, porridge, wheat and barley products, breakfast cereals, pasta, beer

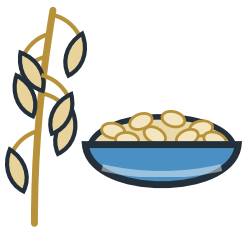
HOW OFTEN IT IS FOUND: One of the most commonly found mycotoxins in European grain

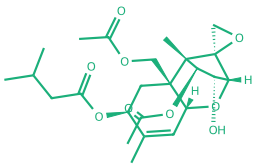
HOW OFTEN IT IS EATEN: Bread and porridge, every day

MYCOTOXINS 20

T-2 and HT-2 toxins

$C_{24}H_{34}O_9$ T-2 toxin





WHAT IT DOES

Weakens the immune system; irritates the gut

WHERE IT IS FOUND

Oats and oat flakes (also muesli), barley, rye, oat drinks

HOW OFTEN IT IS FOUND: Mostly in oats, and found more often in a cool, damp climate

HOW OFTEN IT IS EATEN: Oat flakes, every morning for many

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





MYCOTOXINS

18

Aflatoxins

One of the most potent natural carcinogens in food; no safe level is set. Yet exposure in Europe is kept in check: aflatoxins are among the most frequent reasons for rapid alerts in the European Union, and most contaminated shipments are stopped at the border. High hazard, controlled exposure.

HOW MUCH IS TOO MUCH?

Aflatoxins damage DNA, so no safe dose is set. The limit is as low as is technically achievable.

Source: European Food Safety Authority (EFSA), 2018, 2020; Ruokavirasto 1/2021; Rapid Alert System for Food and Feed (RASFF)

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





MICRO-ORGANISMS

17

Tick-borne encephalitis from raw milk

Tick-borne encephalitis is usually linked to a tick bite. The European Centre for Disease Prevention and Control (ECDC) names a second route: unpasteurised dairy products. The goat, sheep or cow does not fall ill itself, but after a tick bite the virus is in its milk for a while.

About 1 % of patients are infected through food, in Slovakia up to 17 %. Then several people usually fall ill at once: a family, or everyone who ate the same cheese. Latvia recorded 186 cases of tick-borne encephalitis in 2025. Pasteurisation destroys the virus.

HOW MUCH IS TOO MUCH?

There is no limit. Pasteurise or boil milk from goats, sheep and cows that graze where ticks live. The vaccine protects whichever way the virus arrives.

Source: European Centre for Disease Prevention and Control (ECDC), 2024; Buczek et al., International Journal of Environmental Research and Public Health, 2022; Centre for Disease Prevention and Control of Latvia (SPKC), 2026

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure





MYCOTOXINS

20

T-2 and HT-2 toxins

Scored joint-highest of all chemicals for monitoring priority by the Norwegian Scientific Committee for Food and Environment (VKM) in 2019, above lead, cadmium and mercury. Oats are the most affected cereal. Binding European Union limits only came into force in 2024.

HOW MUCH IS TOO MUCH?

The limit is based on immune effects; exceeding it means a smaller margin, not illness.

Source: Norwegian Scientific Committee for Food and Environment (VKM), 2019:13; Regulation (EU) 2024/1038

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure





MYCOTOXINS

19

Deoxynivalenol (DON)

A mycotoxin whose intake in Europe actually exceeds the tolerable level (in infants, toddlers and children). Not exotic food: ordinary bread and porridge. Effects are usually mild and reversible.

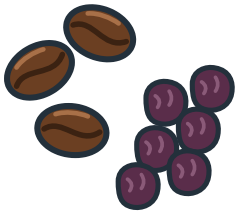
HOW MUCH IS TOO MUCH?

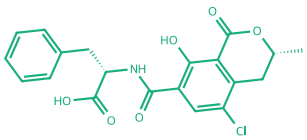
There are two limits: a daily one protecting children's growth, and a single-occasion one eight times higher protecting against vomiting.

Source: Regulation (EU) 2024/1022, recitals; European Environment Agency (EEA), 2025

Ochratoxin A

$C_{20}H_{18}ClNO_6$ ochratoxin A





↑ WHAT IT DOES

Damages the kidneys; considered possibly carcinogenic

→ WHERE IT IS FOUND

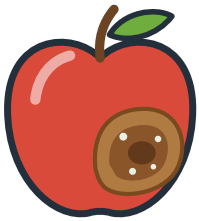
Cereals, coffee (roasted and instant), raisins, wine, dried spices (paprika, chilli), cured meat, cheese

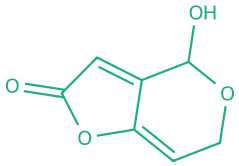
HOW OFTEN IT IS FOUND: In many everyday products, but usually in small amounts

HOW OFTEN IT IS EATEN: Coffee and cereals, every day

Patulin

$C_7H_6O_4$ patulin





↑ WHAT IT DOES

Irritates the gut at high doses

→ WHERE IT IS FOUND

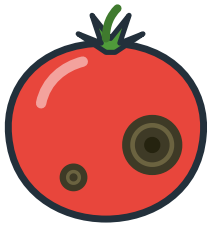
Apple juice, apple purée, cider, rotten apples and pears

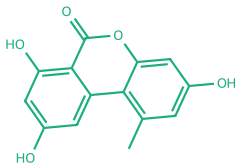
HOW OFTEN IT IS FOUND: Forms only in rotten fruit, which is sorted out before pressing

HOW OFTEN IT IS EATEN: Apple juice often, rotten apples rarely

Alternaria toxins

$C_{14}H_{10}O_5$ alternariol (AOH)





↑ WHAT IT DOES

Damages DNA; may cause cancer

→ WHERE IT IS FOUND

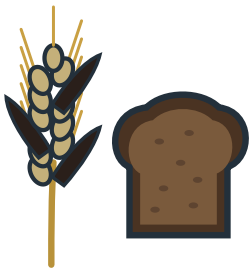
Tomatoes and tomato products, sunflower seeds, cereals, fruit juices

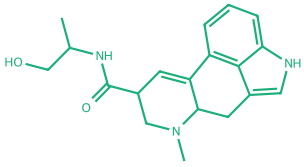
HOW OFTEN IT IS FOUND: A very common mould; its toxins turn up in many plant products

HOW OFTEN IT IS EATEN: Tomatoes and juice, almost daily

Ergot alkaloids

$C_{19}H_{23}N_3O_2$ ergometrine, one of the ergot alkaloids





↑ WHAT IT DOES

Narrows blood vessels; the severe poisonings of the Middle Ages no longer happen in Europe

→ WHERE IT IS FOUND

Rye bread, dark rye bread, rye flour, rye flakes

HOW OFTEN IT IS FOUND: More common in cereals in recent years; still found in Latvian rye fields

HOW OFTEN IT IS EATEN: Many people eat dark rye bread every day

RISK ASSESSORS PUT IT HERE

MILD × RARELY

severity × exposure





MYCOTOXINS

Patulin

22

Forms when apples go mouldy, which is why juice is pressed from sound fruit. The European Union limit for infant apple products is five times stricter than for ordinary juice.

HOW MUCH IS TOO MUCH?

The daily limit comes from a long-term rat study; the legal limit for juice is 50 µg/kg, for baby food 10 µg/kg.

Source: Regulation (EU) 2023/915; Ruokavirasto 1/2021

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure





MYCOTOXINS

Ochratoxin A

21

Affects the kidneys. The European Food Safety Authority (EFSA) set a tolerable weekly intake in 2006 and then WITHDREW it in 2020, concluding a safe level could not be justified. The old number still circulates.

HOW MUCH IS TOO MUCH?

No safe dose is set any more: what is measured is the gap to the dose that harmed animals' kidneys. Harm comes from years of intake, not one loaf.

Source: European Food Safety Authority (EFSA), 2020 opinion on ochratoxin A

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure





MYCOTOXINS

Ergot alkaloids

24

In medieval Western Europe, ergot poisoning was called “St Anthony's fire”. “Fire” because hands and feet burned with pain. Some people also hallucinated and had seizures. “St Anthony's” because monks of the Order of St Anthony cared for the sick. They also fed them bread from clean grain.

Rye bread is still a daily food in Latvia, and ergot still turns up in Latvian rye fields. The European Union planned to halve the limit for rye flour to 250 µg/kg in July 2024, but put it off until July 2028.

HOW MUCH IS TOO MUCH?

Rye flour: at most 500 µg/kg (250 µg/kg from July 2028); baby food: 20 µg/kg.

Source: European Food Safety Authority (EFSA), 2012, 2017; Regulation (EU) 2023/915 as amended by Regulation (EU) 2024/1808; Latvia University of Agriculture (LLU), 2008

RISK ASSESSORS PUT IT HERE

SERIOUS × OFTEN

severity × exposure





MYCOTOXINS

Alternaria toxins

23

Placed in the HIGHEST risk group by Finland's 2021 assessment, alongside aflatoxins, inorganic arsenic and acrylamide. Almost nobody has heard of them, and the European Union has no maximum levels for them, only indicative levels for monitoring since 2022.

HOW MUCH IS TOO MUCH?

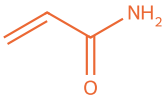
There is no maximum level. Since 2022 there have been indicative levels for monitoring, for example 500 µg/kg of tenuazonic acid in processed tomato products; they are not binding.

Source: Ruokavirasto 1/2021, Finland; European Food Safety Authority (EFSA), update of the risk assessment of Alternaria toxins, 2026; Commission Recommendation (EU) 2022/553 on monitoring Alternaria toxins in food

Acrylamide

C_3H_5NO acrylamide





↑ WHAT IT DOES

Damages DNA; considered probably carcinogenic

→ WHERE IT IS FOUND

Fries, crisps, toast, roasted coffee, biscuits and gingerbread, breakfast cereals

HOW OFTEN IT IS FOUND: Forms whenever starchy food is fried or roasted above 120 °C

HOW OFTEN IT IS EATEN: Fried and roasted food, every day

Furan

C_4H_4O furan





↑ WHAT IT DOES

Damages the liver; considered possibly carcinogenic

→ WHERE IT IS FOUND

Coffee (roasted and instant), jarred baby food, canned food, soups, grain-based foods

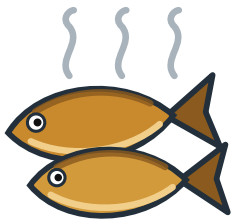
HOW OFTEN IT IS FOUND: In many heat-treated foods; most of it in coffee and canned food

HOW OFTEN IT IS DRUNK: Coffee, every day

Benzo(a)pyrene and PAHs

$C_{20}H_{12}$

benzo(a)pyrene and polycyclic aromatic hydrocarbons (PAHs)





↑ WHAT IT DOES

Damages DNA; can cause cancer

→ WHERE IT IS FOUND

Smoked fish (sprats, herring, salmon), smoked meat, grilled and chargrilled food, also cereal products, vegetable oils and seafood

HOW OFTEN IT IS FOUND: In one study, some samples of Latvian smoked meat were over the limit

HOW OFTEN IT IS EATEN: Smoked and grilled, a few times a month

Glycidyl esters

$C_3H_6O_2$ glycidol





↑ WHAT IT DOES

In the body it turns into glycidol, which damages DNA; probably carcinogenic

→ WHERE IT IS FOUND

Refined vegetable oils, palm oil, margarine, infant formula, confectionery

HOW OFTEN IT IS FOUND: Forms whenever oil is refined at high temperature

HOW OFTEN IT IS EATEN: Processed food, every day

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure



PROCESS CONTAMINANTS

26

Furan

Near the top in both the Finnish and Norwegian assessments, and essentially unknown to the public. It is volatile: part of it leaves during brewing, and how much depends on the method. What is in the product and what reaches the body are not the same thing.

HOW MUCH IS TOO MUCH?

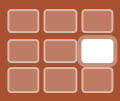
No safe dose is set; what is measured is the gap to the dose that damaged animals' livers, and it is small. For baby food the European Union set maximum levels in 2026: 30 to 80 µg/kg of furan and methylfurans together. They apply from 1 January 2028.

Source: European Food Safety Authority (EFSA), 2017; Ruokavirasto 1/2021; Norwegian Scientific Committee for Food and Environment (VKM), 2019:13; Regulation (EU) 2026/1890

RISK ASSESSORS PUT IT HERE

SERIOUS × OFTEN

severity × exposure



PROCESS CONTAMINANTS

25

Acrylamide

Forms when starchy food is fried or roasted above 120 °C: not added, created by cooking. In one Canadian study, 10 of 29 members of the public ranked it top of six food risks; none of the 21 experts did.

HOW MUCH IS TOO MUCH?

There is no limit at all. What is measured is the gap to the dose that caused tumours in animals: currently 50 to 425 times, not the ten thousand times that would mean low concern.

Source: European Food Safety Authority (EFSA), 2015; Ruokavirasto 1/2021; Webster and colleagues, 2010

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure



PROCESS CONTAMINANTS

28

Glycidyl esters

Formed during high-temperature refining of vegetable oils. The infant-formula limit is roughly 20–170× stricter than for ordinary oil: same hazard, different limits, because who is exposed and how much differs.

HOW MUCH IS TOO MUCH?

The strictest limit is for infant formula, because it can be an infant's only food.

Source: Regulation (EU) 2023/915; Norwegian Scientific Committee for Food and Environment (VKM), 2019:13

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure



PROCESS CONTAMINANTS

27

Benzo(a)pyrene and PAHs

A Latvian study of smoked meat found some samples over the legal limit, yet calculated exposure stayed far from the level of concern. The European Union sets a special higher limit for smoked sprats and small Baltic herring. Over the limit is not the same as harmful.

HOW MUCH IS TOO MUCH?

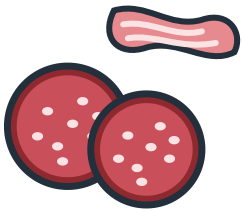
Smoked fish does have a limit. Over the limit means the process went wrong, not that the food is poisonous.

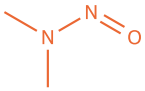
Source: Food Control, 2015 (Latvia); Regulation (EU) 2023/915; Ruokavirasto 1/2021

PROCESS CONTAMINANTS 29

Nitrosamines

$C_2H_6N_2O$ N-nitrosodimethylamine (NDMA)





WHAT IT DOES

Damages DNA; causes liver tumours in animals

WHERE IT IS FOUND

Sausages, ham, bacon, smoked fish, beer, pickled vegetables

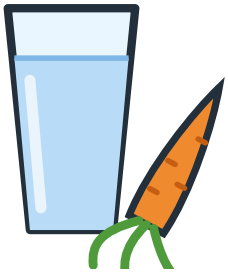
HOW OFTEN IT IS FOUND: Forms whenever nitrite reacts with proteins, especially when heated

HOW OFTEN IT IS EATEN: Almost every day

METALS 30

Lead

plumbum





WHAT IT DOES

Even at low doses it slightly affects children's brain development

WHERE IT IS FOUND

Cereals, vegetables, beverages, game meat, supplements, drinking water

HOW OFTEN IT IS FOUND: In small amounts in almost all food and water

HOW OFTEN IT IS EATEN: Everyday food and water, always

METALS 31

Cadmium

cadmium





WHAT IT DOES

Builds up in the kidneys over decades; at high doses weakens the bones

WHERE IT IS FOUND

Cereals, vegetables (potatoes, root vegetables), mushrooms, cocoa and chocolate, molluscs, tobacco

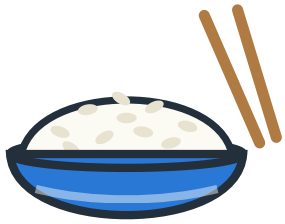
HOW OFTEN IT IS FOUND: In almost all everyday plant food

HOW OFTEN IT IS EATEN: Cereals and vegetables, every day

METALS 32

Inorganic arsenic

arsenicum





WHAT IT DOES

Damages DNA; causes skin and lung cancer in humans

WHERE IT IS FOUND

Rice and rice products (rice flakes, rice cakes, rice drink), other grain products, drinking water, fruit juice

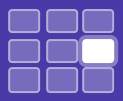
HOW OFTEN IT IS FOUND: In rice almost always; in other grains less often and far less

HOW OFTEN IT IS EATEN: Rice, a few times a week

RISK ASSESSORS PUT IT HERE

SERIOUS × OFTEN

severity × exposure



82 Pb

METALS

Lead

30

No safe level is set; it affects neurodevelopment in children. It ranks first among five toxic elements in our own Latvian data, yet two in three of 122,572 measurements found too little lead to detect.

HOW MUCH IS TOO MUCH?

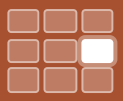
No tolerable intake: there is no safe level for children's development. The goal is not “under the limit” but “as low as possible”.

Source: Institute of Food Safety, Animal Health and Environment “BIOR” / Data-to-Decisions, Latvia × adults; European Food Safety Authority (EFSA)

RISK ASSESSORS PUT IT HERE

SERIOUS × OFTEN

severity × exposure



PROCESS CONTAMINANTS

Nitrosamines

29

Nitrosamines form when nitrite, the preservative that keeps cured meat pink and prevents botulism, reacts with proteins, especially when heated. The European Food Safety Authority (EFSA) concluded in 2023 that exposure raises a health concern for all age groups; since 9 October 2025 the European Union has allowed at most 80 mg/kg of added nitrite in most meat products.

HOW MUCH IS TOO MUCH?

Added nitrite in meat products: at most 80 mg/kg (since October 2025).

Source: European Food Safety Authority (EFSA), 2023 (N-nitrosamines in food); Regulation (EU) 2023/2108

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × SOMETIMES

severity × exposure



33 As

METALS

Inorganic arsenic

32

The top foodborne chemical globally in the 2026 burden estimate of the World Health Organization (WHO). European exposure is far lower than in South Asia, where it gets into drinking water from the ground. Same substance, very different risk, because exposure differs.

HOW MUCH IS TOO MUCH?

No tolerable intake; what is measured is the gap to the dose at which skin lesions and cancer were seen in people.

Source: World Health Organization (WHO), 2026, foodborne disease burden; Ruokavirasto 1/2021; European Food Safety Authority (EFSA), 2021 and 2024

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure



48 Cd

METALS

Cadmium

31

Accumulates in the kidneys over decades; everyone is exposed. Average Latvian intake sits slightly ABOVE the safe level, which does not mean harm. The safe level is set by early changes in the kidneys, not by damage; still, intake should come down. That is why we monitor it.

HOW MUCH IS TOO MUCH?

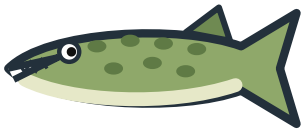
The limit is weekly, not daily: cadmium stays in the kidneys for decades.

Source: Institute of Food Safety, Animal Health and Environment “BIOR” / Data-to-Decisions; European Food Safety Authority (EFSA), tolerable weekly intake (TWI)

METALS 33

Methylmercury

CH_3Hg^+ · hydrargyrum



80
Hg
200,6

WHAT IT DOES

Affects development of the nervous system

WHERE IT IS FOUND

Large predatory fish (tuna, pike, large perch), other fish (less)

HOW OFTEN IT IS FOUND: In 80 % of fish samples, but usually at low levels

HOW OFTEN IT IS EATEN: Predatory fish, a few times a year

METALS 34

Lead shot in game

plumbum



82
Pb
207,2

WHAT IT DOES

Lead harms a child's brain development; in adults it raises blood pressure and damages the kidneys

WHERE IT IS FOUND

Game killed with lead shot or bullets: ducks, pheasants, hares, and also venison and wild boar

HOW OFTEN IT IS FOUND: Shot and bullets leave tiny fragments of lead in the meat

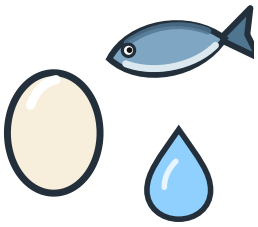
HOW OFTEN IT IS EATEN: Often in hunters' families, rarely or never for everyone else

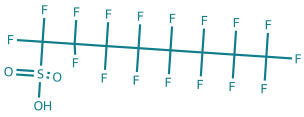
PERSISTENT POLLUTANTS 35

PFAS ("forever chemicals")

$C_8HF_{17}O_3S$

perfluorooctane sulfonic acid (PFOS), a per- and polyfluoroalkyl substance (PFAS)





WHAT IT DOES

Weakens the immune response to vaccination

WHERE IT IS FOUND

Fish, eggs, drinking water, offal, food packaging

HOW OFTEN IT IS FOUND: In food, water and almost everyone's blood

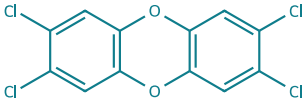
HOW OFTEN IT IS EATEN: Fish, eggs, water, every day

PERSISTENT POLLUTANTS 36

Dioxins and dl-PCBs

$C_{12}H_4Cl_4O_2$ 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)





WHAT IT DOES

Dioxins and dioxin-like polychlorinated biphenyls (dl-PCBs) affect development and reproduction

WHERE IT IS FOUND

Baltic salmon and herring, milk and cheese, meat, eggs, fish oil

HOW OFTEN IT IS FOUND: At low levels in many foods; far more in fatty Baltic fish

HOW OFTEN IT IS EATEN: Milk, meat, eggs, every day

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure



82 Pb

METALS

34

Lead shot in game

When lead shot or a bullet hits an animal, it breaks into tiny fragments that scatter through the meat, also away from the wound. They cannot be seen or felt, and the body absorbs lead from them.

The Food Standards Agency (FSA) of the United Kingdom advises people who often eat such game to eat as little of it as possible, small game killed with shot above all. It matters most for small children, pregnant women and women trying for a baby: lead harms brain development, and there is no safe level. Farmed meat from the shop is not affected. For a hunter the answer is lead-free ammunition.

HOW MUCH IS TOO MUCH?

The Food Standards Agency (FSA) of the United Kingdom: people who often eat game shot with lead should eat as little of it as possible. This matters most for small children, pregnant women and women trying for a baby.

Source: Food Standards Agency (FSA) of the United Kingdom, advice to frequent eaters of game shot with lead, 2024

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure



80 Hg

METALS

33

Methylmercury

Detected in 80 % of fish samples, the highest detection rate in our dataset. Yet it does not rank high in Latvia: most fish hold little, and the large predatory fish that hold the most are eaten rarely. “Often detected” is not the same as “high exposure”.

HOW MUCH IS TOO MUCH?

The limit is weekly and protects the foetus, not the adult, hence the separate advice in pregnancy.

Source: Institute of Food Safety, Animal Health and Environment “BIOR” / Data-to-Decisions; European Food Safety Authority (EFSA), 2012 and 2015; Regulation (EU) 2023/915

RISK ASSESSORS PUT IT HERE

SERIOUS × OFTEN

severity × exposure





PERSISTENT POLLUTANTS

36

Dioxins and dl-PCBs

Average European intake exceeds the safe level. Few cards here can say that. Yet the European Union lets Latvia sell Baltic salmon above the limit domestically, because removing fish from the diet may harm people's health; buyers must be told the eating advice for vulnerable groups.

HOW MUCH IS TOO MUCH?

The limit is weekly, because dioxins take years to leave. One portion of fatty Baltic fish can exceed it, so what counts is how often such fish is eaten.

Source: European Food Safety Authority (EFSA), 2026 opinion; Regulation (EU) 2023/915, Article 7

RISK ASSESSORS PUT IT HERE

SERIOUS × OFTEN

severity × exposure





PERSISTENT POLLUTANTS

35

PFAS (“forever chemicals”)

The carbon-fluorine bond barely breaks down in nature. A large share of Europeans exceed the safe level. The safe level set by the European Food Safety Authority (EFSA) is driven by reduced antibody response to childhood vaccination. Baltic herring and sprat carry a limit 4× higher than fish in general.

HOW MUCH IS TOO MUCH?

The limit is weekly and based on children's vaccine response, the most sensitive effect known.

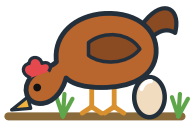
Source: European Food Safety Authority (EFSA), 2020; Regulation (EU) 2023/915

PERSISTENT POLLUTANTS 37

Eggs from backyard hens

$C_8HF_{15}O_2$

perfluorooctanoic acid (PFOA), a per- and polyfluoroalkyl substance (PFAS)





WHAT IT DOES

Per- and polyfluoroalkyl substances (PFAS) and dioxins build up in the body over years; PFAS weaken the immune system

WHERE IT IS FOUND

Eggs from hens that roam free and peck the soil: your own, a neighbour's or from a market

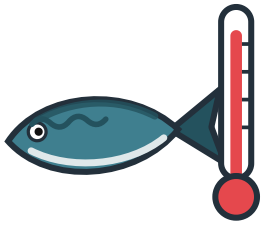
HOW OFTEN IT IS FOUND: A hen that pecks the soil passes the soil's pollutants on to the egg

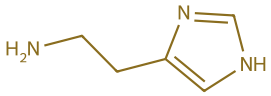
HOW OFTEN IT IS EATEN: Those who keep hens eat these eggs almost every day

OTHER 38

Histamine

$C_5H_9N_3$ histamine





WHAT IT DOES

Flushing, headache and palpitations on the same day

WHERE IT IS FOUND

Poorly stored fish (herring, sprat, tuna, mackerel), ripened cheese, fish sauce

HOW OFTEN IT IS FOUND: In fish it forms only when the fish is kept too warm

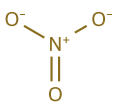
HOW OFTEN IT IS EATEN: Fish often; spoiled fish very rarely

OTHER 39

Nitrate

NO_3^- nitrate ion





WHAT IT DOES

Can form other substances in the body; harmful at high doses

WHERE IT IS FOUND

Leafy vegetables (spinach, rocket, lettuce), beetroot, drinking water, cured meat

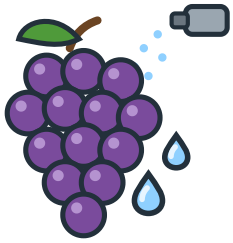
HOW OFTEN IT IS FOUND: Naturally present in vegetables; most in leafy greens

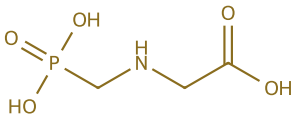
HOW OFTEN IT IS EATEN: Leafy vegetables, almost every day

OTHER 40

Pesticide residues

$C_3H_8NO_5P$ glyphosate, one of more than 400 substances





WHAT IT DOES

Each substance acts in its own way; at high doses some harm the nervous system

WHERE IT IS FOUND

Fruit (grapes, citrus), vegetables, cereals, tea

HOW OFTEN IT IS FOUND: In Latvia in 2024, 30 % of samples had quantifiable residues

HOW OFTEN IT IS EATEN: Fruit and vegetables, every day

RISK ASSESSORS PUT IT HERE

MILD × RARELY

severity × exposure





OTHER

38

Histamine

One of the few substances here that cause fast, same-day illness. A cold-chain failure, not a contamination one. European Union law also sets how much histamine is allowed in herring and sprat. Cooking does not destroy it.

HOW MUCH IS TOO MUCH?

The limit is the dose at which no effect appeared in healthy people. Histamine is heat-stable: once it has formed, cooking will not remove it.

Source: Regulation (EC) No 2073/2005; European Food Safety Authority (EFSA), 2011

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure



PERSISTENT POLLUTANTS

37

Eggs from backyard hens

Eggs from your own hens seem cleaner than shop eggs. With pollutants it can be the other way round: a hen that pecks the soil all day also takes in what has built up in the soil. On farms hens eat tested feed.

In 2025 the Dutch National Institute for Public Health and the Environment (RIVM) measured per- and polyfluoroalkyl substances (PFAS) in eggs from 60 backyard flocks. At 31 places one egg a week or less was enough to exceed the safe level, and at only 9 could more than four be eaten safely. The institute advised against eating such eggs.

HOW MUCH IS TOO MUCH?

The tolerable weekly intake for four PFAS together is 4.4 ng per kilogram of body weight. In 2025 the Dutch authorities advised against eating home-produced eggs; shop eggs hold far less PFAS.

Source: National Institute for Public Health and the Environment of the Netherlands (RIVM), PFAS in home-produced eggs, 2025; European Food Safety Authority (EFSA), PFAS in food, 2020

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





OTHER

40

Pesticide residues

Europe's No. 1 public concern. In Latvia in 2024, 70 % of 443 samples had no quantifiable residue at all. A maximum residue level (MRL) is a standard for correct pesticide use, not a health threshold.

HOW MUCH IS TOO MUCH?

The legal maximum residue level is not a health limit: it shows whether the pesticide was used correctly.

Source: European Food Safety Authority (EFSA), pesticide residues report 2024; Eurobarometer, 2025

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure





OTHER

39

Nitrate

Nitrate from food additives is under 5 % of total dietary intake; over 95 % comes from other sources, mainly vegetables. People worry about the E number on the ham; the intake comes from the salad, and those vegetables are good for you.

HOW MUCH IS TOO MUCH?

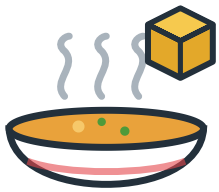
This limit is exceeded routinely: about 50 g of rocket reaches an adult's daily figure. The European Food Safety Authority (EFSA) still concludes the benefit of vegetables prevails: what matters is what the nitrate comes with.

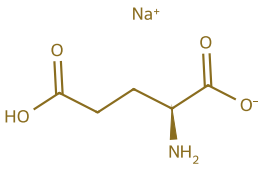
Source: European Food Safety Authority (EFSA), 2008 and 2017 opinions on nitrate

FOOD ADDITIVE 41

Glutamate (E621)

$C_5H_8NNaO_4$ monosodium glutamate (E621)





WHAT IT DOES

In large doses it can cause headaches and raise blood pressure

WHERE IT IS FOUND

Soups and broths, sauces, seasonings, meat products, cakes and pastries

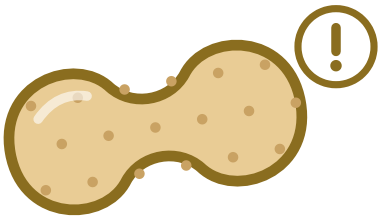
HOW OFTEN IT IS FOUND: In many savoury ready meals; naturally also in cheese and tomatoes

HOW OFTEN IT IS EATEN: Many people, every day

OTHER 42

Peanut allergy

A reaction, not a substance



WHAT IT DOES

In an allergic person, a severe reaction within minutes; can be fatal

WHERE IT IS FOUND

Peanuts, undeclared ingredients, cross-contamination in production

HOW OFTEN IT IS FOUND: Traces can be in products whose ingredients do not list peanuts

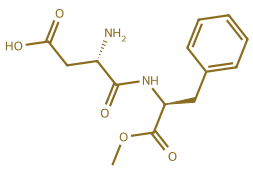
HOW OFTEN IT IS EATEN: Concerns only a few people

FOOD ADDITIVE 43

Aspartame

$C_{14}H_{18}N_2O_5$ aspartame (E951)





WHAT IT DOES

Harmless at usual intakes; the acceptable daily intake is very high

WHERE IT IS FOUND

Sugar-free drinks, chewing gum, tabletop sweeteners, yoghurt, medicines

HOW OFTEN IT IS FOUND: Only where it is added, not in all processed food

HOW OFTEN IT IS EATEN: Some people, every day

OTHER 44

Microplastics

$(C_2H_4)_n$ polyethylene, one of many polymers





WHAT IT DOES

The health effect is not yet established

WHERE IT IS FOUND

Mussels and fish, drinking water, salt, beer, packaging, air

HOW OFTEN IT IS FOUND: In many products, but measuring methods are not yet harmonised

HOW OFTEN IT IS EATEN: Water and salt, every day

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





OTHER

Peanut allergy

42

Ranked THIRD of 14 food hazards by disease burden in a 2023 Danish study, above Salmonella, Listeria and cadmium. For most people there is no exposure at all; for an allergic person a mislabelled pack is a same-day risk. Risk is not the same for everyone.

HOW MUCH IS TOO MUCH?

No limit; for an allergic person traces matter, not amounts.

Source: Pires and colleagues, Technical University of Denmark (DTU), Food Control, 2023

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure





FOOD ADDITIVE

Glutamate (E621)

41

In 2025 additives were the most frequently named concern in Latvia, at 43 %, higher than the European Union average for any concern. Glutamate is one of them: a flavour enhancer in soups, sauces and seasonings. Chemically it is the same as the glutamate in parmesan and tomatoes. In 2017 the European Food Safety Authority (EFSA) set an acceptable daily intake for glutamates. It found that people of any age who eat a lot of foods with these additives, and children with an average diet, may exceed it. An “E” number means a substance has been assessed and approved, not that the amount does not matter.

HOW MUCH IS TOO MUCH?

The acceptable daily intake is 30 mg per kilogram of body weight, about 2 g for a 70 kg person. Larger doses have been linked to headaches and rises in blood pressure and insulin.

Source: Special Eurobarometer 103.3 (2025), Latvia; European Food Safety Authority (EFSA), 2017 (glutamates, E 620–625); Food Standards Australia New Zealand (FSANZ), 2025

RISK ASSESSORS PUT IT HERE

NOT ENOUGH DATA

How well do we know it

?

OTHER

Microplastics

44

A third of Europeans name them a top concern (above bacteria). Yet no authority can quantify either the exposure or the severity: the methods and the toxicology are not there. “We don't know” is not “it's safe”, and not “it's dangerous” either.

HOW MUCH IS TOO MUCH?

No limit, because measurement methods are not yet harmonised.

Source: Eurobarometer, 2025; European Food Safety Authority (EFSA), statements

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





FOOD ADDITIVE

Aspartame

43

In July 2023 one of two bodies linked to the World Health Organization (WHO) classified it as “possibly carcinogenic”: a HAZARD statement. The other left the acceptable daily intake (ADI) unchanged: a RISK statement. They answered different questions. Exceeding the ADI means over nine cans a day, every day.

HOW MUCH IS TOO MUCH?

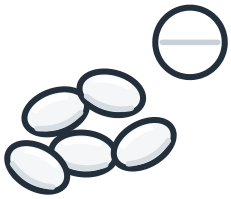
A 70 kg adult would need more than nine cans a day, every day. Even then: aspartame is broken down in the gut into three substances we already eat. A slice of cheese delivers more phenylalanine than a can.

Source: International Agency for Research on Cancer (IARC) and Joint Expert Committee on Food Additives (JECFA), joint statement, July 2023

FOOD ADDITIVE 45

Titanium dioxide (E171)

TiO_2 titanium dioxide (E171)





WHAT IT DOES

Whether it damages DNA can be neither proven nor ruled out

WHERE IT IS FOUND

Formerly confectionery, chewing gum, icings; still medicines and cosmetics

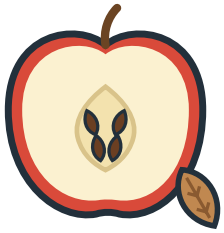
HOW OFTEN IT IS FOUND: Once widely used; banned in food in the European Union since 2022

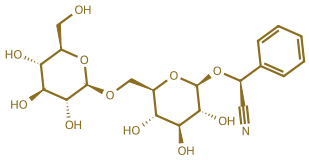
HOW OFTEN IT IS EATEN: No longer in food; in medicines, sometimes

OTHER 46

Cyanogenic glycosides

$C_{20}H_{27}NO_{11}$ amygdalin, releases hydrogen cyanide





WHAT IT DOES

Releases hydrogen cyanide; poisonous at high doses

WHERE IT IS FOUND

Apple seeds, bitter almonds, apricot kernels, linseed, cassava, bamboo shoots

HOW OFTEN IT IS FOUND: Only in a few food plants, mainly in seeds and kernels

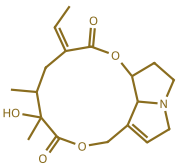
HOW OFTEN IT IS EATEN: Very rarely, and only a little

OTHER 47

Pyrrolizidine alkaloids

$C_{18}H_{25}NO_5$ senecionine, one of the pyrrolizidine alkaloids





WHAT IT DOES

Severely damages the liver; damages DNA

WHERE IT IS FOUND

Herbal teas, tea, honey, herbs, herbal supplements

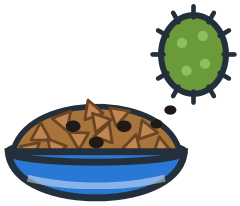
HOW OFTEN IT IS FOUND: The BIOR institute found them in 7 of 15 Latvian herbal teas (2020)

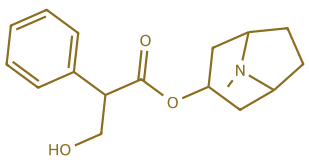
HOW OFTEN IT IS DRUNK: Herbal-tea lovers, every day

OTHER 48

Tropane alkaloids

$C_{17}H_{23}NO_3$ atropine





WHAT IT DOES

Dry mouth, racing heart, confusion, hallucinations

WHERE IT IS FOUND

Buckwheat, buckwheat flour, millet, sorghum, maize, herbal teas

HOW OFTEN IT IS FOUND: Only when thorn-apple grows in the field and its seeds get into the harvest

HOW OFTEN IT IS EATEN: Buckwheat often, contaminated batches rarely

RISK ASSESSORS PUT IT HERE

MILD × RARELY

severity × exposure





OTHER

Cyanogenic glycosides

46

Apple seeds contain a compound that releases cyanide. A real hazard, yet nobody has ever worried about an apple, because you would have to chew hundreds of seeds at once. A hazard by itself does not mean a high risk. The amount matters too.

HOW MUCH IS TOO MUCH?

This limit is per occasion, not per day: more than three small bitter apricot kernels already exceed it for an adult.

Source: European Food Safety Authority (EFSA), 2019 opinion on cyanogenic glycosides

RISK ASSESSORS PUT IT HERE

NOT ENOUGH DATA

How well do we know it

?

FOOD ADDITIVE

Titanium dioxide (E171)

45

The European Union banned it in food in 2022. Not because harm was proven, but because DNA damage could not be ruled out, so no safe intake could be set. The ban follows from not knowing. Still permitted in medicines and cosmetics; in medicines, to avoid shortages.

HOW MUCH IS TOO MUCH?

There is no limit: if DNA damage cannot be ruled out, no safe dose can be set, so the European Union banned E171 in food.

Source: European Food Safety Authority (EFSA), 2021; Regulation (EU) 2022/63

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure





OTHER

Tropane alkaloids

48

Thorn-apple is a weed whose seeds contain atropine and scopolamine, the drugs doctors use to dilate pupils. When it grows in a buckwheat field, its seeds end up in the harvest. In Slovenia in 2003, 73 people fell ill after eating buckwheat products; since 2022 the European Union has had a limit for buckwheat.

HOW MUCH IS TOO MUCH?

Buckwheat: at most 10 µg/kg in the European Union (atropine and scopolamine together).

Source: European Food Safety Authority (EFSA), 2013, 2018; Regulation (EU) 2023/915; Austrian Agency for Health and Food Safety (AGES)

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × SOMETIMES

severity × exposure





OTHER

Pyrrolizidine alkaloids

47

Plants make pyrrolizidine alkaloids to fend off insects; they get into herbal tea when weeds such as ragwort are harvested with the crop. In 2020 the Institute of Food Safety, Animal Health and Environment “BIOR” found them in almost half of the Latvian herbal teas tested, one yarrow tea close to the European Union limit. One cup means nothing; the concern is for people who drink a lot of the same tea every day for years.

HOW MUCH IS TOO MUCH?

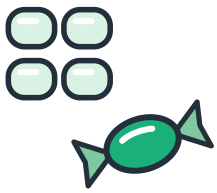
Herbal teas: usually at most 200 µg/kg in the European Union, 400 µg/kg for chamomile and peppermint; honey has no limit.

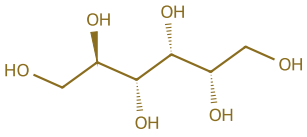
Source: European Food Safety Authority (EFSA), 2017; Institute of Food Safety, Animal Health and Environment “BIOR”, 2020; Regulation (EU) 2023/915

FOOD ADDITIVE 49

Polyols (sugar alcohols)

$C_6H_{14}O_6$ sorbitol (E420), one of the polyols





WHAT IT DOES

In large amounts they cause diarrhoea

WHERE IT IS FOUND

Sugar-free chewing gum, sugar-free sweets and chocolate, sweeteners

HOW OFTEN IT IS FOUND: Mostly in sugar-free products

HOW OFTEN IT IS EATEN: Some people, every day

OTHER 50

Chemicals from packaging and tableware

Melamine · formaldehyde · bisphenols



WHAT IT DOES

Substances from plastics and coatings pass into food; the limits are set for a whole lifetime

WHERE IT IS FOUND

Hot food in plastic containers, cans, bamboo and melamine cups, nylon spoons

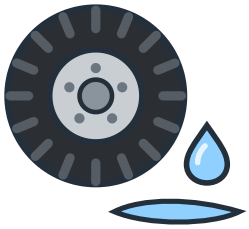
HOW OFTEN IT IS FOUND: Always a little: food touches packaging and tableware every day

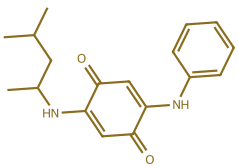
HOW OFTEN IT IS EATEN: Every day: nearly all food has been packed

OTHER 51

6PPD-quinone

$C_{18}H_{22}N_2O_2$ 6PPD-quinone





WHAT IT DOES

A tyre-wear chemical that kills salmon; the effect on people is unknown

WHERE IT IS FOUND

Leafy vegetables and fish have been studied; it is also found in road runoff and house dust

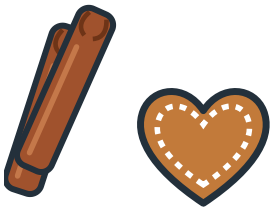
HOW OFTEN IT IS FOUND: Little studied in food; found in some fish and shellfish in the USA

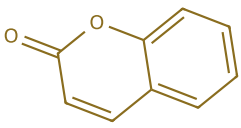
HOW OFTEN IT IS EATEN: How much comes with food is unknown

OTHER 52

Cinnamon and coumarin

$C_9H_6O_2$ coumarin





WHAT IT DOES

In large doses it briefly affects the liver of sensitive people; it passes when they stop

WHERE IT IS FOUND

Gingerbread, cinnamon buns, porridge or rice with cinnamon, apple cake, ground cinnamon

HOW OFTEN IT IS FOUND: Cassia cinnamon is high in coumarin, Ceylon about 100 times lower

HOW OFTEN IT IS EATEN: More at festive times; some daily in porridge

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure





OTHER

Chemicals from packaging and tableware

50

Packaging, tableware and utensils give a little of their substances to food. This is called migration. The European Union (EU) sets migration limits, and the national food authority checks goods in shops and at the border. The checks work: in 2021 the EU acted against plastic cups and other tableware made with bamboo powder, which release melamine and formaldehyde. 21 countries found 748 cases: the goods were ordered off the market or stopped at the border. Bisphenol A was different: in 2023 the European Food Safety Authority (EFSA) found that our intake exceeds its new tolerable daily intake, so in 2024 the EU banned it in food contact materials.

HOW MUCH IS TOO MUCH?

Inspectors find goods that exceed migration limits, and the goods are withdrawn. Bisphenol A was the exception: intake was too high, so it was banned.

Source: European Commission, bamboo and melamine tableware, 2022; Food and Veterinary Service of Latvia (PVD), food contact materials; Regulation (EU) 2024/3190 on bisphenol A; EU Alert and Cooperation Network (ACN) report, 2024

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





FOOD ADDITIVE

Polyols (sugar alcohols)

49

Polyols, or sugar alcohols, are sweeteners: sorbitol, xylitol, erythritol and others. They taste sweet like sugar and go into chewing gum, sweets and other sugar-free products. The gut absorbs them only in part, so in large amounts they cause diarrhoea. A food with more than 10 % added polyols must warn that excessive consumption may have a laxative effect. In 2023 the European Food Safety Authority (EFSA) set a daily limit for erythritol based on this effect and found that people with a high intake exceed it.

HOW MUCH IS TOO MUCH?

For erythritol the daily limit is 0.5 g per kilogram of body weight: 10 g for a 20 kg child, 35 g for a 70 kg adult.

Source: Regulation (EU) No 1169/2011, Annex III; European Food Safety Authority (EFSA), 2023 (erythritol, E 968)

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





OTHER

Cinnamon and coumarin

52

Shops usually sell two kinds of cinnamon. Cassia holds about 3,000 mg of coumarin per kilogram on average; Ceylon cinnamon about 100 times less. The German Federal Institute for Risk Assessment (BfR) and the European Food Safety Authority (EFSA) set a tolerable daily intake of 0.1 mg per kilogram of body weight; an adult reaches it with about 2 g of cassia a day. Since 2011 European Union (EU) maximum levels have applied: 50 mg/kg in traditional and seasonal baked goods with cinnamon, 5 mg/kg in desserts. In Austria in 2025, 4 of 151 samples exceeded them.

HOW MUCH IS TOO MUCH?

No need to fear cinnamon. If you eat a lot of it, or every day, choose Ceylon cinnamon.

Source: German Federal Institute for Risk Assessment (BfR), questions and answers on coumarin in cinnamon; Austrian Agency for Health and Food Safety (AGES), 2025; European Food Safety Authority (EFSA); Regulation (EC) No 1334/2008, Annex III

RISK ASSESSORS PUT IT HERE

NOT ENOUGH DATA

How well do we know it

?



OTHER

6PPD-quinone

51

6PPD protects tyre rubber from cracking. In air it turns into 6PPD-quinone, which reaches rivers with tyre wear and road runoff. It is deadly to coho salmon. In people it is found in urine, blood and breast milk, but nobody knows how much comes from food rather than dust and air. A 2024 study did not find it in 28 leafy vegetable samples from Switzerland, Italy, Spain and Israel. There is no tolerable daily intake. “We don't know” is not “it's safe”, and not “it's dangerous” either.

HOW MUCH IS TOO MUCH?

There is no tolerable daily intake. Neither the source nor a harmful dose for people is known.

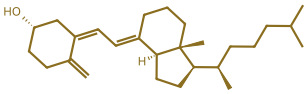
Source: Washington State Department of Health (USA), 6PPD and 6PPD-quinone; Sherman et al., 2024, Frontiers in Environmental Science

OTHER 53

Vitamin D overdose

$C_{27}H_{44}O$ cholecalciferol (vitamin D3)





WHAT IT DOES

Calcium in the blood rises: loss of appetite, nausea, vomiting and thirst; in severe cases the kidneys are damaged, sometimes for good

WHERE IT IS FOUND

High-dose drops and capsules; several products with vitamin D at once; a wrongly made product

HOW OFTEN IT IS FOUND: Usual doses are safe; overdoses come from high doses or a wrongly made product

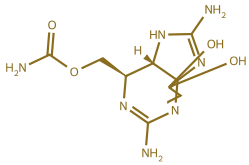
HOW OFTEN IT IS TAKEN: Many take vitamin D, far too much of it rarely

OTHER 54

Shellfish toxins

$C_{10}H_{17}N_7O_4$ saxitoxin, one of the shellfish toxins





WHAT IT DOES

It starts with tingling lips and fingers; in severe cases breathing is paralysed, and a person can die within hours

WHERE IT IS FOUND

Mussels, oysters, scallops and other shellfish from waters where toxic algae have bloomed

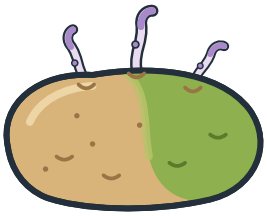
HOW OFTEN IT IS FOUND: Shellfish take the toxin up from algae; harvesting areas are tested and closed when needed

HOW OFTEN IT IS EATEN: In Latvia shellfish are eaten rarely

OTHER 55

Green and sprouted potatoes

glycoalkaloids (solanine)



WHAT IT DOES

A bitter taste and burning in the mouth; nausea, vomiting and diarrhoea that usually pass within a day

WHERE IT IS FOUND

Potatoes that turned green in the light or sprouted; the sprouts and “eyes”; the peel

HOW OFTEN IT IS FOUND: Every potato holds glycoalkaloids; a green or sprouted one holds many times more

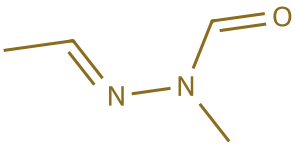
HOW OFTEN IT IS EATEN: Potatoes are eaten often; green and sprouted ones turn up now and then

OTHER 56

False morels

$C_4H_8N_2O$ gyromitrin





WHAT IT DOES

Vomiting and diarrhoea some hours after eating; in severe cases the liver fails, and that can kill

WHERE IT IS FOUND

The false morel (Gyromitra esculenta): a spring mushroom that is boiled, fried or dried

HOW OFTEN IT IS FOUND: Every false morel holds the poison; after boiling twice about 18 % remains

HOW OFTEN IT IS EATEN: Only in spring, and few people pick them

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





OTHER

54

Shellfish toxins

Shellfish filter water. When toxic algae bloom in the sea, their poisons build up in the shellfish meat. The shellfish looks, smells and tastes as usual, and cooking does not destroy the toxins.

The most dangerous is saxitoxin: it paralyses muscles, including the ones we breathe with. Other shellfish toxins cause diarrhoea or, rarely, memory loss. In Canada in 1987 mussels with domoic acid made more than 100 people ill, and at least three died. In Europe the water and the shellfish of harvesting areas are tested regularly, and harvesting stops when toxins run too high.

HOW MUCH IS TOO MUCH?

The EU limit is 800 µg of saxitoxin equivalents per kilogram of shellfish meat. Do not eat shellfish you gathered yourself from unknown waters.

Source: European Food Safety Authority (EFSA), marine biotoxins in shellfish: saxitoxin group, 2009; EFSA, summary on regulated marine biotoxins, 2009; Regulation (EC) No 853/2004; Perl et al., 1990

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





OTHER

53

Vitamin D overdose

Many people in Latvia need vitamin D in winter, and usual doses are safe. The body does not flush out extra vitamin D; it stores it. If the dose stays many times too high for long, calcium in the blood rises, and that damages the kidneys.

In Denmark in 2016 at least 20 children were poisoned by drops that held 75 times more vitamin D than they should have. In Spain in 2025 at least 15 people went to hospital after capsules with a suspected manufacturing error. In Latvia the Children's Clinical University Hospital reported children with toxic vitamin D levels in 2024.

HOW MUCH IS TOO MUCH?

The safe upper level is 100 µg (4,000 IU) a day for an adult and 50 µg for a child aged 1 to 10. It counts all products together.

Source: European Food Safety Authority (EFSA), tolerable upper intake level for vitamin D, 2023; Latvian Public Media (LSM), 2024; Danish Health Authority, 2016 (as reported by The Copenhagen Post); Food Safety News, 2025

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





OTHER

56

False morels

In Latvia people pick false morels every spring, and many eat them with no visible effect. It is still a poisonous mushroom. In the body gyromitrin turns into monomethylhydrazine, a substance also used in rocket fuel.

In 2025 the Finnish Food Authority measured it: after the recommended double boiling an average of 18 % of the poison remains; after drying, up to half. No safe dose for people has been set. In April 2026 a man came to Riga East University Hospital with liver and kidney damage after false morels he had picked and cooked himself.

HOW MUCH IS TOO MUCH?

There is no safe dose. Toxicologists at Riga East University Hospital advise not eating false morels at all; do not breathe the steam when boiling them.

Source: Finnish Food Authority (Ruokavirasto), gyromitrin in false morels, 2025; Latvian Public Media (LSM), 2026: Toxicology and Sepsis Clinic of Riga East University Hospital

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





OTHER

55

Green and sprouted potatoes

The potato makes glycoalkaloids itself, mainly solanine and chaconine: that is its defence against pests. Light, warmth and sprouting raise the amount many times over. The green colour is chlorophyll, which is harmless but shows the potato has been in the light.

The European Food Safety Authority (EFSA) concluded in 2020 that for infants and toddlers the safety margin is too small even at usual portions, for adults only at large ones. In Germany in 2015 a family fell ill after a potato dish, and the German Federal Institute for Risk Assessment (BfR) advised that potatoes should hold no more than 100 mg of glycoalkaloids per kilogram. Keep potatoes in the dark and cool.

HOW MUCH IS TOO MUCH?

Stomach and gut upset has been seen from 1 mg of glycoalkaloids per kilogram of body weight. Cut out green parts and sprouts generously; throw away a very green or bitter potato.

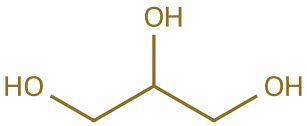
Source: European Food Safety Authority (EFSA), glycoalkaloids in potatoes, 2020; German Federal Institute for Risk Assessment (BfR), 2018

FOOD ADDITIVE 57

Slush ice drinks with glycerol

$C_3H_8O_3$ glycerol (E422)





WHAT IT DOES

In a small child blood sugar drops fast, and the child can pass out; in others a headache and nausea, or nothing

WHERE IT IS FOUND

Brightly coloured slush ice drinks from a machine: at cinemas, fairs and amusement parks

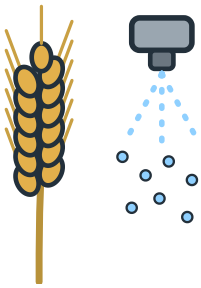
HOW OFTEN IT IS FOUND: Glycerol replaces sugar and keeps the drink from freezing solid

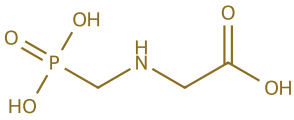
HOW OFTEN IT IS DRUNK: In summer and at fairs, mostly children; very few fall ill

OTHER 58

Glyphosate

$C_3H_8NO_5P$ glyphosate





WHAT IT DOES

At the amounts taken in with food no effect on health has been found; the cancer question is disputed

WHERE IT IS FOUND

Cereals, pulses, beer, honey: small residues in some samples

HOW OFTEN IT IS FOUND: Residues turn up in a small share of samples, usually below the legal limit

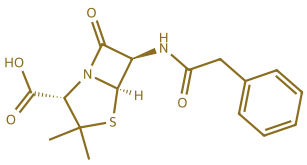
HOW OFTEN IT IS EATEN: These foods are eaten every day

OTHER 59

Antibiotic residues in meat and milk

$C_{16}H_{18}N_2O_4S$ benzylpenicillin, one of the veterinary antibiotics





WHAT IT DOES

At such small amounts no effect on health has been found

WHERE IT IS FOUND

Meat, milk, eggs, fish, honey

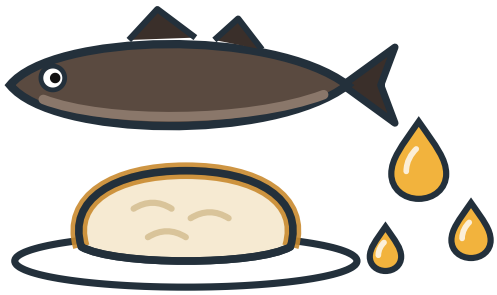
HOW OFTEN IT IS FOUND: In 2023, 0.11 % of 548,194 samples in the EU broke the limits

HOW OFTEN IT IS EATEN: These foods are eaten every day; residues above the limit are rare

OTHER 60

Butterfish (escolar)

wax esters



WHAT IT DOES

Oily, orange diarrhoea and cramps a few hours after eating, sometimes the next day

WHERE IT IS FOUND

Smoked, fried or grilled escolar and oilfish, sold in Latvia as “butterfish”

HOW OFTEN IT IS FOUND: About a fifth of this fish's flesh is wax esters

HOW OFTEN IT IS EATEN: As a delicacy, rarely

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





OTHER

58

Glyphosate

Glyphosate is the most widely used herbicide in the world. In 2015 the International Agency for Research on Cancer (IARC) classified it as probably carcinogenic to humans. IARC judges hazard: whether a substance can cause cancer at all, not how big a dose it takes.

Risk assessors look at the dose too. In 2022 the European Chemicals Agency (ECHA) did not classify glyphosate as a carcinogen. In 2023 the European Food Safety Authority (EFSA) found no critical areas of concern, though it pointed to missing data. The EU renewed the approval until 2033 but banned using glyphosate to dry off cereals before harvest.

HOW MUCH IS TOO MUCH?

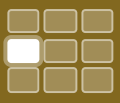
The acceptable daily intake is 0.5 mg per kilogram of body weight. People take in many times less with food.

Source: European Food Safety Authority (EFSA), peer review of glyphosate, 2023; International Agency for Research on Cancer (IARC), 2015; European Chemicals Agency (ECHA), 2022; Implementing Regulation (EU) 2023/2660

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure





FOOD ADDITIVE

57

Slush ice drinks with glycerol

Glycerol (E422) is a permitted food additive and harmless in usual amounts. Slush drinks use it in place of sugar, so that the drink does not freeze solid and stays slushy. So one cup holds a lot of glycerol.

In 2025 doctors described 21 children aged 2 to 7. Almost all fell ill within an hour of the drink: they became drowsy, and their blood sugar was low. All recovered quickly. A small child weighs little, so the same cup is a far bigger dose for the child than for an adult.

HOW MUCH IS TOO MUCH?

Since 2025 the Food Standards Agency (FSA) of the United Kingdom has advised: no slush drinks with glycerol for children under 7, and from 7 to 10 no more than one 350 ml cup a day.

Source: Food Standards Agency (FSA) of the United Kingdom, 2025; Brothwell et al., Archives of Disease in Childhood, 2025

RISK ASSESSORS PUT IT HERE

MILD × RARELY

severity × exposure





OTHER

60

Butterfish (escolar)

In Latvia the name “butterfish” usually means escolar or oilfish. They are deep-sea fish whose flesh is about one fifth wax esters. The human body does not digest them, and they pass through like oil.

So a larger portion can bring oily, orange diarrhoea, sometimes with cramps and nausea. It is not an infection and not a poison, and it passes by itself. In the EU these fish may be sold only packaged and with a warning. Grilling lets part of the oil run out, and the fish sits more easily.

HOW MUCH IS TOO MUCH?

The first time, eat a small piece. EU rules require this fish to be sold packaged, with a note on preparation and on possible stomach upset.

Source: European Food Safety Authority (EFSA), fishery products of the family Gempylidae, 2004; Regulation (EC) No 853/2004

RISK ASSESSORS PUT IT HERE

MILD × RARELY

severity × exposure





OTHER

59

Antibiotic residues in meat and milk

Sick animals are treated with antibiotics just as people are. After treatment there is a set withdrawal period: until the drug has left the body, the meat, milk and eggs may not be sold.

In 2023 EU countries tested more than half a million samples, and 0.11 % broke the limits. The bigger worry is something else: the more antibiotics are used, the more bacteria arise that they no longer work against. That is why the EU restricts antibiotic use in animals.

HOW MUCH IS TOO MUCH?

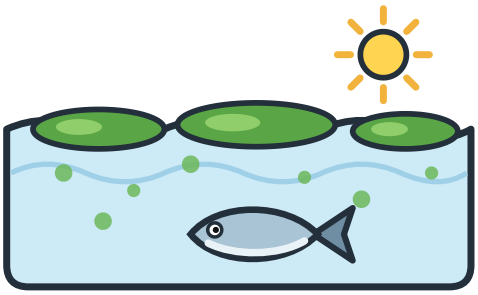
Each drug has a maximum residue limit and a withdrawal period after use. Antibiotics as growth promoters have been banned in the EU since 2006.

Source: European Food Safety Authority (EFSA), veterinary drug residues in animals and food of animal origin, 2023 data, 2025

OTHER 61

Blue-green algae toxins

microcystins and other cyanotoxins



WHAT IT DOES

How much of these toxins people take in with food, and what that dose does, has not been measured

WHERE IT IS FOUND

Fish and shellfish from waters where blue-green algae have bloomed; algae food supplements

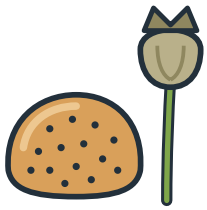
HOW OFTEN IT IS FOUND: The toxins can build up in fish and shellfish; they are rarely measured in food

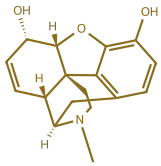
HOW OFTEN IT IS EATEN: In summer, when blue-green algae bloom in lakes and in the gulf

OTHER 62

Poppy seeds

$C_{17}H_{19}NO_3$ morphine, one of the opium alkaloids





WHAT IT DOES

A bun does nothing; after a large portion of unprocessed seeds come drowsiness and nausea, which pass in an adult

WHERE IT IS FOUND

Poppy seed buns; cakes and pastries with poppy seed filling; unwashed, unground poppy seeds

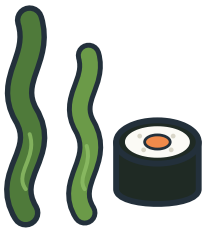
HOW OFTEN IT IS FOUND: The amount of alkaloids on the seeds varies widely: it depends on the variety and the cleaning

HOW OFTEN IT IS EATEN: Often on buns; in large amounts now and then

OTHER 63

Seaweed and iodine

iodum





WHAT IT DOES

Too much iodine upsets the thyroid gland; people with thyroid disease, pregnant women and children are the most sensitive

WHERE IT IS FOUND

Kombu and other brown seaweeds in soups and stocks; dried seaweed snacks; seaweed supplements

HOW OFTEN IT IS FOUND: The iodine in seaweed varies widely; some kinds hold a great deal

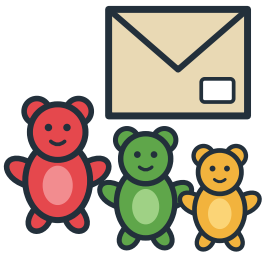
HOW OFTEN IT IS EATEN: Most people eat seaweed rarely and little; few take brown seaweed or seaweed tablets regularly

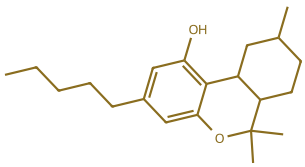
OTHER 64

Jelly sweets with HHC

$C_{21}H_{32}O_2$

hexahydrocannabinol (HHC), a semi-synthetic cannabinoid





WHAT IT DOES

Intoxication, confusion, a racing heart, vomiting and memory loss; children end up in hospital

WHERE IT IS FOUND

Jelly sweets, cookies and other sweets with HHC or similar cannabinoids

HOW OFTEN IT IS FOUND: Not in shops; sold illegally, mostly online

HOW OFTEN IT IS EATEN: Most people never eat them

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure



OTHER

62

Poppy seeds

Poppy seeds themselves hold no opium alkaloids. Morphine and codeine are in the plant's latex, which gets onto the seeds at harvest. How much depends on the variety and on how the seeds were cleaned.

In 2018 the European Food Safety Authority (EFSA) confirmed the acute reference dose: 10 µg of morphine equivalents per kilogram of body weight. People who eat a lot of seeds, or food with unprocessed seeds, can exceed it. Washing, heating and grinding cut the alkaloids by 25–100 %. Do not give babies a poppy seed brew to help them sleep: it has ended in severe poisoning.

HOW MUCH IS TOO MUCH?

The acute reference dose is 10 µg of morphine equivalents per kilogram of body weight. Since 2022 the EU has allowed up to 20 mg/kg in poppy seeds and up to 1.5 mg/kg in bakery products.

Source: European Food Safety Authority (EFSA), opium alkaloids in poppy seeds, 2018; Regulation (EU) 2023/915

RISK ASSESSORS PUT IT HERE

NOT ENOUGH DATA

How well do we know it

?

OTHER

61

Blue-green algae toxins

Blue-green algae, or cyanobacteria, multiply in summer in warm lakes and in the Gulf of Riga. Some release toxins. Warnings about swimming come every year: the water irritates skin and eyes, and livestock that drink it can die.

Less is known about food. The toxins can build up in fish, shellfish and algae supplements. A review commissioned by the European Food Safety Authority (EFSA) concluded in 2016 that data on how much of these toxins people take in with food are very limited, and that no definite conclusion on the risk can be drawn.

HOW MUCH IS TOO MUCH?

For drinking water the World Health Organization (WHO) has a provisional guideline of 1 µg of microcystins per litre. The EU has no limit for food. Latvia's Health Inspectorate advises against eating fish from waters with a mass growth of algae.

Source: European Food Safety Authority (EFSA), review of cyanobacteria toxins in food, 2016; Latvian Public Media (LSM), 2018; World Health Organization (WHO), 2020

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure



OTHER

64

Jelly sweets with HHC

Hexahydrocannabinol (HHC) is a semi-synthetic cannabinoid: it is made in a laboratory from substances in hemp and acts much like tetrahydrocannabinol (THC), the drug in cannabis. Around 2022 it began to be sold in Europe in jelly sweets as a “legal” substitute.

In Latvia HHC has been banned since late 2022. The trade runs online and by post: since 2025 the Tax and Customs Police have seized 599 parcels with new psychoactive substances, often hidden in sweets, and the youngest buyer was 13. In Czechia in 2024 five schoolchildren went to hospital after jelly sweets with HHC.

HOW MUCH IS TOO MUCH?

There is no safe dose, and the buyer does not know how much a sweet holds. In Latvia HHC may not be traded: it is not food but a controlled substance.

Source: State Agency of Medicines of Latvia (ZVA), 2022; Tax and Customs Police of Latvia (NMP), 2026; Radio Prague International, 2024

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure



OTHER

63

Seaweed and iodine

The thyroid gland needs iodine, and in Europe people more often get too little than too much. Seaweeds collect iodine from seawater, and some hold a great deal: brown seaweeds such as kombu the most.

In 2023 the European Food Safety Authority (EFSA) estimated that eaters of kombu and nori take in on average more than 20 µg of iodine per kilogram of body weight a day from seaweed alone. For a person of 70 kg that is 1,400 µg; the tolerable upper level is 600 µg. The French food safety agency ANSES warns that regular excess iodine upsets the thyroid.

HOW MUCH IS TOO MUCH?

The tolerable upper level of iodine for an adult is 600 µg a day. The French food safety agency ANSES advises people with thyroid, heart or kidney disease not to eat seaweed; pregnant and breastfeeding women should ask a doctor first.

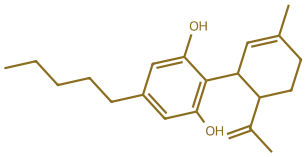
Source: European Food Safety Authority (EFSA), heavy metals and iodine in seaweeds, 2023; French food safety agency ANSES, 2018

OTHER 65

Cannabidiol (CBD) oil

$C_{21}H_{30}O_2$ cannabidiol (CBD)





WHAT IT DOES

How long-term use affects the liver, hormones, the nervous system and fertility has not yet been established

WHERE IT IS FOUND

CBD oil drops, capsules, jelly sweets and drinks with hemp extract

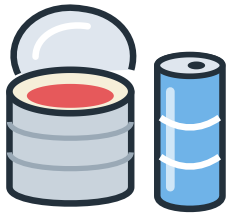
HOW OFTEN IT IS FOUND: Widely sold, mainly online

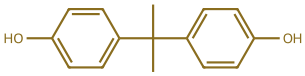
HOW OFTEN IT IS TAKEN: Some take it every day, most never

OTHER 66

Bisphenol A

$C_{15}H_{16}O_2$ bisphenol A (BPA)





WHAT IT DOES

It affects the immune system at very low doses; in animals this may promote allergic lung inflammation and autoimmune disorders

WHERE IT IS FOUND

Canned food and drink cans with an inner coating; older polycarbonate bottles and tableware

HOW OFTEN IT IS FOUND: A little passes into food from can coatings and plastic

HOW OFTEN IT IS EATEN: We use canned food and canned drinks almost every week

FOOD ADDITIVE 67

Sulphites

SO_2 sulphur dioxide (E220); the sulphites are E221–E228





WHAT IT DOES

Nothing in most people; in sensitive people, asthmatics above all, they can cause breathlessness, hives or headache

WHERE IT IS FOUND

Wine and beer; dried fruit, apricots above all; potato products; juices

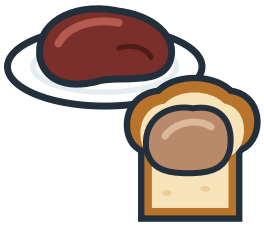
HOW OFTEN IT IS FOUND: Added to stop a product browning and spoiling; E220–E228 on the label

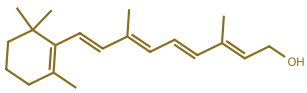
HOW OFTEN IT IS EATEN: Many people have wine and dried fruit every week

OTHER 68

Liver during pregnancy

$C_{20}H_{30}O$ retinol (vitamin A)





WHAT IT DOES

A very high intake of vitamin A during pregnancy can harm the baby's development: birth defects are for life

WHERE IT IS FOUND

Liver and liver pâté; fish liver oil and food supplements with vitamin A

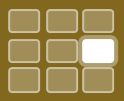
HOW OFTEN IT IS FOUND: Vitamin A is stored in the liver of animals: there is a great deal of it there

HOW OFTEN IT IS EATEN: Some people eat liver; few pregnant women eat it often

RISK ASSESSORS PUT IT HERE

SERIOUS × OFTEN

severity × exposure



OTHER

66

Bisphenol A

Bisphenol A (BPA) is a building block of hard, clear plastic and of the coating inside food and drink cans. From there a little of it passes into food.

In 2023 the European Food Safety Authority (EFSA) reviewed the new studies and cut the tolerable daily intake about 20,000-fold: from 4 µg to 0.2 ng per kilogram of body weight. The reason is an effect on the immune system seen in animals at very low doses. By this measure average and high consumers in all age groups exceed the safe dose. In December 2024 the European Commission banned bisphenol A in materials that touch food.

HOW MUCH IS TOO MUCH?

The tolerable daily intake is 0.2 ng per kilogram of body weight. The EU banned bisphenol A in baby bottles in 2011 and, in December 2024, with a transition period, in materials that touch food.

Source: European Food Safety Authority (EFSA), re-evaluation of bisphenol A, 2023; Regulation (EU) 2024/3190

RISK ASSESSORS PUT IT HERE

NOT ENOUGH DATA

How well do we know it

?



OTHER

65

Cannabidiol (CBD) oil

Cannabidiol (CBD) is a substance from hemp that does not intoxicate. It is sold as oil drops, capsules and jelly sweets. In the European Union it is a novel food that needs an authorisation.

For a long time the European Food Safety Authority (EFSA) could not finish its assessment: data were missing on effects on the liver, hormones, the nervous system and fertility. In February 2026 it set a provisional safe level for adults: about 2 mg of pure cannabidiol a day for a person of 70 kg. For people under 25, pregnant and breastfeeding women and people on medication, safety could not be established.

HOW MUCH IS TOO MUCH?

In 2026 the European Food Safety Authority (EFSA) set a provisional safe level for adults: about 2 mg a day. For people under 25, pregnant and breastfeeding women and people on medication there is no safe level.

Source: European Food Safety Authority (EFSA), a provisional safe level for cannabidiol as a novel food, 2026

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





OTHER

68

Liver during pregnancy

Vitamin A is needed for sight, skin and immunity, and liver is its richest source: that is where an animal's body stores it. One portion of liver holds more vitamin A than a person needs in several days.

For an adult this usually does no harm if liver is eaten no more than once a week. Pregnancy is different: a very high intake of vitamin A can harm the baby's development. So the National Health Service (NHS) of the United Kingdom advises pregnant women not to eat liver or liver pâté at all, and not to take supplements with vitamin A, fish liver oil included. Carrots cannot give an overdose.

HOW MUCH IS TOO MUCH?

A woman needs 600 µg of vitamin A a day. The National Health Service (NHS) of the United Kingdom advises pregnant women not to eat liver or liver products at all, and everyone else not more than once a week.

Source: National Health Service (NHS) of the United Kingdom, vitamin A, 2020; foods to avoid in pregnancy, 2026

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure





FOOD ADDITIVE

67

Sulphites

Sulphur dioxide and the sulphites (E220–E228) are among the oldest preservatives: they keep wine from souring and dried apricots from browning. Small amounts of sulphites also form in wine by themselves, during fermentation.

In some people, asthmatics above all, sulphites cause breathlessness or hives. That is why they are among the 14 allergens that a label must emphasise. In 2022 the European Food Safety Authority (EFSA) concluded that people who eat a lot of such products may exceed the safe level: children by 12.5 %, adults by as much as 60 %. For lack of data the earlier acceptable daily intake could not be confirmed.

HOW MUCH IS TOO MUCH?

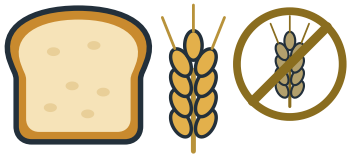
If a product holds more than 10 mg of sulphites per kilogram or litre, they must be emphasised in the list of ingredients. In 2022 the earlier acceptable daily intake could not be confirmed: data were lacking.

Source: European Food Safety Authority (EFSA), re-evaluation of sulphur dioxide and sulphites, 2022; Regulation (EU) No 1169/2011

OTHER 69

Gluten and coeliac disease

gluten: proteins of wheat, rye and barley



WHAT IT DOES

In a person with coeliac disease gluten damages the lining of the small intestine; untreated, the disease leads to anaemia and brittle bones

WHERE IT IS FOUND

Bread, pasta, beer and other products of wheat, rye and barley; traces of gluten in “gluten-free” food

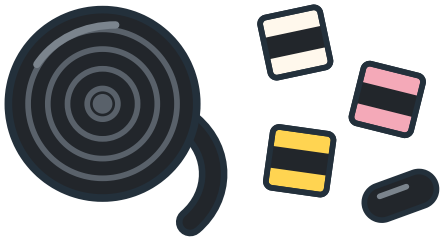
HOW OFTEN IT IS FOUND: Gluten is in every product of wheat, rye and barley

HOW OFTEN IT IS EATEN: It concerns only people with coeliac disease; gluten does no harm to others

OTHER 70

Liquorice

glycyrrhizin



WHAT IT DOES

In large amounts it raises blood pressure and lowers potassium in the blood; it can disturb the heart rhythm

WHERE IT IS FOUND

Liquorice sweets, salty liquorice above all; liquorice root tea; some drinks and supplements

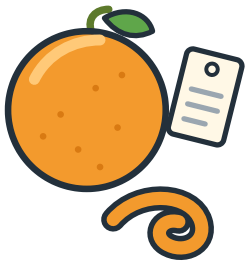
HOW OFTEN IT IS FOUND: Glycyrrhizin is in everything made from liquorice root

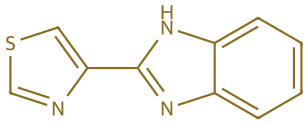
HOW OFTEN IT IS EATEN: Most people rarely or never; only a few fans eat a lot of it every day

OTHER 71

Treated citrus peel

$C_{10}H_7N_3S$ thiabendazole, one of the peel treatments





WHAT IT DOES

Residues on the peel are below the permitted level; at that amount no effect on health is expected

WHERE IT IS FOUND

The peel of oranges, lemons and mandarins: grated into a cake, a slice in tea or a drink, home-made candied peel

HOW OFTEN IT IS FOUND: Much citrus fruit is treated against mould after harvest

HOW OFTEN IT IS EATEN: We eat citrus fruit often, the peel now and then and little of it

OTHER 72

Food fraud

fraud: the product is not what the label says



WHAT IT DOES

Usually the wallet suffers, not health; the danger comes when the fraudster adds something harmful

WHERE IT IS FOUND

Honey with sugar syrup; olive oil, spices, fish and meat sold as a dearer kind

HOW OFTEN IT IS FOUND: Dear products that are hard to check are faked most often: honey, olive oil, spices

HOW OFTEN IT IS EATEN: We use honey, oil and spices often; only a laboratory sees what is fake

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure



OTHER

70

Liquorice

Glycyrrhizin gives liquorice root its sweetness. In the body it hinders an enzyme that shields the kidneys from the hormone cortisol: the body holds on to salt and water, loses potassium, and blood pressure rises. This happens when liquorice is eaten often and in quantity.

Researchers at the University of Helsinki tested 378 young people of about 13. Those whose mothers had eaten a lot of liquorice in pregnancy (more than 500 mg of glycyrrhizin a week, about 250 g of liquorice) did less well in reasoning tests: the gap was about 7 intelligence quotient (IQ) points. One sweet does no harm.

HOW MUCH IS TOO MUCH?

Sweets with a lot of glycyrrhizin must carry a warning for people with high blood pressure. Finland's health institute advises pregnant women against liquorice; in the United Kingdom the advice is against liquorice root tea.

Source: University of Helsinki, 2017; National Health Service (NHS) of the United Kingdom, 2026; Regulation (EU) No 1169/2011

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure



OTHER

69

Gluten and coeliac disease

Gluten is the proteins of wheat, rye and barley that make dough stretchy. It does most people no harm. In a person with coeliac disease the immune system answers gluten by attacking the gut itself: the lining is damaged, and nutrients are no longer absorbed.

The National Health Service (NHS) of the United Kingdom estimates that at least one person in a hundred has coeliac disease, and some do not know it. Untreated, it leads to anaemia and osteoporosis. There is no medicine: only a gluten-free diet for life helps. So traces matter to a patient too: a shared toaster, flour in the air, a sauce thickened with wheat flour. A healthy person has no need to avoid gluten.

HOW MUCH IS TOO MUCH?

"Gluten-free" may be claimed if the product holds no more than 20 mg of gluten per kilogram. Cereals with gluten must be emphasised in the list of ingredients.

Source: National Health Service (NHS) of the United Kingdom, coeliac disease; Implementing Regulation (EU) No 828/2014

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure



OTHER

72

Food fraud

Food fraud is cheating: a cheaper product is sold as a dearer one. In a European Commission check published in 2023, added sugar syrup was suspected in 147 of 320 samples of imported honey, that is, 46 %. The risk to health was very low: syrup is sugar. In 2013 too, when horse meat was found in beef dishes, the Commission concluded that there was no food safety issue.

But a fraudster keeps no rules, and that is where the risk begins. Melamine in Chinese infant formula, methanol in the vodka of Pärnu and the industrial oil sold in Spain as olive oil were frauds too. This game's history cards tell their stories.

HOW MUCH IS TOO MUCH?

There is no limit: fraud is always forbidden. A buyer cannot spot a fake; laboratories do that. A price too low for a dear product is the only sign to be seen in the shop.

Source: European Commission, the coordinated action "From the Hives", 2023; European Commission, results of the horse meat tests, 2013

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure



OTHER

71

Treated citrus peel

Citrus fruit travels far and is stored for a long time. To keep it from going mouldy, the peel is treated after harvest with fungicides, most often imazalil or thiabendazole, and often with wax as well. In the shop this must be declared.

The treatment stays in the peel. The Bavarian food safety authority (LGL) found on average 2.3 mg of thiabendazole per kilogram of fruit in treated oranges: below the permitted level. The flesh usually held less than a tenth of that, and less than 1 % reached pressed juice. So eating an orange is no problem. For peel that goes into food, take untreated or organic fruit.

HOW MUCH IS TOO MUCH?

The treatment must be declared, for example "preserved with thiabendazole" or "imazalil". For peel that goes into food, take untreated or organic fruit; wash the rest in warm water and wipe it dry.

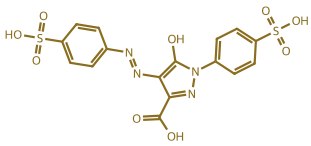
Source: Bavarian Health and Food Safety Authority (LGL), peel treatments of citrus fruit; German consumer centres (Verbraucherzentrale), 2025

FOOD ADDITIVE 73

Azo dyes in sweets

$C_{16}H_{12}N_4O_9S_2$ tartrazine (E102), acid form





WHAT IT DOES

In some children they may briefly raise restlessness and lower attention; the evidence is not clear-cut

WHERE IT IS FOUND

Bright sweets, jellies, drinks and icings with E102, E104, E110, E122, E124 or E129

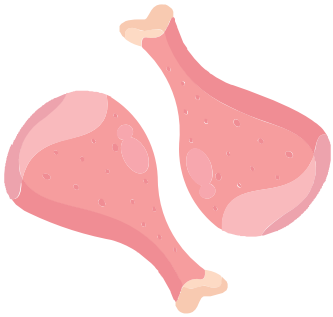
HOW OFTEN IT IS FOUND: Only in some bright sweets and drinks; the label then carries a warning

HOW OFTEN IT IS EATEN: Children eat sweets often

WHAT WE DO 74

Undercooked chicken

Campylobacter · Salmonella



WHAT IT DOES

Diarrhoea and fever; many end up in hospital

WHERE IT IS FOUND

Chicken breast and drumsticks, barbecue and kebabs, chicken mince

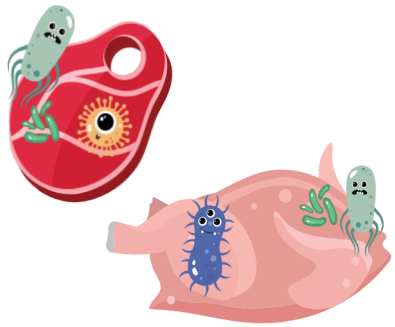
HOW OFTEN IT IS FOUND: About a third of samples of fresh chicken of Latvian origin carry Campylobacter

HOW OFTEN IT IS EATEN: Chicken is eaten almost weekly

WHAT WE DO 75

Self-hunted game

Trichinella



WHAT IT DOES

Fever, facial swelling, muscle pain; lasts months, can affect the heart and brain

WHERE IT IS FOUND

Wild boar, home-made game sausage and dried game

HOW OFTEN IT IS FOUND: In Latvia in 1976–2013, 2.5 % of the wild boar tested carried Trichinella

HOW OFTEN IT IS EATEN: A few times a year, and not by everyone

WHAT WE DO 76

One board for meat and salad

transfer from raw meat



WHAT IT DOES

Bacteria end up in food that will never be cooked again; diarrhoea and fever, one registered case in four ends up in hospital

WHERE IT IS FOUND

Cutting board, knife, worktop, barbecue tongs, hands

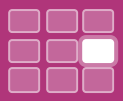
HOW OFTEN IT IS FOUND: About a third of samples of fresh chicken of Latvian origin carry Campylobacter

HOW OFTEN PEOPLE DO IT: About half use one board; some do not wash it in between

RISK ASSESSORS PUT IT HERE

SERIOUS × OFTEN

severity × exposure





WHAT WE DO

74

Undercooked chicken

Colour is not a thermometer. The only answer is 74 °C in the centre. Latvia reports few cases, not because the bacterium is absent, but because it is rarely looked for: in 2018–2019, 36.8 % of samples of fresh chicken of Latvian origin carried it.

HOW MUCH IS TOO MUCH?

There is no limit: there is a temperature. 74 °C in the centre settles the question.

Source: European Food Safety Authority (EFSA) and European Centre for Disease Prevention and Control (ECDC), One Health Zoonoses Report 2024; Tedersoo and colleagues, 2022, Poultry Science; FoodSafety.gov (United States government), safe minimum internal temperatures, 2024

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





FOOD ADDITIVE

73

Azo dyes in sweets

Six synthetic colours, five of them azo dyes, make sweets bright yellow, orange and red: E102, E104, E110, E122, E124 and E129. In 2007 British researchers saw that a mix of these colours with a preservative raised restlessness and lowered attention in some children.

The evidence was not enough to ban the colours, but enough to warn. Since 2010 products with these colours have had to carry the text “May have an adverse effect on activity and attention in children” in the European Union. The warning worked in an unexpected way: many makers replaced the colours so as not to have that sentence on the pack.

HOW MUCH IS TOO MUCH?

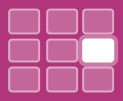
The label must say: “May have an adverse effect on activity and attention in children”. Each colour has an acceptable daily intake; the warning is an extra precaution.

Source: Government of the United Kingdom (GOV.UK), food additives, 2018; McCann et al., The Lancet, 2007; European Food Safety Authority (EFSA), food colours, 2026; Regulation (EC) No 1333/2008

RISK ASSESSORS PUT IT HERE

SERIOUS × OFTEN

severity × exposure





WHAT WE DO

76

One board for meat and salad

The dangerous object is not the chicken but the board. This card does not change how harmful the bacterium is: it changes where the bacterium ends up.

HOW MUCH IS TOO MUCH?

There is no limit: there is an order. Salad first, then meat. Or two boards.

Source: Food Standards Agency (FSA) of the United Kingdom, Food and You 2 (2024); Croatian Agency for Agriculture and Food (HAPIH), survey (2022); World Health Organization (WHO), Five Keys to Safer Food; Tedersoo and colleagues, 2022, Poultry Science; Iulietto and Evers, 2020, EFSA Journal

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





WHAT WE DO

75

Self-hunted game

Freezing does not work here: the Trichinella species found in Latvia are freeze-resistant, and smoking, salting and drying do nothing. In 2022 Latvia had the highest trichinellosis notification rate in the European Union.

HOW MUCH IS TOO MUCH?

There is no limit: there is a test. One laboratory analysis answers everything.

Source: Kirjušina and colleagues, 2015, Parasites & Vectors; European Centre for Disease Prevention and Control (ECDC), Annual Epidemiological Report 2022; European Food Safety Authority (EFSA), Story map on Trichinella, 2025

WHAT WE DO 77

Unwashed hands

norovirus and others



WHAT IT DOES

Vomiting and diarrhoea for a few days

WHERE IT IS FOUND

On hands: before eating, after the toilet, after animals, after raw meat

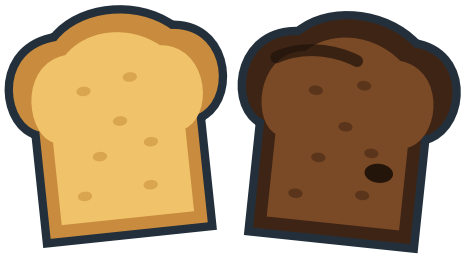
HOW OFTEN IT IS FOUND: Norovirus outbreaks are regular, and not only because of food

HOW OFTEN PEOPLE DO IT: Several times a day

WHAT WE DO 78

Cooked too brown

acrylamide



WHAT IT DOES

Damages DNA; considered a probable carcinogen

WHERE IT IS FOUND

Toast, fries, roast potatoes, gingerbread, roasted coffee

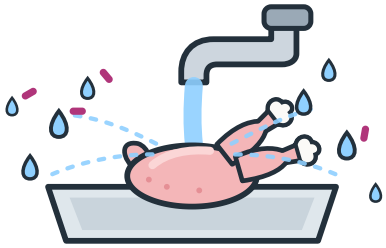
HOW OFTEN IT IS FOUND: Forms whenever food is cooked above 120 °C; the darker the crust, the more

HOW OFTEN IT IS EATEN: Almost every day

WHAT WE DO 79

Washing chicken before cooking

splashes carrying Campylobacter



WHAT IT DOES

Bacteria land on surfaces that will never be heated; diarrhoea and fever, one registered case in four ends up in hospital

WHERE IT IS FOUND

Sink, tap, worktop, food standing nearby, clothes

HOW OFTEN IT IS FOUND: About a third of samples of fresh chicken of Latvian origin carry Campylobacter

HOW OFTEN PEOPLE DO IT: In five European countries, 1–5 in 10 wash it

WHAT WE DO 80

Unwashed salad and berries

norovirus · Salmonella · Shiga toxin-producing Escherichia coli (STEC)



WHAT IT DOES

Vomiting and diarrhoea for a few days; occasionally worse

WHERE IT IS FOUND

Leafy salad, strawberries, raspberries, tomatoes, garden greens

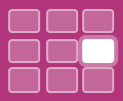
HOW OFTEN IT IS FOUND: EU, 2024: vegetables among the top five foods linked to outbreaks

HOW OFTEN IT IS EATEN: In season, almost every day

RISK ASSESSORS PUT IT HERE

SERIOUS × OFTEN

severity × exposure





WHAT WE DO

78

Cooked too brown

“Don't burn it, lightly brown it” is the official advice. Children have the highest acrylamide exposure of any age group per kilogram of body weight.

HOW MUCH IS TOO MUCH?

Acrylamide has no limit; there are benchmark levels for industry and one rule at home: golden, not dark.

Source: European Food Safety Authority (EFSA), 2015, acrylamide; Regulation (EU) 2017/2158

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure





WHAT WE DO

77

Unwashed hands

Alcohol gel only partly works on norovirus: alcohol destroys enveloped viruses, and norovirus has no envelope. Soap and water, not the bottle in your bag.

HOW MUCH IS TOO MUCH?

There is no limit: there is soap, water and twenty seconds.

Source: World Health Organization (WHO), Five Keys to Safer Food; European Centre for Disease Prevention and Control (ECDC), 2013, Norovirus in schools and childcare

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure





WHAT WE DO

80

Unwashed salad and berries

Washing reduces contamination but does not sterilise, and anything taken up through roots or leaf pores cannot be washed off at all. Re-washing bagged ready-to-eat salad at home is more likely to add contamination than to remove it.

HOW MUCH IS TOO MUCH?

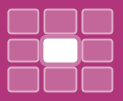
Washing reduces but does not sterilise. Re-washing bagged salad is not worth it.

Source: European Food Safety Authority (EFSA) Panel on Biological Hazards (BIOHAZ), 2014, pathogens in food of non-animal origin; EFSA and European Centre for Disease Prevention and Control (ECDC), One Health Zoonoses Report 2024; Uhlig and colleagues, 2017, Food Science & Nutrition

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure





WHAT WE DO

79

Washing chicken before cooking

A hygiene habit that increases risk. Washing does not remove Campylobacter from the bird; it sprays it around the kitchen, up to 80 cm away. Only heat makes chicken safe.

HOW MUCH IS TOO MUCH?

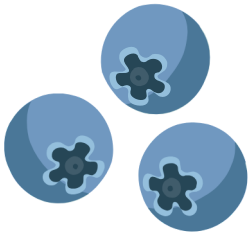
Here “wash more” means “spread more”. Only heat makes chicken safe.

Source: Food Standards Agency (FSA) of the United Kingdom, “Don't wash raw chicken”; safefood (Ireland); Iulietto and Evers, 2020, EFSA Journal; SafeConsume survey (Didier et al., 2021); Tedersoo and colleagues, 2022, Poultry Science

WHAT WE DO 81

Frozen berries straight from the freezer

norovirus · hepatitis A



WHAT IT DOES

Vomiting and diarrhoea; less often hepatitis A, which lasts weeks

WHERE IT IS FOUND

Frozen bilberries and raspberries, smoothies, porridge, desserts

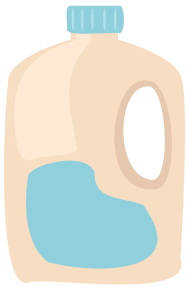
HOW OFTEN IT IS FOUND: Dozens of alerts in Europe for norovirus in frozen berries in 2006–2024

HOW OFTEN IT IS EATEN: Often in winter, rarely in summer

WHAT WE DO 82

Raw milk

Campylobacter · Salmonella · Shiga toxin-producing Escherichia coli (STEC)



WHAT IT DOES

Diarrhoea; kidney failure in small children

WHERE IT IS FOUND

Milk vending machines, markets, milk straight from a farm, home-made cheese

HOW OFTEN IT IS FOUND: In the EU in 2007–2013: 27 outbreaks, 21 of them caused by Campylobacter

HOW OFTEN IT IS DRUNK: Rarely, but some drink it regularly

WHAT WE DO 83

Mushrooms you picked yourself

amatoxins



WHAT IT DOES

The death cap destroys the liver; fatal in severe cases

WHERE IT IS FOUND

Wild mushrooms, fried mushrooms, pickled mushrooms, mushroom soup

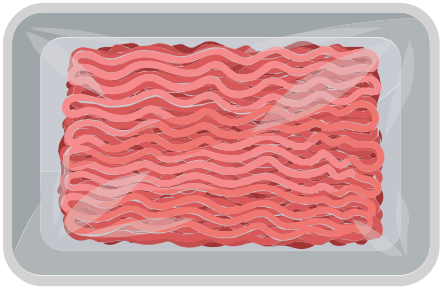
HOW OFTEN IT IS FOUND: Only a few pickers take a poisonous one

HOW OFTEN IT IS EATEN: Many in autumn, few the rest of the year

WHAT WE DO 84

Undercooked burger

Shiga toxin- or verotoxin-producing Escherichia coli (STEC / VTEC)



WHAT IT DOES

Can cause kidney failure, especially in children

WHERE IT IS FOUND

Mince patties, “medium” burgers, home-minced meat, kebabs

HOW OFTEN IT IS FOUND: In Europe about 30 % of STEC infections are linked to beef

HOW OFTEN IT IS EATEN: Minced meat, several times a month

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





WHAT WE DO

Raw milk

82

“Natural” does not mean “safe”. The strangest fact in the deck: you can catch a tick-borne disease by drinking milk. The tick bit the goat, not you. Boiling removes the risk.

HOW MUCH IS TOO MUCH?

There is no limit: there is boiling. Boiled raw milk is a different matter.

Source: European Food Safety Authority (EFSA), 2015, raw drinking milk; Zavadska and colleagues, 2018; Latvian Public Media (LSM), 12 March 2026

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





WHAT WE DO

Frozen berries straight from the freezer

81

Freezing does not kill viruses: it preserves them. Note that the official advice says “imported”, yet Finland's 2019 outbreaks came from domestic bilberries. One minute of boiling settles it.

HOW MUCH IS TOO MUCH?

Freezing does not kill the viruses. One minute of boiling does.

Source: Food Safety Authority of Ireland (FSAI), advice on frozen berries; Summa and colleagues, 2024, Food and Environmental Virology; Velebit and colleagues, 2025, Foods

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × SOMETIMES

severity × exposure





WHAT WE DO

Undercooked burger

84

Same meat, same bacterium, same cook, yet a completely different square on the matrix. The difference is the mincing machine: a rare steak is safe because the bacteria are only on the surface.

HOW MUCH IS TOO MUCH?

A steak needs only its surface cooked; mince has to be cooked through: 70 °C all the way.

Source: European Centre for Disease Prevention and Control (ECDC), Shiga toxin-producing Escherichia coli (STEC) infection: Annual Epidemiological Report 2023; Food Standards Agency (FSA) of the United Kingdom, Food and You 2 (2024)

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





WHAT WE DO

Mushrooms you picked yourself

83

Every folk rule is wrong: the silver spoon does not tarnish, animals do eat poisonous species, boiling does not help, and the death cap tastes fine. The dangerous part is the pause: feeling better on day two is when the liver is being destroyed.

HOW MUCH IS TOO MUCH?

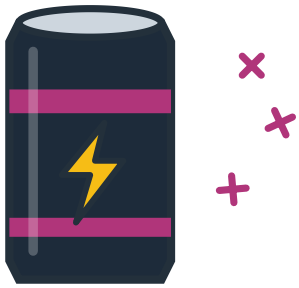
There is no limit: there is identification. If you are not certain, it is not food.

Source: Riga East University Hospital (RAKUS), Toxicology and Sepsis Clinic, 2023; Poisoning and Drug Information Centre

WHAT WE DO 85

Energy drinks

caffeine



WHAT IT DOES

What it does to teenagers in the long run has not been studied enough

WHERE IT IS FOUND

Energy drinks, colas, coffee drinks, pre-workout mixes

HOW OFTEN IT IS FOUND: In every energy drink: 160 mg of caffeine in a 500 ml can

HOW OFTEN IT IS DRUNK: Some teenagers, every day

WHAT WE DO 86

Leftovers left out

Bacillus cereus · Clostridium perfringens



WHAT IT DOES

Vomiting or diarrhoea within hours

WHERE IT IS FOUND

Rice, pasta, pilaf, soup or stew left on the stove overnight

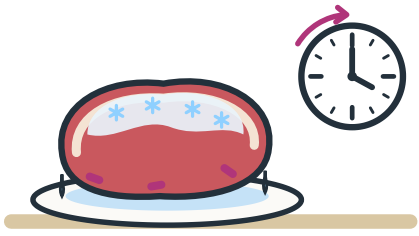
HOW OFTEN IT IS FOUND: Spores are in many foods; beyond 2 hours at room temperature a toxin can form

HOW OFTEN PEOPLE DO IT: In many homes, now and then

WHAT WE DO 87

Thawing meat on the counter

bacteria on the surface



WHAT IT DOES

While the middle is still frozen, bacteria multiply on the surface and can cause diarrhoea and vomiting

WHERE IT IS FOUND

Frozen meat, chicken, mince or fish thawing at room temperature

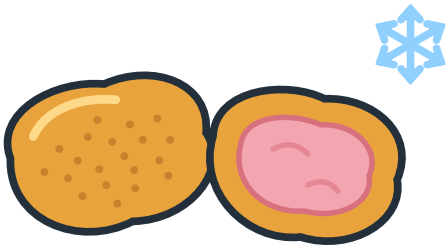
HOW OFTEN IT IS FOUND: Raw meat often carries bacteria; freezing only puts them to sleep

HOW OFTEN PEOPLE DO IT: Often: about every other person

WHAT WE DO 88

Frozen breaded chicken

Salmonella



WHAT IT DOES

Salmonellosis: diarrhoea, fever, cramps; one in five went to hospital

WHERE IT IS FOUND

Frozen chicken nuggets, breaded fillets, popcorn chicken, chicken Kiev

HOW OFTEN IT IS FOUND: Salmonella is seldom found in them: in 5 of 310 UK samples

HOW OFTEN IT IS EATEN: Sometimes; a children's favourite

RISK ASSESSORS PUT IT HERE

MILD × SOMETIMES

severity × exposure





WHAT WE DO

86

Leftovers left out

Reheating does not fix it. Bacillus cereus spores survive cooking, wake up in warm food and make a vomiting toxin that heat does not destroy. The advice is about time: no more than two hours at room temperature, then the fridge; freeze what you will keep longer than 2–3 days.

HOW MUCH IS TOO MUCH?

The limit is time: no more than 2 hours at room temperature, then into the fridge.

Source: French food safety agency ANSES; European Food Safety Authority (EFSA), 2016 (Bacillus cereus); Centre for Disease Prevention and Control of Latvia (SPKC), 2022; Food Standards Agency (FSA) of the United Kingdom, Food and You 2 (2024); Bensa and colleagues, 2026 (Slovenia)

RISK ASSESSORS PUT IT HERE

NOT ENOUGH DATA

How well do we know it

?



WHAT WE DO

85

Energy drinks

This card belongs at the question mark. The figure the European Food Safety Authority (EFSA) gives for children is extrapolated from an adult single-dose value because data on children were insufficient. The assessment is being redone. Since 2016 Latvia has banned sales to under-18s.

HOW MUCH IS TOO MUCH?

The figure for children is 3 mg caffeine per kilogram per day, but the European Food Safety Authority (EFSA) itself says the data on children were insufficient.

Source: European Food Safety Authority (EFSA), 2015, caffeine (EFSA Journal 13(5):4102); EFSA, 2026, safety of caffeine and “energy drinks” in children and adolescents (assessment under way, EFSA-Q-2026-00259); Saeima, 2016

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure





WHAT WE DO

88

Frozen breaded chicken

Between 2018 and 2020, at least 193 people in nine European countries caught salmonellosis from frozen breaded chicken made in Poland, and one in five went to hospital. The crumb is fried; the meat inside is raw. The cooking time on the pack is an instruction, not a suggestion.

HOW MUCH IS TOO MUCH?

There is no limit, only the instructions on the pack: how long and how hot.

Source: European Centre for Disease Prevention and Control (ECDC) and European Food Safety Authority (EFSA), rapid outbreak assessment, 2021; Food Standards Agency (FSA) of the United Kingdom, 2022; Epidemiology and Infection, 2019 (Canada)

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure





WHAT WE DO

87

Thawing meat on the counter

Freezing does not kill bacteria; it pauses them. While the middle is still hard, the surface spends hours in the warm, where bacteria grow fastest. The European Food Safety Authority (EFSA) lists it among thawing habits of concern. Safe ways: in the fridge, in cold water in a sealed bag, or in the microwave.

HOW MUCH IS TOO MUCH?

The limit is temperature: in a fridge below 5 °C bacteria barely grow.

Source: Food Standards Agency (FSA) of the United Kingdom, Food and You 2 (2024); Bensa and colleagues, 2026 (Slovenia); European Food Safety Authority (EFSA), 2021 (date marking, Part 2); Centre for Disease Prevention and Control of Latvia (SPKC), 2022

WHAT WE DO 89

Frozen vegetables, uncooked

Listeria



WHAT IT DOES

Listeriosis: dangerous in pregnancy, in old age and for people with weak immunity

WHERE IT IS FOUND

Frozen corn, peas, spinach and vegetable mixes in salads or smoothies

HOW OFTEN IT IS FOUND: In a 2015–2018 outbreak, 53 people fell ill in five countries

HOW OFTEN PEOPLE DO IT: Usually cooked, sometimes not

WHAT WE DO 90

Raw dough

Shiga toxin-producing Escherichia coli (STEC) · Salmonella



WHAT IT DOES

E. coli (STEC): bloody diarrhoea; in children it can damage the kidneys

WHERE IT IS FOUND

Raw cookie and cake dough, pancake batter, a licked spoon, flour play dough

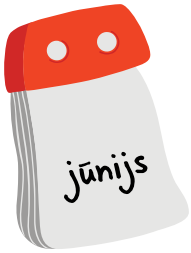
HOW OFTEN IT IS FOUND: German tests found live STEC in one in ten ready-made doughs and baking mixes

HOW OFTEN IT IS EATEN: In Germany one in five, at least once a month

WHAT WE DO 91

Eating food past its “use by” date

Listeria



WHAT IT DOES

Listeria keeps growing in the fridge; listeriosis can be fatal

WHERE IT IS FOUND

Mince, cold-smoked fish, ready salads, cold cuts and soft cheese past the date

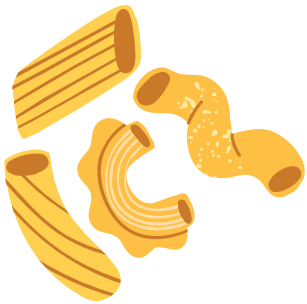
HOW OFTEN IT IS FOUND: Listeria is in a small share of products; past the date there may be more

HOW OFTEN PEOPLE DO IT: Many do: in the UK 23–49 % within a month; few fall ill

WHAT WE DO 92

Eating food past its “best before” date

a quality date



WHAT IT DOES

Usually nothing: taste or texture may change

WHERE IT IS FOUND

Pasta, rice, grains, tinned food, chocolate, crisps, frozen vegetables

HOW OFTEN IT IS FOUND: Only when the pack is damaged or the food was stored wrongly

HOW OFTEN PEOPLE DO IT: In almost every home

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × SOMETIMES

severity × exposure



WHAT WE DO

Raw dough

90

Flour looks finished but is a raw crop: bacteria cannot grow in dry flour, yet they survive, and only baking kills them. It is thought of as an American problem, but in 2021 German testing found live Shiga toxin-producing Escherichia coli (STEC) in 35 of 335 ready-made doughs and baking mixes.

HOW MUCH IS TOO MUCH?

There is no limit: only baking makes dough safe.

Source: German Federal Institute for Risk Assessment (BfR), 2023; German Federal Office of Consumer Protection and Food Safety (BVL), 2022; European Centre for Disease Prevention and Control (ECDC), 2023

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure



WHAT WE DO

Frozen vegetables, uncooked

89

From 2015 to 2018, 53 people in five countries caught listeriosis from frozen corn made in Hungary; ten died, and Finland had the most cases. Listeria survives freezing, so cook frozen vegetables even for salads and smoothies.

HOW MUCH IS TOO MUCH?

The limit is on the pack: “cook before eating”.

Source: European Centre for Disease Prevention and Control (ECDC) and European Food Safety Authority (EFSA), rapid outbreak assessment, 2018; EFSA, 2020

RISK ASSESSORS PUT IT HERE

MILD × OFTEN

severity × exposure



WHAT WE DO

Eating food past its “best before” date

92

“Best before” is about quality, not safety. In Latvia shops may not sell food past this date, but they may donate it: pasta and chocolate up to two months past the date, bread two days.

HOW MUCH IS TOO MUCH?

There is no limit, just common sense: an intact pack, the look, the smell.

Source: Regulation (EU) No 1169/2011; Cabinet Regulation No 514; Ministry of Climate and Energy of Latvia (KEM), 2025

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure



WHAT WE DO

Eating food past its “use by” date

91

Two labels that look alike but belong in very different squares. “Use by” is a safety date: European Union law says food past it is deemed unsafe. Listeria grows even at 2 °C, and the European Food Safety Authority (EFSA) estimates that a third of listeriosis cases come from food prepared and stored at home. Freeze it before the date, not after.

HOW MUCH IS TOO MUCH?

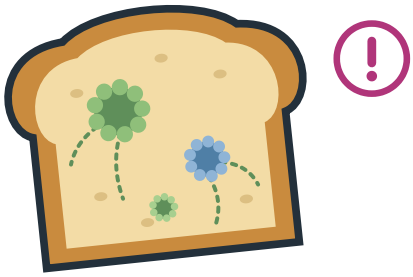
The date itself is the limit. After it, the food may not be sold and should not be eaten.

Source: Regulation (EU) No 1169/2011, Article 24; European Food Safety Authority (EFSA), 2018, 2020; Eurobarometer 425 (2015); Food Standards Agency (FSA) of the United Kingdom, Consumer Insights Tracker (2023); EFSA and European Centre for Disease Prevention and Control (ECDC), One Health Zoonoses Report 2024

WHAT WE DO 93

Scraping off the mould

mycotoxins



WHAT IT DOES

How much toxin you take in when you scrape off the mould has been little studied

WHERE IT IS FOUND

Bread, jam, yoghurt, soft fruit and berries with the mould scraped or cut off

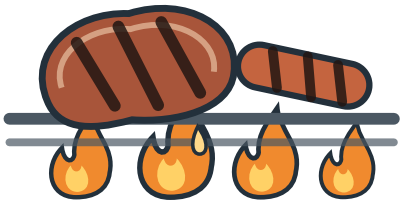
HOW OFTEN IT IS FOUND: Not every mould makes toxins, but they spread beyond the visible spot

HOW OFTEN PEOPLE DO IT: In Germany one in four, with jam

WHAT WE DO 94

Charred barbecue meat

polycyclic aromatic hydrocarbons (PAHs) · heterocyclic amines



WHAT IT DOES

PAHs and heterocyclic amines damage DNA; the harm builds up over years

WHERE IT IS FOUND

Shashlik, sausages, chops with black edges, meat dripping fat into the flames

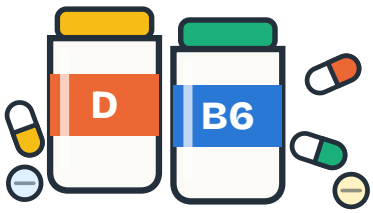
HOW OFTEN IT IS FOUND: They form whenever fat drips into the flames; above 150 °C also in the meat

HOW OFTEN IT IS EATEN: In summer, several times a month

WHAT WE DO 95

Several supplements at once

vitamin D · vitamin B6



WHAT IT DOES

Too much vitamin D harms the kidneys; too much vitamin B6 harms the nerves

WHERE IT IS FOUND

Vitamin D, multivitamins, B vitamins, magnesium, green tea extract

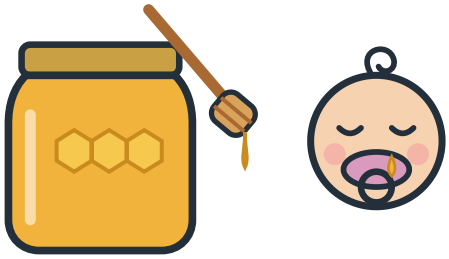
HOW OFTEN IT IS FOUND: Rarely: the dose gets too high when one nutrient is in several products

HOW OFTEN IT IS TAKEN: Many people daily, but too-high doses are rare

WHAT WE DO 96

Honey for babies

Clostridium botulinum (spores)



WHAT IT DOES

The baby's muscles weaken: constipation, weak sucking, trouble breathing

WHERE IT IS FOUND

Honey for a baby under 12 months: on a spoon, in porridge, on a dummy or a finger

HOW OFTEN IT IS FOUND: Spores in honey are uncommon, but in a baby's gut they can germinate

HOW OFTEN PEOPLE DO IT: No data for Latvia; given to soothe a baby or sweeten its food

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure





WHAT WE DO

94

Charred barbecue meat

Barbecuing makes two groups of chemicals: polycyclic aromatic hydrocarbons (PAHs), when fat drips into the flames and smoke coats the meat, and heterocyclic amines, which form inside meat above 150 °C, even in a pan. The fixes are the same: nothing dripping onto the coals, brown not black, cut off the charred bits.

HOW MUCH IS TOO MUCH?

Grilled meat that is sold may hold at most 5 µg of benzo(a)pyrene per kg; heterocyclic amines have no limit.

Source: European Food Safety Authority (EFSA), 2008; International Agency for Research on Cancer (IARC); German Federal Institute for Risk Assessment (BfR), 2026; Regulation (EU) 2023/915; Danish Agriculture & Food Council (Landbrug & Fødevarer), 2023

RISK ASSESSORS PUT IT HERE

NOT ENOUGH DATA

How well do we know it

?



WHAT WE DO

93

Scraping off the mould

Mould is not just the spot on the surface: its threads grow into soft bread and jam, and toxins spread further. Heat kills the mould but not its toxins. And moulds differ: the blue in Roquefort and the white rind on Camembert are grown on purpose and safe; wild mould on bread is not.

HOW MUCH IS TOO MUCH?

There is no limit: cutting it off does not protect against mycotoxins.

Source: Centre for Disease Prevention and Control of Latvia (SPKC), 2022; German Federal Institute for Risk Assessment (BfR), 2024, 2026; Norwegian Food Safety Authority (Mattilsynet)

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





WHAT WE DO

96

Honey for babies

Honey can carry spores of Clostridium botulinum. In an adult gut they do not develop. A baby's gut flora is not yet mature, so the spores germinate there and release a toxin that paralyses muscles. The first sign is usually constipation, then weak sucking and poor head control.

The illness is very rare but severe: it usually means a long hospital stay, often with breathing support. Deaths in Western countries are extremely rare. The World Health Organization (WHO) and the French food safety agency ANSES advise no honey at all before 12 months, not even on a dummy or a finger.

HOW MUCH IS TOO MUCH?

No honey at all before 12 months: not on a spoon, in porridge or on a dummy. Boiling does not kill the spores.

Source: World Health Organization (WHO), botulism fact sheet (2023); French food safety agency ANSES, 2013; Harris and Dabritz, 2024; European Centre for Disease Prevention and Control (ECDC), botulism, 2022

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





WHAT WE DO

95

Several supplements at once

A supplement is food, not medicine, and in the European Union there is no safety check before it goes on sale. Trouble starts when the same nutrient comes from several products, or big doses are taken “just in case”. The Netherlands has 238 reports of nerve damage linked to vitamin B6; the European Food Safety Authority (EFSA) set its upper level at 12 mg a day in 2023.

HOW MUCH IS TOO MUCH?

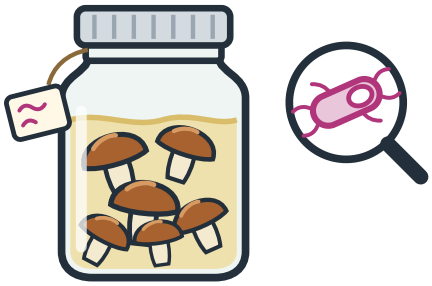
The upper level is an amount not to exceed long-term; for children it is lower: vitamin D 50 µg a day at ages 1–10.

Source: European Food Safety Authority (EFSA), 2023 (vitamins D and B6); Netherlands Pharmacovigilance Centre Lareb, 2024; Institute of Food Safety, Animal Health and Environment “BIOR”, 2025

WHAT WE DO 97

Home-canned food

Clostridium botulinum (toxin)



WHAT IT DOES

Blurred vision, trouble speaking and swallowing, paralysis

WHERE IT IS FOUND

Home-canned mushrooms, beans, beetroot, meat or fish; garlic or herbs in oil

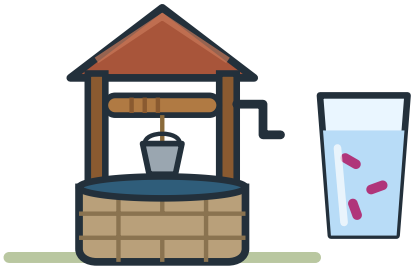
HOW OFTEN IT IS FOUND: Only in jars canned the wrong way, with no acid

HOW OFTEN IT IS EATEN: Many eat home-canned food, but botulism is rare

WHAT WE DO 98

Well water

E. coli · enterococci · nitrate



WHAT IT DOES

Bacteria cause diarrhoea; nitrate stops a baby's blood carrying oxygen

WHERE IT IS FOUND

Water from your own well for drinking, tea, cooking and baby formula

HOW OFTEN IT IS FOUND: In Latvia, gut bacteria were found in five of six wells tested

HOW OFTEN IT IS DRUNK: Daily in the countryside, rarely in town

WHAT WE DO 99

Wild garlic and its poisonous look-alikes

lily of the valley · autumn crocus



WHAT IT DOES

Lily of the valley eaten in place of wild garlic disturbs the heart rhythm; autumn crocus damages several organs after a few days and can kill

WHERE IT IS FOUND

Wild garlic you picked yourself, in salad, pesto or soup, with look-alike leaves mixed in

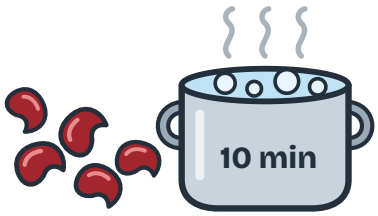
HOW OFTEN IT IS FOUND: Lily of the valley and autumn crocus grow where wild garlic does, and in spring they look alike

HOW OFTEN IT IS EATEN: Only in spring, and few people pick it

WHAT WE DO 100

Undercooked kidney beans

lectins



WHAT IT DOES

Severe nausea, vomiting and diarrhoea a few hours after eating

WHERE IT IS FOUND

Dried red kidney beans and other beans that were only soaked, or stewed at a low temperature

HOW OFTEN IT IS FOUND: All raw beans hold lectins; proper boiling destroys them

HOW OFTEN IT IS EATEN: Many eat beans, undercooked ones rarely

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure





WHAT WE DO

98

Well water

The owner is responsible for well water. The Health Inspectorate does not supervise private wells and advises testing them regularly. In a Latvian study (2022) of 356 wells, E. coli was in 9.6 %, enterococci in 82.6 % and too much nitrate in 4.5 %. The World Health Organization (WHO) sets 50 mg of nitrate per litre to protect bottle-fed babies. Boiling kills bacteria but concentrates nitrate. Sometimes covering and cleaning the well is enough.

HOW MUCH IS TOO MUCH?

Have the well tested in a laboratory. If nitrate is high, use other water for baby formula: boiling does not remove it.

Source: Purmalis and Ozols, 2022, University of Latvia conference; Health Inspectorate of Latvia, 2025; World Health Organization (WHO), nitrate and nitrite in drinking water

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





WHAT WE DO

97

Home-canned food

Clostridium botulinum spores live in soil and easily reach mushrooms and vegetables. Ordinary boiling does not kill them. In a sealed jar without air or acid the spores can germinate and make toxin. Mushrooms, beans and beetroot are not acidic.

In 2022 Europe had 84 confirmed botulism cases, most often from canned food, often home-made. Latvia reported no confirmed case in 2015–2022. The German Federal Institute for Risk Assessment (BfR) advises against storing home-made vegetables or herbs in oil.

HOW MUCH IS TOO MUCH?

Throw away a bulging or doubtful jar. Do not keep garlic or herbs in oil at home. Heating destroys the toxin: 5 minutes above 85 °C.

Source: European Centre for Disease Prevention and Control (ECDC), annual epidemiological report on botulism, 2022; World Health Organization (WHO), botulism, 2023; German Federal Institute for Risk Assessment (BfR), 2016

RISK ASSESSORS PUT IT HERE

MILD × RARELY

severity × exposure





WHAT WE DO

100

Undercooked kidney beans

Raw beans, red kidney beans above all, hold lectins: proteins that irritate the gut. Four or five raw or half-cooked beans are enough for some hours of violent vomiting and diarrhoea.

Only proper boiling destroys lectins. In a slow cooker, or stewed at a low temperature, they stay, and beans that seem soft can still be poisonous. So dried beans are soaked first, the water is poured away, and then they are boiled in bubbling water. Canned beans are already cooked.

HOW MUCH IS TOO MUCH?

Soak dried beans for at least 5 hours, pour the water away and boil them in fresh water for at least 10 minutes, 30 to be safe. Canned beans are ready to eat.

Source: Food Safety Information Council (Australia), kidney beans; Food Safety News, 2021

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





WHAT WE DO

99

Wild garlic and its poisonous look-alikes

Wild garlic is a spring green that tastes of garlic. Its leaves resemble those of two poisonous plants: lily of the valley and autumn crocus. The German Federal Institute for Risk Assessment (BfR) writes that mix-ups end in poisonings every spring, some of them fatal.

Lily of the valley causes vomiting and diarrhoea, more rarely a disturbed heart rhythm. Autumn crocus is more dangerous: severe vomiting starts after 6 to 12 hours, then for a few days things seem to improve, and then several organs fail. The smell test helps, but after the first leaf your fingers already smell of garlic. In Latvia wild garlic is protected in the wild: it may not be picked in the forest.

HOW MUCH IS TOO MUCH?

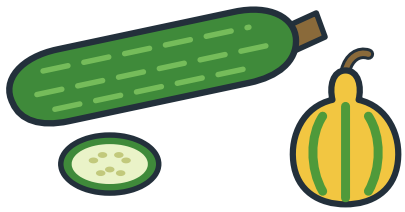
There is no limit, only recognition. Smell alone is not enough: after one leaf your fingers smell of garlic too. Check each leaf by sight; if in doubt, throw it out. It is safer to grow wild garlic or buy it.

Source: German Federal Institute for Risk Assessment (BfR), wild garlic and its poisonous look-alikes, 2023

WHAT WE DO 101

A bitter courgette or pumpkin

cucurbitacins



WHAT IT DOES

Nausea, vomiting and diarrhoea a few hours after eating, which usually soon pass

WHERE IT IS FOUND

A bitter courgette, pumpkin or cucumber, most often home-grown from seeds you saved yourself

HOW OFTEN IT IS FOUND: Bitter courgettes are rare: mostly from saved seeds or after a hot, dry summer

HOW OFTEN IT IS EATEN: Many eat courgettes, bitter ones very rarely

WHAT WE DO 102

Green tea extract in capsules

epigallocatechin gallate (EGCG)



WHAT IT DOES

At high doses it can damage the liver; this usually passes once the capsules are stopped

WHERE IT IS FOUND

Capsules and powders for weight loss and "detox" with concentrated green tea extract

HOW OFTEN IT IS FOUND: Capsules hold many times more catechins than a cup of tea

HOW OFTEN IT IS TAKEN: In courses lasting weeks; few people take them

WHAT WE DO 103

The extra-hot chip challenge

capsaicin



WHAT IT DOES

Fierce burning in the mouth, stomach pain and vomiting, which pass within hours

WHERE IT IS FOUND

One extremely hot chip or sauce, eaten for a dare or in a social media challenge

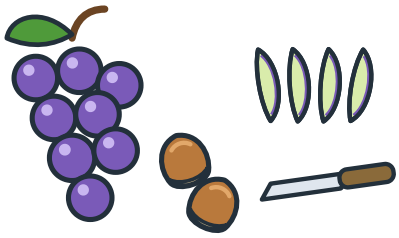
HOW OFTEN IT IS FOUND: Challenge chips hold many times more capsaicin than ordinary spicy food

HOW OFTEN IT IS EATEN: Rarely: mostly teenagers, once

WHAT WE DO 104

Whole grapes and nuts for a small child

choking: a piece of food in the airway



WHAT IT DOES

A piece of food blocks the airway: without help a child can suffocate within minutes

WHERE IT IS FOUND

Whole grapes and cherry tomatoes; nuts; popcorn; boiled sweets; hard pieces of apple and carrot

HOW OFTEN IT IS FOUND: Round, smooth and hard pieces are just the size of a small child's airway

HOW OFTEN IT IS EATEN: Small children get these foods often, but seldom choke badly

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure





WHAT WE DO

102

Green tea extract in capsules

Green tea is one of the most widely drunk beverages in the world, and drinking the tea does not harm the liver. Extract in capsules is another matter: there the tea's catechins, mainly epigallocatechin gallate (EGCG), are concentrated and swallowed at once, often on an empty stomach.

In 2018 the European Food Safety Authority (EFSA) concluded that 800 mg of EGCG a day or more from food supplements may bring the first signs of liver damage. It could not identify a safe dose. With tea a person takes in 90–300 mg a day. “Natural” does not mean “safe at any dose”.

HOW MUCH IS TOO MUCH?

Since 2022 the EU has banned food supplements that give 800 mg of EGCG a day or more. The rest must carry a warning: not on an empty stomach, not in pregnancy and not under 18.

Source: European Food Safety Authority (EFSA), safety of green tea catechins, 2018; Regulation (EU) 2022/2340

RISK ASSESSORS PUT IT HERE

MILD × RARELY

severity × exposure





WHAT WE DO

101

A bitter courgette or pumpkin

Wild gourds are bitter: bitter substances called cucurbitacins protect them from pests. Breeding took them out of the edible varieties. They come back when a courgette crosses with an ornamental gourd in the garden and its saved seeds are sown the next year, or when the plant suffers heat and drought.

Cucurbitacins irritate the stomach and gut, and cooking does not destroy them. French poison centres recorded 353 cases in five years, none severe. In Germany in 2015 a 79-year-old man died after a bitter courgette from his own garden; his wife ate less and recovered. Do not eat a bitter courgette.

HOW MUCH IS TOO MUCH?

There is no limit: your tongue helps. Taste a raw piece before cooking; if it is bitter, spit it out and throw the whole vegetable away.

Source: Tox Info Suisse, the Swiss poison information centre, bitter pumpkins and courgettes, 2024

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





WHAT WE DO

104

Whole grapes and nuts for a small child

This hazard is neither a microbe nor a chemical: it is the size and shape of food. A grape, a cherry tomato or a nut is just big enough to plug a small child's airway, and a smooth skin seals it tight.

Latvia's Children's Clinical University Hospital notes that swallowed objects and choking are among the most frequent injuries of small children, and that the risk is highest up to the age of three. The National Health Service (NHS) of the United Kingdom advises giving no whole nuts before the age of five. A child should eat sitting down, with an adult present.

HOW MUCH IS TOO MUCH?

There is no dose here: only the size and shape of the piece. Cut grapes and cherry tomatoes lengthways into quarters; give no whole nuts before the age of five. If a child is choking, call the emergency number.

Source: Children's Clinical University Hospital of Latvia (BKUS), 2022; National Health Service (NHS) of the United Kingdom, foods to avoid giving babies and young children

RISK ASSESSORS PUT IT HERE

MILD × RARELY

severity × exposure





WHAT WE DO

103

The extra-hot chip challenge

Capsaicin makes chilli peppers hot. It irritates the same nerve endings that sense heat, so the mouth “burns”. In ordinary food it does no harm. Challenge chips and sauces hold many times more capsaicin, and the point is to endure it.

The French food safety agency ANSES counted 124 calls to poison centres from 2021 to 2025. A third were about children aged 10 to 15, and in 39 % of cases it was a challenge. Almost all cases were mild. In the United States in 2023 a 14-year-old boy with a congenital heart condition died after such a chip. Six such products have been withdrawn from sale in the European Union since 2023.

HOW MUCH IS TOO MUCH?

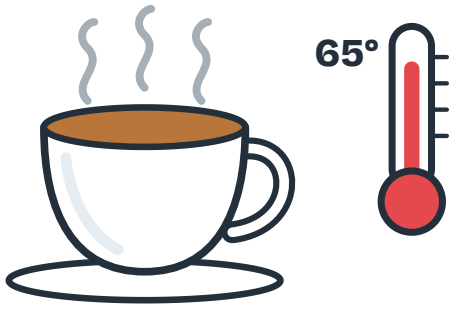
In one meal an adult tolerates up to 5 mg of capsaicin per kilogram of body weight; children are more sensitive. Something fatty or starchy, such as milk or bread, eases the burning; water does not.

Source: French food safety agency ANSES, hot pepper challenges, 2026; German Federal Institute for Risk Assessment (BfR), 2023

WHAT WE DO 105

Very hot tea and coffee

a temperature above 65 °C



WHAT IT DOES

The heat scalds the gullet again and again; over the years the risk of cancer of the gullet grows

WHERE IT IS FOUND

Tea, coffee, maté and other drinks drunk straight after pouring, hotter than 65 °C

HOW OFTEN IT IS FOUND: A freshly poured drink is well above 65 °C

HOW OFTEN IT IS DRUNK: Almost everyone drinks tea and coffee; some drink them very hot

WHAT WE DO 106

The "fat burner" DNP

2,4-dinitrophenol (DNP)



WHAT IT DOES

The body overheats from within: fever above 40 °C, a racing heart, organ failure; there is no antidote

WHERE IT IS FOUND

Capsules and powder for weight loss, bought online, sometimes as a "food supplement"

HOW OFTEN IT IS FOUND: Not in food or in shops; websites sell it

HOW OFTEN IT IS TAKEN: Almost nobody; mostly young people who want to lose weight fast

WHAT WE DO 107

Fennel tea for a baby

estragole



WHAT IT DOES

Estragole damages DNA; in animals it causes liver tumours

WHERE IT IS FOUND

Fennel tea for a baby's colic; fennel tea drunk by a breastfeeding or pregnant woman

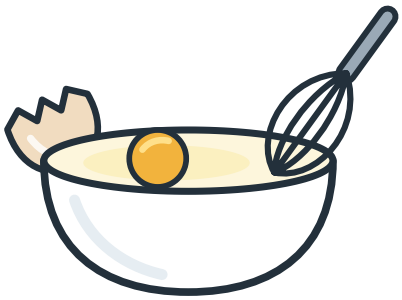
HOW OFTEN IT IS FOUND: Estragole is in fennel seeds and in tea made from them

HOW OFTEN PEOPLE DO IT: Some parents give it to a baby almost every day; many give none

WHAT WE DO 108

Raw eggs

Salmonella



WHAT IT DOES

Diarrhoea, fever and stomach pain for a few days; small children and older people may need hospital care

WHERE IT IS FOUND

Home-made mayonnaise, tiramisu, egg creams and drinks with raw egg; soft-boiled eggs

HOW OFTEN IT IS FOUND: In Latvia Salmonella is rarely found in eggs

HOW OFTEN IT IS EATEN: We eat dishes with raw egg now and then, more often on festive days

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × RARELY

severity × exposure





WHAT WE DO

106

The “fat burner” DNP

2,4-dinitrophenol (DNP) is an industrial chemical. In the 1930s it was sold as a slimming aid, until in 1938 it was declared unfit for human consumption. The internet brought it back.

DNP breaks the cell's energy production: energy is no longer stored but released as heat. Fat does “burn”, and the whole body overheats with it. There is no antidote. In the United Kingdom the poisons service took 21 enquiries about DNP from January 2012 to August 2013, and four people died. Since 2023 it has been a regulated poison there, which may not be sold or bought without a licence.

HOW MUCH IS TOO MUCH?

There is no safe dose: the gap between a dose that “works” and one that kills is small. In the United Kingdom DNP has been a regulated poison since 2023. A product that promises to “burn fat” without effort is a warning sign.

Source: Public Health England, 2013; Government of the United Kingdom (GOV.UK), 2,4-dinitrophenol, 2023

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure





WHAT WE DO

105

Very hot tea and coffee

In 2016 the International Agency for Research on Cancer (IARC) assessed coffee, maté and very hot drinks. For coffee it found no link with cancer. It found something else: drinks hotter than 65 °C are “probably carcinogenic to humans”, whatever is in the cup.

The evidence comes from China, Iran, Turkey and South America, where tea or maté is drunk very hot and cancer of the gullet is more common. The scald itself is thought to be the cause: the lining has to repair itself again and again. The answer is simple: wait a few minutes, or add milk.

HOW MUCH IS TOO MUCH?

The line is 65 °C. Wait a few minutes, or add milk or cold water. For coffee and maté that are not very hot, no link with cancer has been shown.

Source: International Agency for Research on Cancer (IARC), coffee, maté and very hot beverages, 2016

RISK ASSESSORS PUT IT HERE

SERIOUS × RARELY

severity × exposure





WHAT WE DO

108

Raw eggs

Salmonellosis was recorded in 65,208 people in the European Union in 2022, and eggs are one of the most frequent sources. Since 2003 the EU has run control programmes in poultry flocks. In Latvia Salmonella is rarely found in eggs.

Rarely is not never. Boiling and frying destroy Salmonella, but in tiramisu, home-made mayonnaise and egg cream the egg stays raw. If the dish then stands in the warm, a few bacteria multiply. So take fresh eggs for such dishes, keep them in the fridge and eat them the same day.

HOW MUCH IS TOO MUCH?

There is no dose here: one infected egg is enough. For dishes without heating, take fresh, uncracked eggs kept cool; give no raw egg to small children, pregnant women or older people.

Source: European Food Safety Authority (EFSA), Salmonella, topic page with 2022 data

RISK ASSESSORS PUT IT HERE

SERIOUS × SOMETIMES

severity × exposure





WHAT WE DO

107

Fennel tea for a baby

Fennel tea is an old home remedy for a baby's colic. Fennel seeds hold estragole, the substance behind the aniseed-like smell. In animals it damages DNA and causes liver tumours, so no safe dose can be set.

In a draft opinion of 2025 the European Food Safety Authority (EFSA) concluded that fennel seed preparations are a concern for babies and young children, and for pregnant and breastfeeding women, because estragole reaches the child. Preparations with the estragole removed raise no concern. The smallest are the most sensitive: they weigh little and get the tea every day.

HOW MUCH IS TOO MUCH?

No safe level can be set. The European Food Safety Authority (EFSA) in 2025: the concern is for babies, young children, and pregnant and breastfeeding women. Ask a doctor about colic.

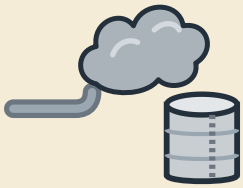
Source: European Food Safety Authority (EFSA), estragole in fennel seed preparations, draft opinion, 2025

METALS 109

A CASE FROM HISTORY **Europe, 1970s**
One real case from the past, assessed for the people who lived then and there.

Lead from petrol

plumbum



82
Pb
207,2

WHAT IT DOES

Permanently harms children's brain development: lower intelligence quotient (IQ), changed behaviour

WHERE IT IS FOUND

All everyday food, the air, cans with lead solder

HOW OFTEN IT IS FOUND: Everywhere, as road traffic in Europe emitted 119,000 t of lead in 1975

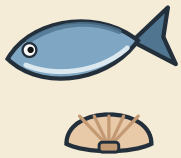
HOW OFTEN IT IS EATEN: Everyone, every day, including by breathing

METALS 110

A CASE FROM HISTORY **Japan, 1956**
One real case from the past, assessed for the people who lived then and there.

Methylmercury in Minamata

CH_3Hg^+ · hydrargyrum



80
Hg
200,6

WHAT IT DOES

Severely damages the nervous system; can kill; harms children before birth

WHERE IT IS FOUND

Fish and shellfish from Minamata Bay

HOW OFTEN IT IS FOUND: In the bay's fish for decades; from about 1953, cats that ate them went mad and died

HOW OFTEN IT IS EATEN: Fishing families ate fish every day, often three times a day

METALS 111

A CASE FROM HISTORY **Japan, 1910s–1970s**
One real case from the past, assessed for the people who lived then and there.

Cadmium in Toyama rice

cadmium



48
Cd
112,4

WHAT IT DOES

Damages the kidneys, then softens the bones until they break again and again

WHERE IT IS FOUND

Rice from paddies irrigated with Jinzū river water, and river water to drink

HOW OFTEN IT IS FOUND: In every harvest, as the soil of 1,686.2 ha of paddies was polluted

HOW OFTEN IT IS EATEN: Rice from their own paddies, every day, for decades

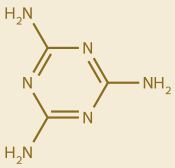
OTHER 112

A CASE FROM HISTORY **China, 2008**
One real case from the past, assessed for the people who lived then and there.

Melamine in infant formula

$C_3H_6N_6$ melamine





WHAT IT DOES

Forms stones in the kidneys and urinary tract; in babies the kidney damage can be fatal

WHERE IT IS FOUND

Infant formula and milk products

HOW OFTEN IT IS FOUND: 69 of 491 batches; the most contaminated brand, Sanlu, averaged 1,212 mg/kg

HOW OFTEN IT IS EATEN: For the babies it was the main food, for some the only one, several times a day

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a fishing family on Minamata Bay in the 1950s



80 Hg

METALS · HISTORY · JAPAN, 1956

110

Methylmercury in Minamata

In 1956 a new disease was officially reported in Minamata, among people who ate fish from the bay. Since 1932 a chemical plant had discharged waste with methylmercury into the sea, and it built up in fish and shellfish, which fishing families ate daily. Japan has officially recognised 3,000 patients, 716 of them from a second outbreak in Niigata. Discharge stopped in 1968, and the Minamata Convention on Mercury entered into force in 2017.

HOW MUCH IS TOO MUCH?

In 1957 fish sales were not banned. Today Regulation (EU) 2023/915 caps mercury in fish: 0.30 or 0.50 mg/kg, and 1.0 mg/kg in large predatory fish.

Source: Ministry of the Environment of Japan (2002, 2025); European Environment Agency (EEA), "Late lessons from early warnings II", Chapter 5 (2013); Takaoka and colleagues, 2018

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a child in Europe in the 1970s



82 Pb

METALS · HISTORY · EUROPE, 1970S

109

Lead from petrol

In the 1970s lead was everywhere: cars blew it out (road traffic in Europe emitted 119,000 t in 1975), and it was in the solder of food cans. In the United Kingdom the diet held 110 µg of lead a day in 1976 and 6 µg in 2006. The European Union cut lead in petrol step by step and banned leaded petrol from 1 January 2000. Lead has not gone, so the card "Lead" still sits at "often", but the amounts are many times smaller.

HOW MUCH IS TOO MUCH?

In 1978 the European Economic Community (EEC) allowed petrol to hold up to 0.4 g of lead per litre. Today Regulation (EU) 2023/915 caps lead in food, for example 0.20 mg/kg in cereals.

Source: European Food Safety Authority (EFSA), 2010 (lead in food); European Environment Agency (EEA), "Late lessons from early warnings II", Chapter 3 (2013); Stroh and colleagues, 2009; Directive 98/70/EC

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a baby fed on a contaminated brand of formula in China in 2008





OTHER · HISTORY · CHINA, 2008

112

Melamine in infant formula

In China in 2008 melamine was added to watered-down milk. It is rich in nitrogen, and the usual test read it as protein, so the milk looked complete. Products of 22 companies carried it. For formula-fed babies formula was the main food, for some the only one: 294,000 were affected and six died. The European Union banned such imports from China that year and now sets limits for melamine in food.

HOW MUCH IS TOO MUCH?

After the crisis the European Union banned such imports from China in 2008. Today the limit is 2.5 mg/kg in food, and in infant formula 1 mg/kg as powder and 0.15 mg/kg as liquid.

Source: World Health Organization (WHO), 2009 (melamine and cyanuric acid); Commission Decision 2008/798/EC; Regulation (EU) 2023/915

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a long-term resident of the Jinzū river basin in the mid-20th century



48 Cd

METALS · HISTORY · JAPAN, 1910S–1970S

111

Cadmium in Toyama rice

From about 1912 people in the Jinzū river basin in Japan suffered pain all over the body. The disease was called "itai-itai", "it hurts, it hurts". The cause was cadmium from the Kamioka mine: irrigation water carried it into the rice paddies and the rice, and people also drank the river water. In all, 201 patients were officially recognised. In 1968 the government named the cause; the paddies were rebuilt with clean soil in 1979–2012.

HOW MUCH IS TOO MUCH?

Japan set a limit for rice (1 mg/kg) only in 1970. Today Regulation (EU) 2023/915 caps cadmium in rice at 0.15 mg/kg.

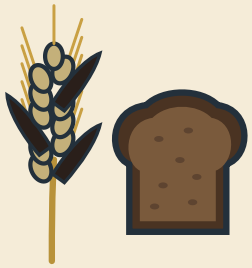
Source: Toyama Prefecture; Ministry of the Environment of Japan (2025); Kaji, 2012

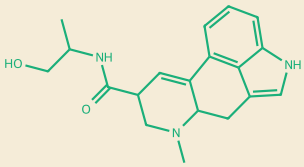
MYCOTOXINS 113

A CASE FROM HISTORY **Urals, 1926–1927**
One real case from the past, assessed for the people who lived then and there.

Ergotism epidemic

$C_{19}H_{23}N_3O_2$ ergometrine, one of the ergot alkaloids





WHAT IT DOES

Painful cramps, fits and psychoses; can kill

WHERE IT IS FOUND

Rye bread, and kvass and beer from the same rye

HOW OFTEN IT IS FOUND: 45 % of 457 flour samples held a lot of ergot

HOW OFTEN IT IS EATEN: Everyone, several times a day, all autumn and winter

OTHER 114

A CASE FROM HISTORY **Estonia, 2001**
One real case from the past, assessed for the people who lived then and there.

Methanol in Pärnu

CH_4O methanol





WHAT IT DOES

After 12 to 24 hours sight blurs, breathing gets hard, coma follows; many die or lose their sight

WHERE IT IS FOUND

Illegal vodka with methanol in place of drinking alcohol

HOW OFTEN IT IS FOUND: The illegal vodka held 50–100 % methanol

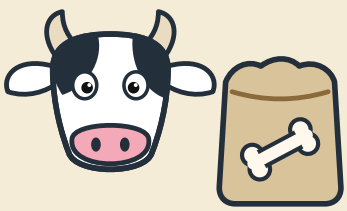
HOW OFTEN IT IS DRUNK: Buyers drank it as ordinary vodka

OTHER 115

A CASE FROM HISTORY
United Kingdom, 1986–1996
One real case from the past, assessed for the people who lived then and there.

"Mad cow disease"

prions: misfolded proteins



WHAT IT DOES

A new variant of Creutzfeldt–Jakob disease: the brain breaks down, and the disease always ends in death

WHERE IT IS FOUND

Beef products that held brain or spinal cord tissue of sick cattle

HOW OFTEN IT IS FOUND: For ten years meat and tissue of infected cattle went into food

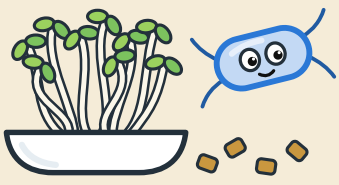
HOW OFTEN IT IS EATEN: The British ate beef every week

MICRO-ORGANISMS 116

A CASE FROM HISTORY **Germany, 2011**
One real case from the past, assessed for the people who lived then and there.

E. coli in sprouts

Escherichia coli O104:H4



WHAT IT DOES

Bloody diarrhoea; kidney failure in more than one patient in five; 50 people died

WHERE IT IS FOUND

Raw sprouts in salads and sandwiches, grown from contaminated fenugreek seeds

HOW OFTEN IT IS FOUND: The bacteria were on the seeds from which the sprouts were grown

HOW OFTEN IT IS EATEN: The sprouts were eaten raw, in restaurants and at home

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a person who bought illegal vodka in Pärnu in September 2001

OTHER · HISTORY · ESTONIA, 2001

114

Methanol in Pärnu

In September 2001 illegal vodka holding 50–100 % methanol was sold in and around Pärnu. Within days 111 poisoned people were in hospital, and another 43 were found dead outside hospital. In all 68 died.

Methanol itself is less poisonous than what it turns into: the body converts it to formic acid, which damages the optic nerve and the brain. So in the first hours a person feels only drunk, and seeks help too late. Six years later 26 of the 86 survivors had died. Legal alcohol is controlled; an illegal bottle can hold anything.

HOW MUCH IS TOO MUCH?

Methanol is poisonous in small amounts: a few shots of such a drink can take a person's sight or life. Legal alcohol holds only traces of methanol, and EU rules limit it.

Source: Paasma et al., BMC Clinical Pharmacology, 2009; Paasma, University of Tartu, 2013

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a peasant in the Urals from autumn 1926 to spring 1927



MYCOTOXINS · HISTORY · URALS, 1926–1927

113

Ergotism epidemic

The summer of 1926 in the Urals was cold and wet, and rye flowered for a long time. Ergot spread: in some fields every ear was affected, and 45 % of flour samples held a lot of it. People baked bread and brewed kvass from that rye. Four districts registered more than 10,000 cases. Today grain is cleaned and sorted and the European Union sets limits, but ergot still grows in Latvian rye fields.

HOW MUCH IS TOO MUCH?

A ban on milling rye with a lot of ergot was ignored even at state mills. Today the European Union limit for unprocessed rye is 0.2 g of ergot per kilogram.

Source: Maksudov, Kazan Medical Journal, 1927 (in Russian); Regulation (EU) 2023/915; Bankina and colleagues, 2008, Latvia University of Agriculture (LLU)

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a person who ate salads with sprouts in northern Germany in May 2011



MICRO-ORGANISMS · HISTORY · GERMANY, 2011

116

E. coli in sprouts

In May 2011 adults with bloody diarrhoea and kidney failure began to arrive at hospitals in northern Germany. Cucumbers, tomatoes and lettuce were blamed first. After several weeks the trail led to sprouts from one farm; the seeds had been imported from Egypt.

4,075 people in 16 countries fell ill, 908 of them developed haemolytic uraemic syndrome, and 50 died. Sprouts are a special product: the seeds are sprouted in warmth and damp, where a few bacteria become millions in a day, and then the sprouts are eaten raw. Since 2013 sprout growers in the EU have had to meet stricter rules.

HOW MUCH IS TOO MUCH?

There is no dose here: a very small number of these bacteria is enough. Since 2013 sprout growers in the EU have had to test seeds and sprouts; vulnerable people are advised to eat sprouts only cooked.

Source: Centers for Disease Control and Prevention (CDC) of the United States, Morbidity and Mortality Weekly Report, 2013; Regulations (EU) No 208/2013 to 211/2013

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a person who ate beef products in the United Kingdom between 1986 and 1996



OTHER · HISTORY · UNITED KINGDOM, 1986–1996

115

“Mad cow disease”

Bovine spongiform encephalopathy, or “mad cow disease”, appeared in the United Kingdom in 1986. Cattle had been fed meat-and-bone meal from sick animals. The cause is not a microbe but a prion: a misfolded protein that cooking does not destroy.

For a long time it was said to be no danger to people. In 1996 a new variant of Creutzfeldt–Jakob disease was found. By 2014 there were 229 patients in 12 countries, 177 of them in the United Kingdom, and none survived. In 2001 the EU banned animal meal in feed. This crisis is one of the reasons why the European Food Safety Authority (EFSA) was set up in 2002.

HOW MUCH IS TOO MUCH?

There is no safe dose, and cooking does not destroy prions. So the EU banned animal meal in feed, and the brain and spinal cord of cattle are kept out of food.

Source: European Food Safety Authority (EFSA), bovine spongiform encephalopathy; Centers for Disease Control and Prevention (CDC) of the United States, variant Creutzfeldt–Jakob disease, 2014

OTHER 117

A CASE FROM HISTORY
Belarus and Ukraine, 1986
One real case from the past, assessed for the people who lived then and there.

Radioactive iodine in milk

iodine-131, a radioactive isotope





WHAT IT DOES

The thyroid gland collects radioactive iodine; years later children developed thyroid cancer

WHERE IT IS FOUND

Fresh milk from cows that grazed contaminated pastures in the first weeks after the accident

HOW OFTEN IT IS FOUND: After the accident radioactive iodine was in the milk throughout the affected area

HOW OFTEN IT IS DRUNK: Children drank milk every day

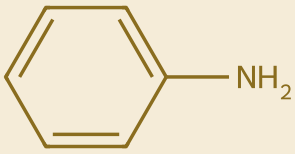
OTHER 118

A CASE FROM HISTORY **Spain, 1981**
One real case from the past, assessed for the people who lived then and there.

The toxic oil of Spain

C_6H_7N aniline, added to make the oil unfit for food





WHAT IT DOES

First inflammation of the lungs, then muscle pain, hardening of the skin and nerve damage; many were left disabled

WHERE IT IS FOUND

Industrial rapeseed oil, reprocessed and sold without a label as cheap olive oil

HOW OFTEN IT IS FOUND: All of this oil was poisonous; sellers offered it cheap and without a label

HOW OFTEN IT IS EATEN: Families cooked with it every day

METALS 119

A CASE FROM HISTORY **United States, 2023**
One real case from the past, assessed for the people who lived then and there.

Lead in cinnamon apple purée

plumbum





WHAT IT DOES

Lead harms a small child's brain development, sometimes for life

WHERE IT IS FOUND

Cinnamon apple purée in pouches for toddlers

HOW OFTEN IT IS FOUND: The lead was in the cinnamon, and so in every pouch

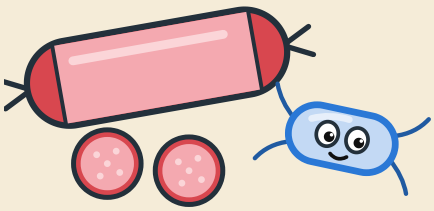
HOW OFTEN IT IS EATEN: Small children ate it often, some every day

MICRO-ORGANISMS 120

A CASE FROM HISTORY **South Africa, 2017–2018**
One real case from the past, assessed for the people who lived then and there.

Listeriosis in South Africa

Listeria monocytogenes



WHAT IT DOES

Blood poisoning and meningitis; a pregnant woman's baby may be born ill or dead

WHERE IT IS FOUND

The cheap cooked sausage “polony” from one plant

HOW OFTEN IT IS FOUND: The contaminated sausage was in the shops for more than a year

HOW OFTEN IT IS EATEN: Everyday food, eaten without heating

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a person who bought cheap “olive oil” from a street seller in Spain in spring 1981



OTHER · HISTORY · SPAIN, 1981

118

The toxic oil of Spain

In May 1981 people near Madrid began to fall ill with an unusual inflammation of the lungs. Weeks later the common link was found: all had cooked with a cheap oil that sellers offered as olive oil. In fact it was rapeseed oil for industry, with aniline added to keep it from being eaten. Fraudsters had tried to refine the aniline out.

About 20,000 people fell ill, and about 300 died soon after. Many were left with damage to muscles, nerves and skin. More than 20 years later researchers wrote that it was still not proven which substance in the oil caused the disease. The aniline compounds found in the oil mark the dangerous batches, but the poison itself has not been found.

HOW MUCH IS TOO MUCH?

There was no limit: such oil should not have been in food at all. The guilty substance was not found; the aniline compounds in the oil are only a marker of the dangerous batches.

Source: Gelpí et al., Environmental Health Perspectives, 2002

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a child who drank local milk in the areas hit by the Chernobyl accident in spring 1986



53 I

OTHER · HISTORY · BELARUS AND UKRAINE, 1986

117

Radioactive iodine in milk

On 26 April 1986 a reactor of the Chernobyl nuclear power plant exploded. Radioactive iodine-131 was released into the air and settled on pastures in Belarus, Ukraine and western Russia. Cows ate the grass, and the iodine passed into the milk.

The thyroid gland collects iodine, ordinary or radioactive alike, and a child's thyroid is small and sensitive. According to the World Health Organization (WHO), by 2005 thyroid cancer had been found in more than 6,000 people who were children or adolescents then; 15 of them died. Iodine-131 decays fast: after a few months it was gone. Most of the dose came with the milk drunk in the first weeks.

HOW MUCH IS TOO MUCH?

The half-life of iodine-131 is eight days: after a few months it is gone. Today, after a nuclear accident, the EU sets temporary limits for radioactivity in food.

Source: World Health Organization (WHO), radiation: the Chernobyl accident

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a person who ate “polony” sausage in South Africa in 2017





MICRO-ORGANISMS · HISTORY · SOUTH AFRICA, 2017–2018

120

Listeriosis in South Africa

From January 2017 to July 2018 South Africa confirmed 1,060 cases of listeriosis; 216 people died. It is the largest listeriosis outbreak known. Almost half the patients, 42 %, were newborns: to the pregnant woman herself listeriosis often feels like a mild cold, but the bacteria reach the baby.

The search for the source took more than a year. It turned out to be a cheap cooked sausage, “polony”, from one plant, eaten without heating. Listeria lived in the plant itself and got onto the sausage after cooking. The products were recalled, and 5,812 tonnes were destroyed.

HOW MUCH IS TOO MUCH?

Since July 2026 the EU rule for ready-to-eat food where Listeria can grow has been: none found in 25 g, unless the producer has shown there will be no more than 100 per gram. In this outbreak the products were recalled, and 5,812 tonnes were destroyed.

Source: Food Safety News, figures of the South African Department of Health, 2018; Regulation (EC) No 2073/2005; Regulation (EU) 2024/2895

RISK ASSESSORS PUT IT HERE

VERY SERIOUS × OFTEN

for a small child who ate this purée in the United States in 2023



82 Pb

METALS · HISTORY · UNITED STATES, 2023

119

Lead in cinnamon apple purée

In autumn 2023 doctors in the United States found high blood lead levels in several small children. One product was common to their homes: cinnamon apple purée in pouches. Tests showed 1.9–3.0 mg of lead per kilogram of purée. The product was recalled on 29 October.

The lead was in the cinnamon, ground in Ecuador. It held lead chromate, a yellow pigment: probably added to make the spice heavier and brighter. The Centers for Disease Control and Prevention (CDC) counted 566 cases, and 55 % of them were under two years old. The fraud was uncovered not by food control but by children's blood tests.

HOW MUCH IS TOO MUCH?

No safe level of lead in a child's blood is known. The United States acts above 3.5 µg/dl; the median for these children was 7.2. The product was recalled on 29 October 2023.

Source: Centers for Disease Control and Prevention (CDC) of the United States, Morbidity and Mortality Weekly Report, 2025