

Research letters

Dioxin contamination of feed and food

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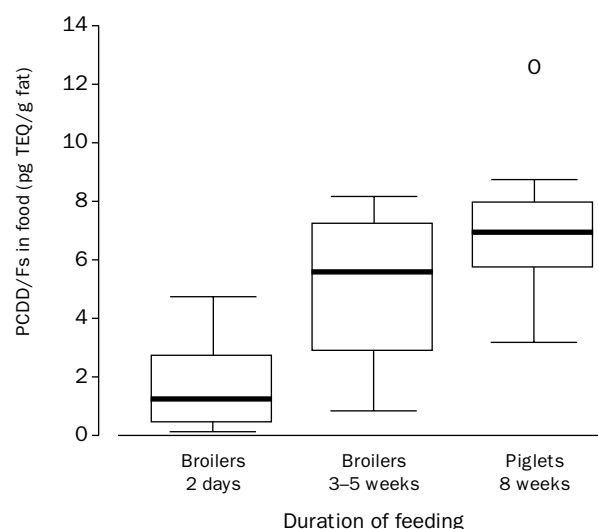
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A preventive action limit for dioxins in feed for broiler chickens and pigs was set to 2 pg toxic equivalents/g feed in Austria. This limit was effective in the detection of feed contamination from an imported mineral additive, and in the prevention of food contamination according to WHO tolerable daily intake.

In 1998, WHO experts lowered the tolerable daily intake (TDI) to 1–4 pg toxic equivalents (TEQ) per kg bodyweight, and recommended that every effort be made to reduce exposure to the lowest possible level.¹ More than 90% of human exposure to polychlorinated dibenzo-*p*-dioxins and polychlorinated furans (PCDD/Fs) is from food, mainly animal fat. Chloracne and other chronic symptoms have been reported in Japan from rice oil, and in Spain from olive oil contaminated with PCDD/Fs. Recently, the Belgian government failed to be re-elected because it had provided very late information on food contamination from animal feed. Contamination was first discovered in chickens. About 8 L of used polychlorinated biphenyl ended up in an 80 tonne batch of recycled fats used in production of 1600 tonnes of animal feed. In the first sample from a dead hen analysed for PCDD/Fs, 958 pg TEQ/g fat were found.

The member states of the European Union were faced with the difficult task of tracing the contamination and setting preliminary standards to protect consumers from additional body loads, without knowledge of transfer rates from feed to food. Austria, the first country to lower PCDD/F emission standards, set preventive action limits for feed.

A multidisciplinary working group from universities and federal institutes for food and feed control proposed to limit PCDD/Fs in feed for hens and pigs to 2 pg international TEQ/g feed. Under worst case assumptions of 100% PCDD/F uptake and no elimination by the



Polychlorinated dibenzodioxins and polychlorinated furans in food

Fat concentrations in food (chickens aged 5 weeks, necks of porkers aged 3 months) after feeding ten broilers for 2 days, ten broilers for 3–5 weeks, and ten piglets for 8 weeks with contaminated feed. O=outlier. Dark line=median. Box=interquartile range. Bars=non-outlier range.

animal, this preventive action limit in feed should prevent TDI exceeding 4 pg/kg bodyweight from consumption of 300 g meat per day. From all 17 feed producers controlled only in the samples of one producer the preventive action limit was exceeded (whereas others showed international TEQs from 0.04 to 0.60 pg/g). We examined this feed for broilers, containing 4.8 pg/g, and the feed for piglets, containing 5.9 pg/g, together with the animals fed. The source of contamination was traced back to an imported mineral additive and the use of this kaolinite was stopped.

Ten chickens fed for 2 days and ten for 3–5 weeks with contaminated feed were killed at the age of 5 weeks, and homogenised samples of all edible parts analysed for PCDD/Fs. Ten porkers fed with the contaminated feed for 8 weeks (up to a mean bodyweight of 30 kg) were killed at age 3 months (mean bodyweight 40 kg), and parts of their necks were analysed for PCDD/F at the Austrian Research Centre. By contrast with the incidents in Japan and Belgium, PCDD/Fs were much lower, and 1,2,3,7,8-PeCDD and other polychlorinated dioxins contributed most, whereas furans contributed less than 10% to TEQs.

Chickens fed for 2 days could be taken to market. The exceeded action levels² in poultry (5 pg/g fat) in 60% and in pork (2 pg/g fat) in 100% of animals fed for the full period scheduled, confirmed the necessity of the preventive action limits set for feed; however, continuation of feeding with dioxine-free feeding stuff before slaughtering diluted contamination in adult animals to levels tolerable in human beings. In Europe we are still lacking a preventive sampling strategy and regulations ensuring quick traceability of contamination to the raw materials used in production of feed and food.

- 1 WHO. Dioxins: tolerable intake level revisited. *Environ Health* 1998; 9–12.
- 2 Verordnung zum Schutz der Verbraucher vor Gefährdung durch Dioxine in bestimmten Lebensmitteln tierischer Herkunft vom 9.6.1999; Bundesanzeiger S. 8993.

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High fish-specific dioxin concentrations in Finland

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Dioxin concentrations in a population that frequently eat fish from the Baltic Sea are comparable to those seen in inhabitants of Seveso, Italy, after the accidental release of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) in 1976. Individual variations in the congener patterns in human beings are similar to congener patterns in the fish species consumed.