

**EVALUATION OF THE MEAN CONTENT OF DIOXINS AND FURANS
IN HEAT TREATED MILK AT THE CONSUMPTION LEVEL IN
FRANCE**

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Introduction

The surveillance of dioxins in milk in France is conducted since 1994 by the Ministry of Agriculture and Fisheries (1-2).

In 1997 the contamination levels of farm milk in the immediate vicinity of known industrial sources of pollution were investigated. The results indicated a local problem in the North of France near a waste incinerator (3).

Milk from several farms was not found suitable for consumption according to the French health related guidelines established by the CSHPF (French Superior Council of Public Health).

Nevertheless these figures were not representative of the average dioxin content of the milk consumed in France.

The aim of the study described below was to determine the average level of PCDDs and PCDFs in heat-treated milk ready for consumption produced in France.

Materials and Methods

The study was conducted by the dairy sector in collaboration with the Ministry of Agriculture and Fisheries. The sampling plan and the statistical interpretation was worked out by experts belonging to the AFSSA (French Agency for Food Safety) and the analyses were performed by CARSO, an accredited laboratory, according to the method described by Liem and al. (4)

148 samples of half-skimmed, heat-treated milk (UHT or sterilised) produced by 33 French dairies were collected between the 1st of April 1998 and the 15th of June 1998.

Each sample consisted of 2 litres of milk, ready for consumption (cartons or bottles) and was taken at the factory by the local services of the Ministry of Agriculture and Fisheries. An identification sheet for each sample provided the code - number of the dairy factory, data corresponding to the sampling and the capacity of the milk tank where it came from. Samples were transported in the original packages to the laboratory.

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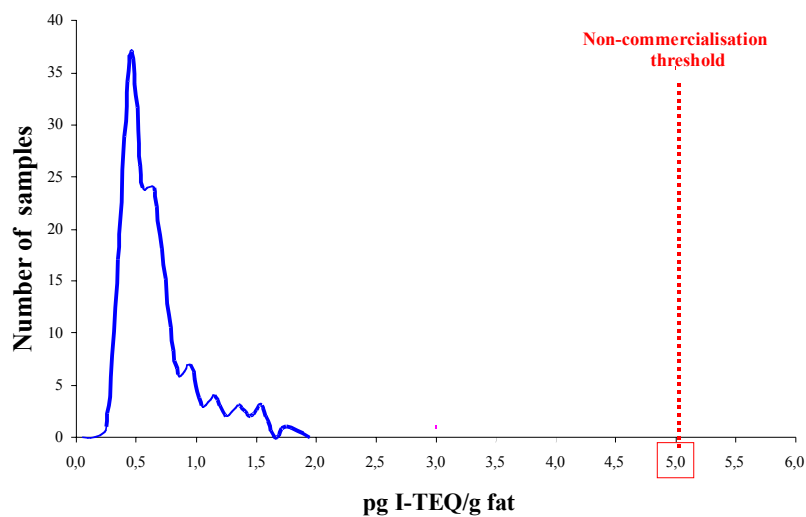
In order to obtain representative results of the marked milk produced in France, a random sampling protocol was worked out :

- the number of samples for each dairy was related to their annual production,
- when several samples had to be taken in a given day, their collection was spread through time.

Results of the analyses expressed in pg I-TEQ /g fat were centralised by ARILAIT. The figures were sent to AFSSA for statistical treatment and each participating dairy was informed of its individual results.

Results and discussion

The figure shows the distribution of the concentrations of PCDDs and PCDFs obtained in the 148 samples. A dot line indicates the maximum tolerable concentration for milk and milk products, established in France at 5 pg I-TEQ/g of milk fat by the CSHPF (5).



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Dioxin concentrations ranged between 0,29 and 1,75 pg I-TEQ/g of milk fat. The average level was 0,65 pg I-TEQ/g of fat with a 99% confidence interval of 0,59 - 0,72 pg I-TEQ/g. The weighted average level (each result being weighted with the corresponding capacity of the tank) was 0,67 pg I-TEQ/g (99% confidence interval of 0,60 - 0,73 pg I-TEQ/g of milk fat).

The following table shows the distribution of dioxin concentrations for the 148 milk samples

Concentration ¹	Number of samples
0,00 - 0,05	0
0,05 - 0,15	0
0,15 - 0,25	0
0,25 - 0,35	7
0,35 - 0,45	29
0,45 - 0,55	27
0,55 - 0,65	35
0,65 - 0,75	13
0,75 - 0,85	9
0,85 - 0,95	7
0,95 - 1,05	6
1,05 - 1,15	3
1,15 - 1,25	3
1,25 - 1,35	1
1,35 - 1,45	3
1,45 - 1,55	2
1,55 - 1,65	2
1,65 - 1,75	0
1,75 - 1,85	1
1,85 - 1,95	0
1,95 - 2,05	0
Total number of samples	148
Average	0,65
Standard deviation	0,29
Weighted average ²	0,67
Weighted standard deviation ²	0,30

(¹) Concentrations are expressed in pg I-TEQ/g of milk fat.

(²) Each of the results was weighted with the corresponding capacity of the tank.

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For each of the samples the capacity of the milk tank was known (<12 000 litres to >240 000 litres). Assuming that concentration of dioxin of each sample was representative of the tank's content, the results obtained with weighted data correspond to a total volume of 15,043,412 litres of milk.

The results are far below the maximum tolerable concentration of 5 pg I-TEQ/g of milk fat. The mean concentration (0,65 pg I-TEQ/g) is also below the target recommended by the European Union (<1 pg I-TEQ/g).

Acknowledgements

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