

Frequently asked questions about chlorate in food

BfR FAQ of 15 February 2018

Due to repeated detections, the European Food Safety Authority (EFSA) has assessed the health risks caused by chlorate in foods. The German Federal Institute for Risk Assessment (BfR) has updated its opinion on chlorate on this basis.

Chlorates are salts of chloric acid. Sodium and potassium chlorate used to be employed as herbicides but the use of plant protection and biocidal products containing chlorate is no longer permitted in the EU. Chlorate can occur, however, as a by-product when using chlorinated substances for cleaning or disinfection. According to the latest available findings, the likely entry path is the contact of foods with water that was previously treated with chlorinated biocidal products for disinfection purposes.

The BfR has compiled questions and answers on the subject.

What is chlorate?

Chlorates are salts of chloric acid (HClO_3) which consist of the chlorate anion (ClO_3^-) and various cations. Sodium and potassium chlorate are examples of well-known chlorate compounds. It is not known which chlorate compounds were contained in the foods in which chlorate was detected.

Where does chlorate come from and what is it used for?

Sodium and potassium chlorate used to be employed as herbicides but the use of plant protection and biocidal products containing chlorate is no longer permitted in the EU. Chlorate can occur, however, as a by-product when using chlorinated substances for cleaning or disinfection.

How does chlorate get into food?

According to the latest findings, the main entry path is probably the contact of foods - in the course of their production and/or processing - with water which has been treated previously with chlorinated biocidal products for disinfection purposes. Chlorate can occur as a by-product of disinfection when used in this way.

Which health impairments can be caused by chlorate and who is affected by them?

Repeated exposure to chlorate can have the result that iodine intake is inhibited in humans. This inhibition can cause temporary changes to thyroid hormone levels in high-risk groups. The inhibition of iodine intake through chlorate is reversible.

People with thyroid disorders or an iodine deficiency can be particularly affected by undesired effects, as can newly born babies and other children. Another critical group comprises expectant mothers who already have a thyroid function disorder.

A one-time intake of chlorate (acute exposure) has only a negligible effect on the inhibition of iodine intake but higher chlorate concentrations can result in damage to the red blood cells.

From which intake quantity does chlorate become a health concern?

EFSA has derived a tolerable daily intake (TDI) for chlorate of 0.003 milligrams (mg) per kilogram (kg) body weight. Potency is therefore ten times lower than that for perchlorate (http://www.bfr.bund.de/en/frequently_asked_questions_about_perchlorate_in_food-188608.html). Based on the effect that with a one-time intake of higher chlorate concentra-

tions the red blood cells can be damaged, EFSA also derived an acute reference dose (ARfD) of 0.036 mg per kg body weight for chlorate.

Which maximum residue levels apply to chlorate in food?

Chlorate lies within the scope of Regulation (EC) No. 396/2005. As no specific maximum residue levels have been established yet for chlorate, a default maximum residue level of 0.01 mg per kg food applies to all foods in line with the regulation. In many food groups, however, this maximum level is not sufficient to cover the levels that can occur after contact with water that was previously treated with chlorinated disinfectants. For this reason, the European Commission intends to establish specific maximum residue levels for food groups of plant and animal origin on the basis of monitoring data. When determining maximum residue levels, it should be taken into account that consumers not only ingest chlorate through food but also and above all via drinking water, and that the estimated total intake through both entry paths should not be above the TDI.

How much chlorate may be contained in drinking water?

The World Health Organization (WHO) has published a preliminary guideline value for chlorate of 0.7 mg per litre of drinking water. Under consideration of the current toxicological assessments, however, a lowering of this value and the inclusion of a specific limit value for chlorate in the German drinking water regulation are being discussed.

Can chlorate in food lead to adverse health effects?

On the basis of the evaluated data on the occurrence of chlorate in food, EFSA comes to the conclusion in its opinion that the repeated intake of chlorate among the younger population groups with a slight to moderate iodine insufficiency gives cause for concern, whereas a one-time intake is regarded as non-critical.

In which foods is chlorate detected particularly often?

Chlorate is frequently detected in deep-frozen vegetables, fruit juices and lettuce/herbs. The reason for the occurrence of chlorate in these products could have been processes such as the glazing of deep-frozen produce, the dilution of juice concentrates or the rinsing of herbs and lettuce with water containing chlorate.

Did the foods that contained chlorate come from specific countries?

Chlorate residues were detected in foods from numerous countries of origin, including Germany.

What can consumers do?

Consumers should maintain a balanced and varied diet. The health benefits of fruit and vegetables remain undisputed.

What does the BfR recommend to protect consumers from chlorate?

The BfR recommends that, in line with the proposal of the EU Commission, all bodies affected by the chlorate problem in the areas of plant protection products, drinking water, baby food and food hygiene jointly discuss the necessary measures so that it can be guaranteed in the risk assessment that all entry paths have been taken into account and that the measures necessary to comply with drinking water hygiene can continue to be implemented.

More information on the subject of chlorate at the BfR website

Opinion on chlorate of 15 February 2018

<http://www.bfr.bund.de/cm/349/the-entry-of-chlorate-into-the-food-chain-should-be-reduced.pdf>



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About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the Federal Ministry of Food and Agriculture (BMEL) in Germany. It advises the Federal Government and Federal Laender on questions of food, chemical and product safety. The BfR conducts its own research on topics that are closely linked to its assessment tasks.

This text version is a translation of the original German text which is the only legally binding version.