Review of the 2008 Irish Dioxin Incident

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What’s was this incident all about?

PCB/Dioxin Contaminated Irish Pork and Beef
Dioxins and PCBs

PCDD

PCDF

PCB
PCDD/PCDFs

- The term “dioxin” covers a group of chemically similar substances:
  - 75 polychlorinated dibenzo-p-dioxins (PCDDs) and
  - 135 polychlorinated dibenzofurans (PCDFs)
  - 17 of toxicological concern
Adverse effects

- Dermal toxicity, immunotoxicity, carcinogenicity, reproductive toxicity possibly neurotoxicity, endocrine toxicity and developmental changes in utero

- The toxicological effects of the dioxins are due to binding of the dioxins to a specific receptor protein in the cells, the aryl hydrocarbon (Ah) receptor present in most tissues of animals and humans
How Did We Find It?

Pesticide Control Service, DAFF

National Residues Monitoring Programme
Dioxins in Feed and Pork Fat

- **Crumb Product:** E.U. Feed Limit 0.75pg/g
- **Levels detected in Feed:** 5200pg/g
- **Pig Fat:** E.U. Max Limit 1.5pg/g
- **Levels detected:** 80 – 200 pg/g
Crumb Manufacturer

- Licensed Feed Business Operator

- Raw Materials Used:-
  - Dough from industrial bakery facilities
  - Unsold and sell-by date bread, wrapped and unwrapped

- Direct heating process (oil fired)
Source of Contamination

10 Pig Production Farms = 8% National Pork Output

One Recycling Plant
98% of National Output

10 Major Processing Plants

98% Pork Output
150,000 t/year
Uncontaminated Raw Materials

Delivered to Feed Manufacturer A

Contaminated Feed Produced

Farmer A Receives Contaminated Feed

Farmer A Feeds Contaminated Feed to his Pigs

Contaminated and Uncontaminated Pigs are Transported to the Slaughter Plant

Possible some Contaminated Pigs Processed with Uncontaminated Pigs

Possible some Contaminated Pork Products Mixed with Uncontaminated Pork Products

Possible some Contaminated Pork Products Delivered to Customer A

Possible some Contaminated Pork Products Delivered to Customer B

Uncontaminated Raw Materials

Delivered to Feed Manufacturer B

Uncontaminated Feed Produced

Farmer B Receives Uncontaminated Feed

Farmer B Feeds Uncontaminated Feed to his Pigs

Supplier Traceability (Legal Requirement)

Customer Traceability (Legal Requirement)

Process Traceability

92%

8%
Timeline of Dioxin incident

- **19/11/08** – **Routine** pig fat sample taken under the National Residues Programme for screening at the National Pesticides Laboratory

- **Friday 28/11/08**
  Call from DAFF to say preliminary laboratory result was indicative of marker PCBs

- **Saturday 29/11/08**
  1st visit to ‘index’ farm to evaluate possible sources of contamination
Timeline

Monday 1/12/08

- Initial laboratory sample confirmed positive for non-Dioxin like marker PCBs
- Preliminary movement restrictions imposed on farm
- One feed ingredient sample (crumb) showed indicative marker-PCB finding
**Thursday 4/12/08**

- 7 pig producers (manufacturer’s client list) placed under movement restriction

- 38 cattle farms (manufacturer’s client list) put on formal notification imposing movement restrictions on cattle farms

- 6 pig samples from manufacturer’s units (slaughtered on 3/12/08) positive on screening test for NDL-PCB’s

- Initial Press Statement
Friday 5/12/08

- Netherlands VWA phone contact with FSAI

- Dioxin investigation under way in Netherlands into reports of dioxins in pork

- References in discussions to Belgian rendering plant dioxin findings from mid-September and also dioxin in French pork loin sample
Saturday 6/12/08

- Discussions with European Commission

- Confirmation from CSL UK laboratory that 4 pig fat samples showed Dioxin levels ranging from 80 – 200pg/g

- One initial crumb sample showed higher levels (> 2000pg/g)

- Decision taken
Outcome

Irish Independent

HARRY SPURS
KEANE EXIT
MUNSTER'S LOSING BONUS

Gardai hunt for sour
in €1bn pizz

总产品召回
生产后1月9日
IRL Pattern of DL-PCBs

![Chart showing the IRL Pattern of DL-PCBs with PCB numbers from PCB81 to PCB189 on the x-axis and fraction of total (%) on the y-axis. The chart displays various bars representing different PCBs with different colors indicating the fraction of total.]
NL Pattern of DL-PCBs

The graph shows the % total for various PCBs, with peaks for PCB 156 and PCB 123.
IRL Pattern of dioxins

Dioxin congener

% total
NL Pattern of dioxins

The graph illustrates the pattern of dioxins, with various congeners shown on the x-axis and their percentage of the total on the y-axis. The congeners include 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-HxCDF, and others. The data indicates a significant percentage for certain congeners, particularly 2,3,4,7,8-HxCDF and 1,2,3,7,8-PeCDF.
Data summary

- Same dioxin and PCB profiles in pork meat samples in IRL / NL / FR

- NDL-PCBs in pork 500-3000 ppb, beef 150 ppb

- Ratio NDL-PCBs / dioxin-TEQ is low compared to previous incidents

- Dioxins almost exclusively PCDFs
Congeners of dioxins like:

2,4,6,7,-TCDF and 1,2,3,7,8 –PeCDF

Suggest Contamination Recent

Why September 1st?
Feed Screening Results 13 Aug – 3 Dec

- Positive ++
- Positive
- Positive--
- Trace
- Negative

Dates:
- 13-Aug
- 20-Aug
- 27-Aug
- 03-Sep
- 10-Sep
- 17-Sep
- 24-Sep
- 01-Oct
- 08-Oct
- 15-Oct
- 22-Oct
- 29-Oct
- 05-Nov
- 12-Nov
- 19-Nov
- 26-Nov
- 03-Dec
Dioxin levels at rendering plant
Pork risk assessment

Assumptions in exposure calculation
- 10% of pork contaminated
- 90 day exposure
- 200pg/g dioxin

Conclusion
- 10% increase in body burden
- No concern to human health from this single exposure event
Distribution/Recall is Simple...
Where Did Germany Get Irish Pork?
Where Did Germany Export Irish Pork?

[Map showing pork exports from Germany to various countries, including Russia.]
What About Beef?
The Facts...

- Only 38 farms received feed (0.02% of total)
- Some Farms “Clear” (21 affected)
- Greater traceability in beef sector
Withdrawal of Beef?

- 99.98% of national beef production free of contamination
- Traceability in beef production works
- Carcasses and prime cuts withdrawn from market
- FSAI risk assessment: additional body burden calculated to be 0.035% or 300 times less than that of contaminated pork
Ongoing research work

- Analysis of dioxin in pigs of different ages
- Transfer of dioxin from sows to piglets
- Beef cattle - changes in dioxin levels
- Method development – blood samples
Co-operation is vital...

- Central Science Laboratory, York
- RIKILT, NL
- VWA, NL
- Food Standards Agency (NI and London)
- European Commission
- European Food Safety Authority
Celebrating ten years