19/10/2018

Comments from the Food Safety Authority of Ireland on the EFSA Scientific Opinion "Risk for animal and human health related to the presence of dioxins and dioxin-like PCBs in feed and food"

The Authority wishes to thank the European Food Safety Authority for the extensive work carried out in preparing the opinion. However, we would like to convey some observations, questions and concerns, as follows:

Concentration data and exposure estimates

Concerning the exposure estimates, which are based on pooled European occurrence data, we note that the outcome will considerably be influenced by the large dataset submitted by some Member States. This is not a criticism, rather an observation, which is not specific to this opinion, but is generally observed for all opinions. It is anticipated that actual exposure in Ireland is much lower than estimated by EFSA, due to generally lower concentration of dioxins in Ireland compared to more industrialised countries in Europe.

Complexity of the model/ Model input parameters

While we wish to acknowledge that advances in the modelling of risk will result in a certain lack of comprehension, the methodologies employed in this opinion are of such complexity, that it is difficult to fully appreciate all uncertainties associated with same.

In particular, it is difficult for us to evaluate the reliability of back-calculating from a blood serum level in 8-9 year old boys to a tolerable daily exposure level in women, which would not lead to exceedance of the aforementioned serum level. But not withstanding our difficulties in assessing the model itself, the model uses input parameters such as a concentration of PCDD/F of 5.9 pg/g fat in the breast milk of the mother (levels in Ireland are much lower), a defined breastfeeding period of 12 months (typically 6 months or shorter in Ireland), the assumption that the concentration in the breast milk remains constant over the 12 month's period (unlikely). It further assumes a daily intake of 800ml of breast milk, which appears conservative (based on 150ml/kg bw liquid recommendations, this would assume a 5.3 kg infant at birth). The model also does not take into account multiple pregnancies and the associated decline in body burden over time, and as such the intake recommendations really only apply to women of child bearing age, who don't have any children yet.

The model further assumes a constant exposure of the child after weaning, up to the age of 8-9 years old, which will be highly dependent on the diet and region of where the child grows up. The latter will also influence the exposure of the mother and consequently the concentration in the breast milk.

The Seveso study further suggests that there may be a postnatal period of sensitivity, and exposure during this time period in the study population is unknown. It therefore remains uncertain, whether serum concentration at the age of 8-9 years is a suitable time to assess effect on semen quality at a later stage in life.

Taken all the above together, the model output appears to be based on worst case scenario assumptions, it is highly conservative, and possibly unlikely.

Confounders

We are concerned about the level of co-exposure to other organochlorinated and other compounds, and it is not clear if all relevant compounds were tested for in the study. Reference is made to extensive manufacturing of chemical warfare agents and chlorine containing industrial and agricultural chemicals in the past, however, only three substances were included in the Russian study. And whilst no direct association between the tested compounds and sperm quality was observed (except for beta HCH and DDE on sperm volume), it is unknown if the presence of these substances might have had a potentiating effect on dioxins.

Furthermore, reference is made to an association of serum HCB levels with delayed puberty, and it is not known whether pubertal timing in boys is related to semen quality later in life. Potential effect of HCB on semen quality therefore remains uncertain.

Inclusion of furans and DL-PCBs in the HBGV and TEFs

We note that no association between DL-PCBs and furans on sperm quality was seen, however, the HBGV is set on the Total TEQ.

Concerning the TEF system, reference is made to the fact that most studies on which TEF values are set, do not include critical endpoints like sperm production and pubertal onset following exposure of the mother. There is also considerable uncertainty related to the sensitivity of humans compared to animals, on which the current TEF system is based.

This is of particular importance given the large contribution of PCB 126 to Total TEQ exposure.

Median serum levels

With regard to the median serum level, on which the HBGV is based, i.e. 7 pg/g fat PCDD/F TEQ, there appears to be a narrow range between unaffected and affected (i.e. 11 pg/g fat). This range narrows even further when looking at TCDD only (i.e. 2.5 versus 3.4 pg/g). With regard to TCDD, the levels reported in table 14, p 149 appear inconsistent with the ranges reported in Table 10 (p 83) and the ranges reported in Annex A table 65 page 114), whereas they match for PCDD TEQ, PCDF-TEQ and PCDD/F TEQ.

Annex A Table 65:

Median (Min, Max) (n = 133) (pg WHO_{2005}-TEQ/g fat):

Total TEQ:
21.9 (1.88, 107)

TCDD:
2.9 (0.35–12.1)

PCDD-TEQ:
8.7 (0.95–36.0)

PCDF-TEQ:
4.8 (0.55–50.6)

DL-PCB-TEQ (sum of PCB-77, -81, -126, -169):
6.9 (0.52–67.2)

Table 10:

TCDD[a] (pg/g fat)
Q1 [0.35–1.70]
Q2 [1.77–2.45]
Q3 [3.00–3.40]
Q4 [4.40–5.80]
p, trend
TCDD[a],[b] (pg/g fat)
Q1 [0.35–1.70]
Q2 [1.77–2.45]
Q3 [3.00–3.40]
Q4 [4.40–5.80]
p, trend
PCDD/F-TEQ[a] (pg/g fat)
Q1 [1.95–9.13]
Q2 [9.16–13.8]
Q3 [13.9–20.4]
Q4 [20.5–62.4]
p, trend

PCDD-TEQ[a] (pg/g fat)
Q1 [0.95–5.62]
Q2 [5.69–8.42]
Q3 [8.68–13.3]
Q4 [13.7–36.0]
p, trend
PCDF-TEQ[a] (pg/g fat)
Q1 [0.55–3.20]
Q2 [3.29–4.66]
Q3 [4.76–6.87]
Q4 [7.10–50.6]
p, trend
PCDF-TEQ[a],[b] (pg/g fat)
Q1 [0.55–3.20]
Q2 [3.29–4.66]
Q3 [4.76–6.87]
Q4 [7.10–50.6]
p, trend

Co-PCB TEQ[a],[c] *(pg/g fat)*	
Q1 [0.52–4.63]	2
Q2 [4.66–6.87]	2
Q3 [6.88–9.97]	2
Q4 [10.1–67.2]	2
p, trend	
Co-PCB TEQ[a],[b],[c] (pg/g fat)	
Q1 [0.52–4.63]	2
Q2 [4.66–6.87]	2
Q3 [6.88–9.97]	2
Q4 [10.1–67.2]	2
p, trend	
Total TEQ[a] *(pg/g fat)*	
Q1 [4.88–16.8]	3
Q2 [17.0–21.4]	2
Q3 [21.7–32.5]	2
Q4 [33.3–107]	2
p, trend	
Total TEQ[a],[b] (pg/g fat)	
Q1 [4.88–16.8]	2
Q2 [17.0–21.4]	2
Q3 [21.7–32.5]	2
Q4 [33.3–107]	2
p, trend	

Table 14: Measured and estimated median serum levels of TCDD and PCDD/F-TEQ in affected and unaffected boys in the Seveso and Russian Children's Study

Study[a]	TCDD (pg/g fat)		PCDD/F-TEQ (pg/g fat)	
Group	'Unaffected'[b]	'Affected'	'Unaffected'[b]	'Affected'
Russian Children's Study Boys (9 years)	2.5	3.4	7.0	10.9

And whilst no effects were observed at higher levels in the Russian study, this appears illogical when looking at the effects observed at much higher levels in the Seveso study.

Overall observation

There appears to be considerable uncertainty associated with the derivation of the proposed HBGV, which is also reflected in the numerous recommendations provided for in the report.

There are also concerns as to the suitability of the pivotal study, given the many confounding factors.

Given the interdependence of uncertainties within the model, which are difficult to follow, and the concerns about the suitability of the pivotal study, it is difficult to understand the overal level of uncertainty associated with the HBGV, which raises the question if it is fit for purpose with regard to protecting human health.