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Reducing aluminium intake can minimise potential health risks

BfR Opinion No. 045/2019 of 18 November 2019*

Consumers can take up aluminium compounds from various sources, such as food, cosmetic products like aluminium containing antiperspirants and toothpaste, food contact materials like uncoated aluminium menu or baking trays and drugs. For the first time, the BfR has now estimated the total aluminium intake for different age groups (infants, children and adolescents as well as adults) and carried out a risk assessment. In addition, the contributions of the various sources of total aluminium intake by the population were compared with one another. A high intake of aluminium compounds can cause, among other things, neurotoxic developmental disorders as well as damage the kidneys, liver and bones.

The BfR bases its assessment of the population's aluminium intake from food on the latest consumption and concentration data. Consumption data are collected through consumer surveys and provide information on which foods and how much of them are eaten by different consumer groups. The concentration data used show the average aluminium concentrations in the different food categories. For non-food products, such as cosmetics or packaging, the exposure assessment is also based on data regarding aluminium contents in the products. Furthermore, typical application forms and quantities are taken into account.

For the risk assessment of aluminium intake, the BfR uses the tolerable weekly intake (TWI) derived from the European Food Safety Authority (EFSA) of 1 milligram aluminium per kilogram body weight.

The BfR's assessment shows that aluminium intake from food is lower compared to previous studies. Food is still a relevant, but no longer the population's main source of intake. If other relevant sources of aluminium intake are taken into account, such as aluminium containing cosmetic products and uncoated food contact materials, the total intake can exhaust or even exceed the TWI for all age groups.



Consumers can influence their aluminium intake. Those who want to reduce their aluminium intake should use aluminium containing antiperspirants¹ and toothpaste sparingly. When it comes to food, the BfR recommends a varied diet as well as alternating products and brands. This can contribute to reducing the risk of permanently high aluminium intake caused by individual highly contaminated products. The BfR recommends, also for other reasons, exclusively breastfeeding infants in the first six months of life, if possible. The BfR generally advises against the preparation and storage of, in particular, acidic and salty foods in uncoated aluminium articles or aluminium foil. If the aforementioned and avoidable sources of intake are reduced, most consumers are not expected to suffer any adverse health effects.

¹ A new assessment of the BfR of 20 July 2020 is available <https://www.bfr.bund.de/cm/349/new-studies-on-anti-perspirants-containing-aluminium-impairments-to-health-unlikely-as-a-result-of-aluminium-uptake-via-the-skin.pdf>. The BfR recommendations do not change, with the exception of those on antiperspirants. (see also https://www.bfr.bund.de/en/press_information/2020/24/aluminium_in_antiperspirants_low_contribution_to_the_total_intake_of_aluminium_in_humans-250982.html)

* This version was amended on 20 July 2020 to include a reference to the re-assessment of aluminium in antiperspirants

The BfR recommends that manufacturers take appropriate measures to reduce the amount of aluminium in food. These may include, for example, using raw materials with low aluminium content or coated materials for processing and packaging food.

There is still a high level of uncertainty in aluminium risk assessment because important data is still missing or can be interpreted differently. This concerns, for example, the question of how much aluminium is actually absorbed through the skin as well as the possible occurrence of certain long-term consequences of chronic exposure to aluminium.

		BfR Risk Profile: Total aluminium intake of the German population (Opinion No. 045/2019)			
A Affected persons	General population [1] infants [2], children [3], young women/pregnant women [4]				
B Probability of a health impairment due to the total aluminium intake	Practically impossible	Unlikely	Possible [1]	Probable	Certain
C Severity of the health impairment due to total aluminium intake	No impairment	Mild impairment [reversible/irreversible]	Moderate impairment irreversible	Severe impairment [reversible/irreversible]	
D Validity of available data	High: The most important data are available and there are no contradictions		Medium: Some important data are missing or contradictory [1]	Low: Lots of important data are missing or contradictory	
E Controllability by the consumer	Control not necessary	Controllable through precautionary measures		Controllable through avoidance	Not controllable

Fields marked in dark blue indicate the properties of the risk assessed in this opinion (for more details, see the text of Opinion No. 045/2019 of the BfR dated 18 November 2019 (in German) or the related publication "Aggregated aluminium exposure: risk assessment for the general population" in "Archives of Toxicology", doi: 10.1007/s00204-019-02599-z).

Line A – Affected persons

[1] – The majority of the population, i.e. adolescents and adults, already on average exhaust half of the TWI through food. If aluminium intake from cosmetics or cooking utensils is added, the health-based guidance value can be exceeded.

The following age groups are among the risk groups that already exhaust the health-based guidance value by consuming food or who take up particularly high amounts of aluminium due to their behaviour:

[2] – Infants who are not breastfed and toddlers who receive special soy-based, lactose-free or hypoallergenic infant formula. If aluminium absorption from cosmetics such as sun cream is also added, the TWI can be exceeded by up to 3.5 times.

[3] – Children aged between 3 and 10 who consume high amounts of food containing aluminium – so-called "high consumers" – already exhaust the TWI through food. If aluminium intake from other sources such as sun cream or food packed in/with uncoated aluminium occurs, the TWI is significantly exceeded.

[4] – Young women who take up high amounts of aluminium through cosmetic products. Since aluminium is stored in the body for a very long time and can pass to the placenta, unborn children could also be exposed to an increased concentration of aluminium during pregnancy. From the BfR's perspective, any aluminium intake from an avoidable source of exposure over a longer period of time should therefore be critically evaluated by young women.

Line B – Probability of a health impairment due to total aluminium uptake

[1] – A health impairment is possible for all age groups but can be controlled individually by reducing the overall intake. Health impairment is unlikely, if the overall intake is reduced.

Line C – Validity of available data

[1] There are uncertainties in deriving the health-based guidance value and converting dermal exposure to an oral rate of absorption. Furthermore, it cannot be ruled out that high consumers of particularly highly contaminated foods may already exhaust the TWI through their diet (for example through brand loyalty).

BfR's opinion (in German)

<https://www.bfr.bund.de/cm/343/reduzierung-der-aluminiumaufnahme-kann-moegliche-gesundheitsrisiken-mindern.pdf>

The study is published in the scientific journal “Archives of Toxicology”.

<https://link.springer.com/article/10.1007/s00204-019-02599-z>

Further information on this issue

FAQs about aluminium in food and products intended for consumers

https://www.bfr.bund.de/en/faqs_about_aluminium_in_food_and_products_intended_for_consumers-191148.html

Press Release, 45/2019, 18 November 2019

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https://www.bfr.bund.de/en/press_information/2019/45/reducing_aluminium_intake_can_minimise_potential_health_risks-243396.html

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