

Maximum limits for boron and fluoride in natural mineral water should be in line with drinking water regulations

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Natural mineral water contains minerals in various combinations and concentrations, which are dissolved in the water on its way through rock layers. In order to protect consumer health, the European Community will be determining maximum concentrations, which are to come into force uniformly in 2008. At present, existing maximum limits are under review and, if found to be necessary, maximum limits for additional substances will be proposed and established. This is currently under way for boron and fluoride. While there is no maximum limit for boron, the German regulation for mineral and drinking water (TrinkwV 2001) lays down 5 mg per litre for fluoride. Both naturally occurring elements are not essential for humans. In contrast, high concentrations of boron can have negative effects on reproduction and foetal development in animals. An overdose of fluoride can, depending on age, primarily cause adverse effects of skeletal or dental fluorosis. While the latter constitutes a largely aesthetic problem due to discoloured teeth, the storing of increased amounts of fluoride in the skeleton can raise bone density. In excess, this can lead to decreased bone elasticity and an increased risk of bone fractures.

The European Food Safety Authority (EFSA) has provided an Opinion on both elements and proposed upper intake levels. In order to protect all age groups, natural mineral waters should thus contain no more than 1.5 mg boron and no more than 1 mg fluoride per litre. In its Opinion, EFSA assumes a daily intake of mineral water of 0.5 to 2 litres per person and a high degree of brand loyalty. In its exposure scenarios for different age groups in the population, The exposure scenarios only take natural mineral water as source of boron and fluoride into account. EFSA relates the calculated exposure amounts to the “tolerable upper intake level (UL)” – the amount at which even long-term daily intake yields no health risks.

In regard to the EFSA Opinion on daily tolerable intake levels, the Federal Institute for Risk Assessment (BfR) has reached the following conclusion: In order to estimate the degree to which the UL for boron and fluoride is reached in total, it is not enough to consider through natural mineral waters. Consumers take in boron and fluoride from additional sources, which should also be incorporated in exposure calculations. If the total possible intake amount is considered, the upper intake level recommended by EFSA for boron proves too high. If mineral water with high concentrations of boron is consumed, adolescents can reach 87 % of the UL simply by drinking mineral water, and children under six years of age can even exceed the UL. A similar example is the maximum limit for fluoride laid down by the German regulation for mineral and drinking water: By consuming just one litre of mineral water that contains 5 mg of fluoride per litre, children and adolescents under 15 years of age would exceed the UL, while adults would reach 71%.

BfR therefore recommends that the maximum limits for boron and fluoride follow the international and national regulations in force for drinking water. Accordingly, the maximum limit for boron would be 0.5 to 1 mg per litre, for fluoride it would be lowered to 1 to 1.5 mg per litre. For natural mineral water, which is “suitable for the preparation of infant food”, boron and fluoride values should be well below these maximum limits.

The full version of the BfR Opinion in German is available on http://www.bfr.bund.de/cm/208/hoechstmengen_fuer_bor_und_fluorid_in_natuerlichen_mineralwaessern_sollten_sich_an_trinkwasserregelungen_orientieren.pdf