Vitenskapskomiteen for mattrygghet
Norwegian Scientific Committee for Food Safety

Opinion of the Panel on Contaminants of the Norwegian Scientific Committee for Food Safety

New WHO TEFs for dioxins and dioxin-like PCBs:

Assessment of consequence of altered TEF values for dioxins and dioxin-like PCBs on current exposure in the Norwegian population

14 November 2007

SUMMARY

Dioxins and dioxin-like PCBs (dl-PCBs) exhibit a broad range of toxic and biological effects and act via the same mechanism. There is a general acceptance of an additive model for risk assessment of such compounds. Since their potencies vary over several orders of magnitude, the toxic equivalency concept was developed in order to simplify risk assessment of mixtures of dioxins and dl-PCBs. Each of the dioxins and dl-PCBs with similar mechanisms of action have been assigned a toxic equivalency factor (TEF), ranging their potencies relative to the most potent dioxin. TEF values in combination with analytical data are used to calculate and express the concentrations as toxic equivalencies (TEQs) in food.

Different TEF values were in use until the WHO TEF values were published in 1998. In 2005 the WHO 1998 TEF values were revised, resulting in increased, decreased or unchanged TEF values for individual congeners of dioxins and dl-PCBs.

The Norwegian Food Safety Authority has asked the Norwegian Scientific Committee for Food Safety (Vitenskapskomiteen for mattrygghet, VKM) to evaluate how the revised TEF values for dioxins and dl-PCBs influence the dietary exposure expressed as TEQ in relation to tolerable weekly intake (TWI). Based on this evaluation, The Norwegian Food Safety Authority would like VKM to comment if there is a need to re-calculate the previously estimated dietary intake of dioxins and dl-PCBs in Norway.

The request has been answered by the Panel on Contaminants (Panel 5) of VKM.

Panel 5 has calculated total TEQs for some foods known to be important sources for dioxins and dl-PCBs in the Norwegian diet by using both the old and the revised TEFs. In all samples the revised TEFs reduced the total TEQ by 5 to 45%. The highest reduction was seen for cod liver oil, in which mono-*ortho*-PCBs contributed more than 50% to the total TEQ calculated

with the 1998 TEFs. For fish, the reduction was 15-19%. For dairy products and pork the reduction was 11-15%, whereas for mutton the reduction in total TEQ was only 5%.

Panel 5 has not re-calculated the previously estimated dietary intake of dioxins and dl-PCBs in the Norwegian population using the revised TEFs. However, since calculations with the revised 2005 TEFs result in lower total TEQ in some important dietary sources for these compounds than calculations with the WHO 1998 TEFs, Panel 5 deduces that the dietary TEQ-exposure to dioxins and dl-PCBs will be lower when using the revised TEFs. This indicates that a lower proportion of the population will be exceeding the TWI. It should be kept in mind that changes in TEFs, resulting in lower TEQ in food, do not imply reduced exposure to the absolute concentration of dioxin-like compounds.

Panel 5 is of the general opinion that there is a need for regular monitoring of food contamination and dietary habits because both dietary habits and contaminant profiles in food change with time. It is now 10 years since the last national dietary survey. A re-calculation of the previously estimated dietary intake of dioxins and dl-PCBs with the revised TEFs would be based on possibly outdated consumption data. Panel 5 is therefore of the opinion that a new estimation of dietary intake of dioxins and dl-PCBs in Norway should await new consumption data. Furthermore, Panel 5 recommends that in the next national assessment of dietary exposure to dioxins and PCBs the exposure should be calculated with both the 1998 and the 2005 TEFs in order to better investigate the impact of the new TEFs on calculated exposure. This will also be important when documenting the exposure time-trends.