Risiken erkennen – Gesundheit schützen

BfR advises against taking over the new toxic equivalency factors (WHO-TEFs) into the statutory EU provisions for food and feed

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Dioxin and dioxin-like polychlorinated biphenyls (PCBs) are ubiquitous in the environment and up to 90-95% of them are ingested by people from food. In food there is mostly a mixture of these substances. In order to improve the estimation of the toxicity of dioxins and dioxin-like PCBs, the system of toxic equivalents (TEQs) was introduced. The toxic equivalency factors (TEFs) play a key role in calculating the toxic equivalents (TEQs). The World Health Organisation (WHO) compiled a list of toxic equivalency factors (WHO-TEFs) in 1998 on the basis of which the EU maximum levels for dioxins and dioxin-like PCBs in food were established. The BfR health assessments are also done on the basis of the WHO-TEFs in conjunction with the WHO TDI (tolerable daily intake) for WHO-TEQs. In its review of the WHO-TEFs, WHO has now proposed adjusted factors for some dioxins and dioxin-like PCBs. BfR was asked to assess the new WHO-TEFs.

The term dioxin used in every day language describes 210 compounds with a similar chemical structure. To calculate the WHO-TEQs, the 17 particularly toxic and persistent substances have been used so far as well 12 dioxin-like PCBs, which out of a total of 209 PCB compounds, have similarities with dioxins because of their molecular structure. WHO has assigned factors (TEFs) to these 29 substances in line with their relative toxicity relative to the most harmful substance in these substance groups, i.e. the so-called Seveso dioxin. As the reference substance, the Seveso dioxin was assigned the factor 1; other dioxins and dioxin-like PCBs were assigned correspondingly graduated values. In the calculation model for the WHO-TEQs, the levels of the 29 individual substances measured in food are multiplied by their respective TEF. The results obtained are then added together. The TEQ concentrations calculated in this way correspond to the toxic effect of a comparable concentration of the Seveso dioxin.

The TEFs are determined on the basis of scientific studies on the toxic potential of the various dioxins and dioxin-like PCBs. Hence, they must be adapted at regular intervals to take into account new findings. In the opinion of BfR, the regular evaluation of the valid values makes sense. The changes to some WHO-TEFs, which have now been undertaken, are based, however, according to WHO on provisional and statistical considerations in conjunction with an unchanged toxicological data situation and constitute an interim solution.

Calculations by BfR by way of example show that the new TEFs in some cases lead to TEQ values which are between 10-20% lower, i.e. lead to a lower classification of the toxicity of dioxins and dioxin-like PCBs. This means that, as a consequence of the new WHO-TEFs, consumers could ingest higher levels of dioxins and dioxin-like PCBs from food until in purely arithmetic terms the maximum tolerable daily intake laid down by WHO of 1-4 picogram WHO-TEQ per kilogram (pg/kg) body weight would be reached. In order to maintain the level of consumer health protection, BfR recommends continuing to use the WHO-TEFs from 1998 given that further dioxin-like substances are also to be taken into account. Only when new toxicologically relevant findings are available, should the factors be adjusted.

Within the framework of its evaluation, WHO is also considering including other dioxin-like compounds in the TEF concept. BfR points out that firstly this would reduce the accuracy of the WHO-TEQs as this is calculated as the sum of many individual findings which come with a large range of scattering of numerous, scarcely detectable compounds in the ultra-trace range. Secondly, initially comparative statements about contaminations with dioxins and di-

oxin-like compounds over longer periods would be rendered far more difficult. In principle, BfR does support measures that continue to reduce human exposure to dioxins and dioxin-like compounds. For that reason BfR supports the extension of the WHO-TEFs to other compounds which it sees as a move in that direction.

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