



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

22 November 2007

Risk assessment of dioxins and dioxin-like PCBs in fish liver

SUMMARY

The Norwegian Food Safety Authority has asked the Norwegian Scientific Committee for Food Safety (Vitenskapskomiteen for mattrygghet, VKM) to do a risk assessment of dioxins and dioxin-like PCBs (dl-PCBs) in fish liver. Given the different levels of dioxins and dl-PCBs found in fish liver from different areas, the assessment will consider - what are the general risks to consumers, and with respect to vulnerable groups.

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

Concentrations of dioxins and dl-PCBs in cod liver vary and are dependent on the place where the fish is caught. Results from available analyzes indicate that liver from cod caught close to cities and/or industrial zones, small towns and villages contain from 30 to 740 pg TEQ/g. Concentration in liver from cod caught in open coastline, varied from 40 to 130 pg TEQ/g. The levels of dioxins and dl-PCBs in fish liver samples from the Barents Sea, ranged from 3 to 66 pg TEQ/g, with a median and mean concentration of 13.0 pg TEQ/g and 16.7 pg TEQ/g, respectively. The mean concentration in roe-liver pâté, which is a bread spread, was 7 pg TEQ/g.

In Norway, approximately 30% of the population consumes oily liver from lean fish species like cod and saithe. The consumption of fish liver is unevenly distributed throughout the adult population. The median consumption among fish liver consumers only corresponds to one meal containing 30 g fish liver every second month. High consumption of fish liver, the 95th percenile, corresponds to nearly 3 meals of fish liver every month. To the knowledge of Panel 5 nothing is known about fish liver consumption among children. Approximately 2% of pregnant women in a cohort were consumers of roe-liver pâté.

Panel 5 is of the opinion that the exposure of dioxins and dl-PCBs among children and in women that are in child-bearing age preferably should be below the TWI for dioxins and dl-PCBs at 14 pg TEQ/kg body weight. Women above fertile age and men are believed to be less sensitive to exposure to dioxins and dl-PCBs, and for these groups of the population, exposure

moderately above the TWI is not believed to be connected to increased risk of negative health effects.

Since relatively few people eat fish liver, the median total TEQ intake among all Norwegians is hardly affected by fish liver consumption. However, fish liver consumption may have pronounced impact on total TEQ intake on an individual basis, depending on the contamination levels found. Exposure calculations indicate that a level of 60 pg TEQ/g in fish liver would for individuals with median fish liver consumption (six meals of 30 g fish liver per year) lead to an intake which is 20% of the TWI from fish liver alone. Those with median exposure to dioxins and dl-PCBs from fish and other seafood, including fish liver, could eat fish liver containing up to 60 pg TEQ/g without exceeding the TWI from the total diet.

High consumption of fish liver with a level of 30 pg TEQ/g would singly contribute with nearly 60% of the TWI. At a contamination level of 30 pg TEQ/g in fish liver, 75% of the cod liver consumers will have exposures below the TWI.

The 95th percentile exposure from total diet at a contamination level of up to 100 pg TEQ/g in fish liver would not exceed the highest TDI for non-developmental health effects suggested by Swedish experts, which corresponds to a weekly intake of 70 pg TEQ/kg body weight.

Available analytical results indicate that liver from cod caught in the Barents Sea contains less dioxins and dl-PCBs than liver from fish caught near cities and/or industrial zones, small towns and villages in Norway, which appears to have median levels above 60 pg TEQ/g. Only one of the 53 samples from the Barents Sea contained more than 60 pg TEQ/g. Over time, the liver consumed from fish caught in the Barents Sea would tend to contain the average concentration of approximately 15 pg TEQ/g liver. The four analyses on liver from fish caught at the open coastline are not sufficient to conclude about the contamination level.

Panel 5 is of the opinion that roe-liver pâté used as bread spread could be a significant source for dioxins and dl-PCBs. People that consume this bread spread regularly increase the probability of exceeding the TWI for dioxins and dl-PCBs.

Fish liver is a rich source for several nutrients, like marine n-3 fatty acids and vitamins A and D. However, the possible nutritional benefits of eating fish liver have not been taken into consideration.