

## Frequently asked questions about perchlorate in food

Updated BfR FAQ of 15 February 2018

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

Perchlorates are salts of perchloric acid. Perchlorate occurrences in the environment are mainly of anthropogenic origin, i.e. they are caused by humans, although perchlorate can also occur naturally in mineral storage sites in several countries. Unlike several chlorates, perchlorates have never been approved as a pesticidal or biocidal active substance in the EU. Perchlorate can occur, however, as a by-product when using chlorinated substances for cleaning or disinfection. According to the latest findings, the main entry path is probably 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 perchlorate?

Perchlorates are salts of perchloric acid ( $\text{HClO}_4$ ) which consist of the perchlorate anion ( $\text{ClO}_4^-$ ) and various cations. Ammonium perchlorate and various metal salts (barium, potassium, lithium, magnesium and silver perchlorate) are examples of well-known perchlorate compounds. It is not known which perchlorate compounds were contained in the foods in which perchlorate was detected.

### Where does perchlorate come from and what is it used for?

Perchlorate is usually of anthropogenic origin, i.e. man-made, although it can also occur naturally. In several countries, such as Chile, perchlorates occur naturally in higher concentrations in the soil. So-called Chile saltpeter, which is used as a fertiliser, can contain perchlorate. Perchlorates are also used as industrial chemicals and pharmaceuticals, especially as rocket fuel and in fireworks. They can also be formed by oxidative processes in the atmosphere or in small quantities when chlorinated disinfectants are used. Perchlorates are not approved in the EU as pesticidal or biocidal active substances.

### How does perchlorate get into food?

Perchlorate can be carried over from fertilisers to plants and therefore to plant-based foods too. It can also find its way into the environment through the use of industrial chemicals, rocket fuels and fireworks. According to the latest findings, however, 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. Perchlorate can occur as a by-product of disinfection when used in this way.

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

Repeated exposure to perchlorate 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 perchlorate 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.

**From which intake quantity does perchlorate become a health concern?**

EFSA has derived a tolerable daily intake (TDI) for perchlorate of 0.0003 milligrams (mg) per kilogram (kg) body weight based on an inhibition of iodine intake in healthy adults. As acute health hazards through a one-time intake of perchlorate in food are unlikely, according to EFSA, an acute reference dose (ARfD) was not derived.

**Which maximum residue levels apply to perchlorate in food?**

As perchlorate is not covered by Regulation (EC) No. 396/2005, no maximum residue levels in foods have been established up to now. Perchlorate has not yet been regulated under contaminants law either. Perchlorate levels in foods should be kept as low as possible and should follow the ALARA (as low as reasonably achievable) principle.

**How great is the risk that perchlorate in food leads to adverse health effects?**

On the basis of the evaluated data on the occurrence of perchlorate in food, EFSA comes to the conclusion in its opinion that, a one-time intake of perchlorate in the concentrations that have been measured up to now, is unlikely to cause adverse health effects. Long-term exposure to perchlorate can give cause for concern, however, with regard to the health risks this can cause, especially for younger population groups with a high intake and a simultaneous slight to moderate iodine deficiency. In addition to this, perchlorate can pose a health risk to infants breastfed by mothers with an iodine deficiency. As with small children with an under-supply of iodine, this applies after only two to three weeks' (short-term) exposure to perchlorate. Even if a perchlorate level of only 0.01 mg per kg were to be tolerated in all foods, which equates to the currently achievable analytical limit of quantification, exposure would lie above the determined TDI so that a health impairment through perchlorate would be possible. Perchlorate levels in food should therefore be as low as possible.

**Did the foods that contained perchlorate come from specific countries?**

Perchlorate 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 perchlorate?**

The BfR recommends that all bodies affected by the perchlorate problem make efforts in their specific area to reduce overall perchlorate levels in food to the extent that is technically feasible without dispensing with the measures that are necessary to comply with drinking water hygiene.

**More information on the subject of perchlorate at the BfR website**

Opinion on perchlorate of 15 February 2018

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



BfR "Opinions app"

## 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.*