

Selected Questions and Answers on PET Bottles

Updated FAQ to the BfR of 10 February 2015

PET is the abbreviation for polyethylene terephthalate, a plastic used among other things for the manufacture of drink bottles and other packagings. It usually states on drink bottles which plastic they are made of. PET bottles are normally marked with "PET" or the triangular arrow symbol with the number 1.

Consumers continually ask the BfR whether plastic bottles made of PET pose a health hazard. They are particularly concerned that hormone-like substances which transfer from the plastic to the drink could be contained in PET bottles.

The BfR answers frequently asked questions about PET bottles in the following paragraphs.

Are hormone-like substances transferred from PET bottles to beverages?

The estrogenic activity of mineral waters was examined in several studies with cell culture test systems and in one test on snails. Estrogenic activity was detected in several cases, but it was approx. 10,000 times lower than the natural estrogenic activity of beverages such as milk, beer or red wine. The comparison between mineral waters from PET bottles and others from glass bottles did not show any differences with regard to the estrogenic activity measured in the cell cultures. It must therefore be assumed that this low activity is not attributable to the PET bottle. In chemical analyses of mineral waters, no substances have yet been detected either which could have caused the estrogenic activity.

Are estrogen-effective substances used in the manufacture of PET bottles?

Antimony compounds can be used as catalysts in the manufacture of PET. Antimony has a very low estrogenic effectiveness. Concentrations of up to 2 micrograms of antimony per litre have been detected in mineral water. These values fall clearly below the limit value for the transfer of antimony from packaging materials to foods. The migration value was set by the EU Commission at 40 micrograms per kg of food.

Are plasticisers contained in PET bottles?

When consumers hear the name "polyethylene terephthalate", they often think of phthalates, which are used as plasticisers. One of the reasons why phthalates are a repeated topic of public discussion is that several of them have hormone-like effects, but phthalates and other plasticisers are not used in the manufacture of PET bottles. For this reason, if they were detected in the mineral waters at all, it was only in such low concentrations which cannot explain the measured estrogenic activities.

Is Bisphenol A contained in PET bottles?

Bisphenol A belongs to a group of substances which can have a hormone-like (estrogen) effect. The substance can be contained in articles made of plastic, including those which have contact with food. Examples of this are drinking cups, plastic dishes and the inside coating of cans, but Bisphenol A is not contained in PET bottles.

Sometimes mineral water from PET bottles has a sweetish fruity taste. What does this mean?

A substance called acetaldehyde is produced in the manufacture and storage of PET bottles. If acetaldehyde from the bottle transfers to the beverage, it can be tasted and smelt in very small quantities - at least in mineral water - but acetaldehyde is inconspicuous to the senses in drinks with an intensive taste, such as cola or lemonade.

Is acetaldehyde in beverages harmful to health?

According to the regulations valid in the EU, a maximum of 6 mg of acetaldehyde may transfer from plastics to 1 kg of food. Health impairments are excluded up to this limit value, even though humans can distinctly smell or taste the substance in less than a hundredth of this quantity. There is therefore no health risk - even though the acetaldehyde is conspicuous to the senses - as the quantity is usually clearly below the limit value.

Does the consumer just have to accept the acetaldehyde taste when drinking mineral water from a PET bottle?

The transfer of acetaldehyde from PET in quantities that can be tasted is usually a result of technical defects in the manufacture of the bottles. Even though small quantities of acetaldehyde do not pose a health risk for consumers, a change to the taste or smell of a drink is not desired and not allowed either by the valid regulations. The acetaldehyde taste constitutes a sensory impairment of the food mineral water and thereby a quality defect which consumers do not have to accept. They can return drinks which show this defect. The manufacturers of PET bottles are required to avoid the transfer of acetaldehyde by technical means. To do so, for example, substances can be used which bond the acetaldehyde in the PET and do not cause any health risks or sensory impairments on their own. Another possibility is to apply a glass-like inner coating to the bottles which prevents the transfer of acetaldehyde to the drink.