

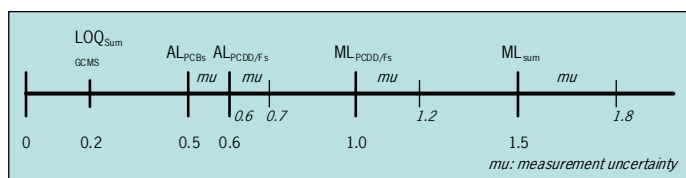
# Practical experience with the DR CALUX<sup>®</sup> assay for screening of food of animal origin

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## Introduction

The DR CALUX<sup>®</sup> assay is a sensitive test for screening of food for dioxins and dl-PCBs. A major issue is when to classify a sample as suspected, thus requiring HRGC/HRMS analysis. For each product, the EU has set different action (AL) and maximum limits (ML), for dioxins, dl-PCBs or the sum (see Figure for pork).

Thus far RIKILT applied a clean-up method without splitting of dioxins and dl-PCBs and compared the responses of a sample and a reference sample at the lowest AL for that product.



## Results

Results of 2 years monitoring (2007/2008) are shown in Table 1.

- A total of 504 samples were screened of which 72 (14%) showed a response higher than the reference sample.
- HRGC/HRMS confirmed that 55 (76%) of these samples exceeded the level of the reference sample.
- Only 21 samples (29%) exceeded the AL+mu of either dioxins and/or dl-PCBs.

Table 1. Screening results for food using the screening approach

Matrix	ALs <sup>1</sup> pg TEQ/ g fat	REF pg TEQ/ g fat	DR CALUX		HRGC/HRMS (AL/ML+mu)				
			tested	suspected > REF	Samples >REF	Samples >AL <sup>2,5</sup>	Samples >ML <sup>3,5</sup>	Neg's tested	>AL
Pork	0.6/0.5	0.5	94	0	0	0 (0/0)		16	0
Poultry	1.5/1.5	0.9	54	0	0	0 (0/0)		15	0
Bovine	1.5/1.0	0.9	87	10	8	5 (0/5)		17	0
Sheep	1.5/1.0	0.9	79	36	35	11 (6/10)	1 (0/1)	7	0
Deer <sup>4</sup>	1.5/1.5	0.9	6	6	6	5 (3/5)	4 (3/4)	0	na
Eggs	2.0/2.0	1.9	106	17	4	0 (0/0)		22	0
Milk	2.0/2.0	1.9	78	3	2	0 (0/0)		21	0
Total			504	72	55	21 (9/20)	5 (3/5)	98	0

<sup>1</sup> ALs for dioxins/dl-PCBs, <sup>2</sup> Samples exceeding one or both ALs (samples exceeding ALs for dioxins/dl-PCBs), <sup>3</sup> Samples exceeding one or both MLs (samples exceeding MLs for dioxins/sum), <sup>4</sup> No official limit for deer; for comparison the limits for game were used, <sup>5</sup> evaluation against AL and ML included 20% measurement uncertainty

- One sample, or when regarding deer as game, 5 samples exceeded the ML+mu.
- So 71 and 93% of the suspected samples were false non-compliant in comparison with AL and ML respectively.
- The major part is caused by the choice of the cut-off level, like the use of a reference sample even below the AL.
- Of 98 samples tested negative, none exceeded an AL or ML.

Two alternative test strategies were evaluated:

- The use of a calibration curve of reference samples and lowest AL as cut-off, reduced the number of suspects from 72 to 64. One sheep sample exceeding an AL but not ML was missed.
- When using a cut-off at 1/2 the ML for the sum, only 25 (5%) of the samples were classified suspected, 5 exceeding the ML for the sum and 9 a virtual AL of 2/3 the ML for the sum. So 16 samples (64%) tested false non-compliant. However, 1 sample above the AL but below the ML was missed.

## Conclusions

- The DR CALUX<sup>®</sup> assay is a suitable tool for selection of suspected samples.
- Most false non-compliant results are caused by the strategy and cut-off values chosen, avoiding false-compliant results.
- Focusing on the sum would strongly decrease the number of suspected samples but a lower cut-off value (1/2 ML) may be required in order not to miss **any** samples exceeding the AL.

