

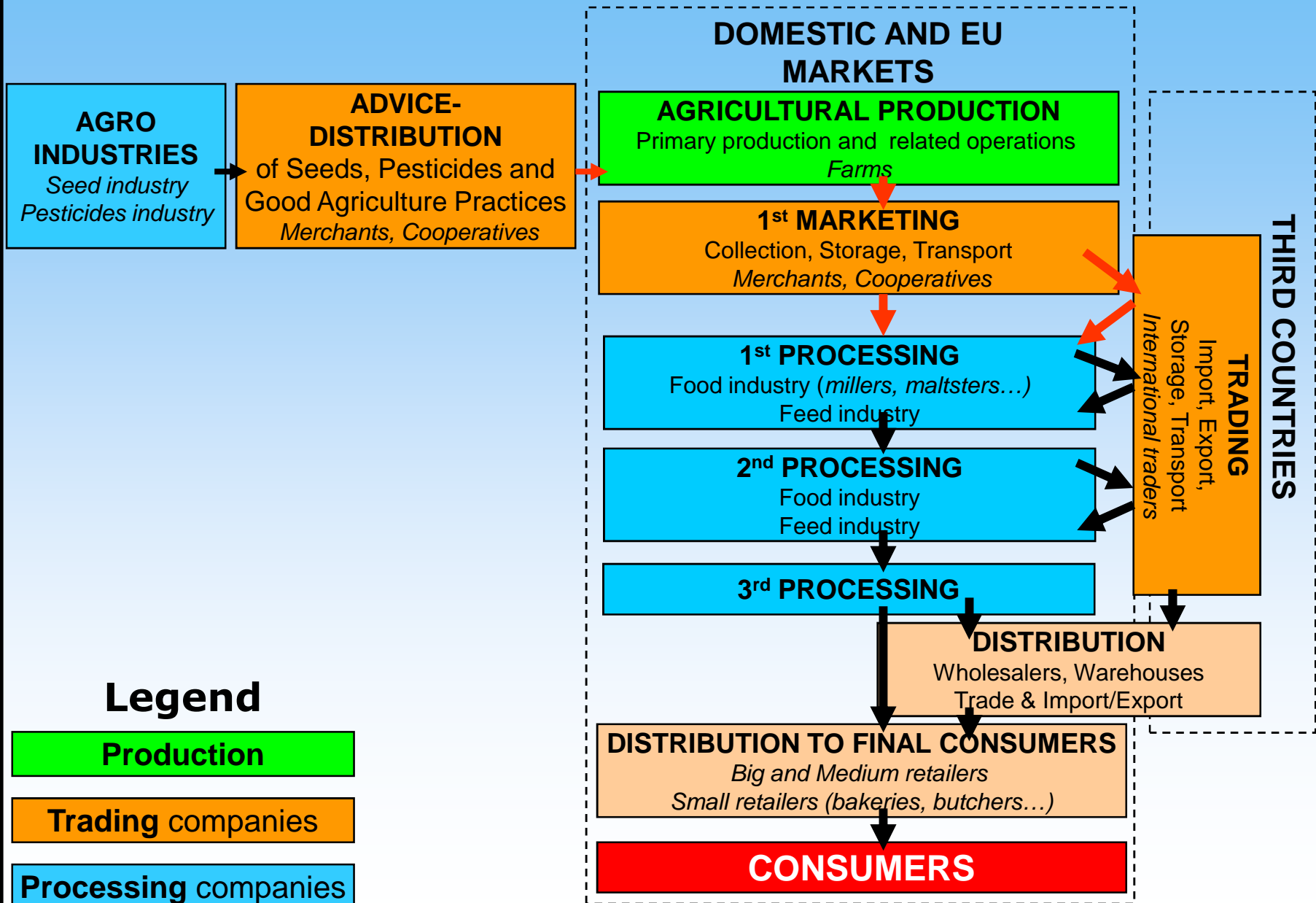


**6th Fusarium Toxin Forum
Brussels, 9-10 February 2009**

**Managing mycotoxins
in the food and feed chain :
theory and practice
in EU trade companies
and agri coops**

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Trade in the food and feed chain



Cereals supply and demand in the food and feed chain, year 2008-2009

	soft wheat	durum wheat	barley	maize	other cereals	total cereals
Production (mio t)	141.1	9.6	65.7	60.8	24.2	310.6
Opening stocks	9.9	3.1	10.4	17.7	3.8	45.4
<i>thereof imports Third countries</i>	4.5	1.3	0.4	2.5	0.4	9.1
Total resources	155.5	15,1	76.6	81.0	28.3	365.0
Consumption						
- Feed	55.0	0.1	38.0	44.0	22.0	162.9
- Other use	60.9	9,1	13.6	13.9	3.6	105.5
<i>thereof :</i>						
<i>Seed</i>	5.2	0,6	2.2	1.8	1.5	12.2
<i>Bioethanol</i>	1.6	0,0	1.2	1.1	0.1	4.4
<i>Industry & human consumption</i>	54.1	8,5	10.2	11.0	2.0	88.9
Total consumption	115.9	9.2	51.6	57.9	25.6	268.4
Remaining for exports and carry-out	39.6	4.8	25.0	23.1	2.7	96.6
Exports Third countries (including flour, semolina and malt)	18.0	1.1	5.8	1.6	0.2	26.8
Carry-out	21.6	3.7	19.2	21.5	2.5	69.8

Source: EU-27 balance sheet for Cereals 2007/08 - 2008/09. 11 December 2008. COCERAL.

Trade in the food and feed chain

1. Prevention in fields

- ✓ Good Agricultural Practices to limit Fusarium development in the fields
- ✓ Identifying and managing the risks
- ✓ Technical advice provided by agrosupply distributors and farming technical institutes
- ✓ Availability of inputs: seeds and PPP

2. Sampling methods, rapid detection and analysis methods

3. Analysis results for trading companies

- ✓ In practice : Uncertainty of analysis techniques



1. Prevention in the fields thanks to Good Agriculture Practice (GAP)



- GAP are defined at national level with public and technical research bodies
- GAP are required to limit fusarium development (agronomic factors, harvest time...)



EU
Recommendation
2006/583
(17/08/2006)

Factor	Details	Risk	Score	Score	Score	Score	Score	Score	Score
Region (see map below)	High	4							
	Moderate	2							
	Low	1							
Previous Crop	Maize	6							
	Other	0							
Cultivation	Direct drilled	4							
	Standard Minimum tillage	3							
	Intensive Minimum tillage	2							
Wheat variety	Plough (soil inversion)	0							
	RL Resistance rating 1-3	1							
	RL Resistance rating 4-9	0							
Your pre-flowering score			0	0	0	0	0	0	0

Branschriktlinjer för att undvika Fusariumtoxiner i spannmål



Projet de Guide de Bonnes Pratiques « Grandes cultures »

1. **Prevention** in the fields by agrosupply distributors' and technical institutes advice to farmers

- Advocate **technical advice** to farmers, in order to limit the presence of mycotoxins (seeds variety, tillage, previous crop)
- Advice-Distribution of **Seeds and Pesticides**
 - **Pesticides** : Review of EC/91/414 to have access to Active Substances (fungicides)
 - **Seeds varieties**



- Resistance against fusarium fungi



2. Sampling of bulk commodities Everyday life for traders and agri coops

**Situations when the trade company
needs to sample and detect mycotoxins**

in Silo/Warehouse



in Cargo/Train/Truck



How to obtain reliable results ?

HOW TO SAMPLE A BIG LOT ?

- **Take** incremental samples in truck, cargo, in silo
 - **Agregate** incremental samples
 - **Divide** into sub-samples
 - **Keep** samples
- **Send** samples to labs for analysis

**Sampling
uncertainty**

+

HOW TO DETECT AND ANALYSE ?

- **Rapid detection** tools for **traders**
- **Standardized analysis** methods for accredited **labs**

**Analysis
uncertainty**

=

HOW TO INTERPRET ANALYTICAL RESULTS ?
Trade to first-processing companies

**Total
uncertainty**



Sampling protocol projects



	Official controls (CE/401/2006)	IWA Seattle	CEN pr24333.2	AFNOR XP V03-777
Project leader	DGSANCO	AOCS, ICC, AACC, ANSI	CEN TC338 (DE, FR, UK)	AFNOR
Publication	23/02/2006	Mid 2009 ?	Summer 2009	June 2008
Scope	Regulated mycotoxins	technological and safety criteria,	technological and safety criteria	technological and safety criteria
Number of samples	-	Project based on pr24333.2	pr24333.2 (uncertainty: 8%)	Less than pr24333.2 (uncertainty: 15%)
Statistical model	NO	YES for technological and safety criteria NO for GMO	YES for technological and safety criteria	YES for technological and safety criteria
Products	Food products	All grains and derived products	Cereals and derived products	Cereals and derived products
Transport	Road, Railway, Cargo	Road, Railway, Cargo	Road, Railway, Cargo	Road, Railway, Cargo

Sampling protocol projects

	Official controls	Commercial contracts (in case of dispute)
Now	CE/401/2006	Protocol only for <u>technological criteria</u> No protocol for <u>safety criteria</u>
What we support	Harmonization (CEN TC338 pr 24333.2?)	



Sampling protocol projects

Example for silos (500t lot)



	Official controls	IWA Seattle	CEN pr24333.2	AFNOR XP V03-777
Statistical model	No	No	Yes	Yes
Number of elementary samples	100	20	20	10
Minimum mass for technological criteria	Not applicable	1 to 3kg	1 to 3kg	1 to 3kg
Minimum mass for Fusariotoxins (DON, ZEA, FUMO)	10kg	5kg	3kg	1kg DON 3kg
Minimum mass for OTA	10kg	5kg	10kg	10kg
Uncertainty rate*	Reference rate	-	8%	15%

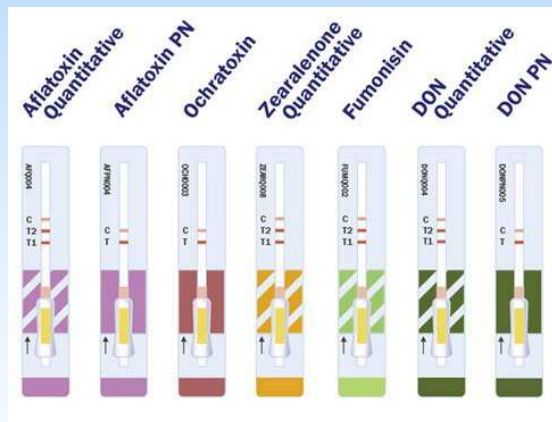
* According to ONIGC/IRTAC/ARVALIS statistical model developed in France

3. Available tools to detect mycotoxins in trade companies

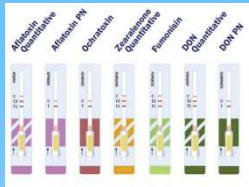
2 ways for « rapid » detection of mycotoxins for traders

Lateral flow devices




ELISA kits



**But time, training and accuracy of
results are practical issues**



Rapid detection tools (Lateral flow device) for traders

	REGULATED FUSARIOTOXINS	Limits	 www.charm.com	 www.neogen.com	 www.r-biopharm.com
FOOD REGULATION (reg. CE/1126/2007)	DON	Cereals (1250 ppb)	QT	SQT	SQT
		Durum wheat, oats, maize (1750 ppb)	QT	SQT	SQT
	Zearalenon	Wheat (100 ppb)	QT	SQT	NA
		Durum wheat and maize : 350 ppb	QT	SQT	NA
	Fumonisin B1/B2	Maize : 4 000 ppb	QT	SQT	SQT
	T2+HT2	-	QT	NA	NA
FEED (rec. CE/576/2006)	DON	Cereals : 8 000 ppb	QT	SQT	SQT
	Zearalenon	Cereals : 2 000 ppb	QT	SQT	NA
	Fumonisin B1/B2	Maize : 60 000 ppb	QT	SQT	SQT
	T2+HT2	-	QT	NA	NA
<p>Legend : NA = Not Available, QL = Qualitative (yes/no), QT = Quantitative (value), SQT = Semi-Quantitative (between 2 values)</p> <p><i>WARNING : This table has been formatted by COCERAL .Data have been given by each supplier (CHARM, NEOGEN and R-BIOPHARM) under their own responsibility. It is published with their authorization.</i></p>					

Uncertainty about result analysis

Some real examples...

Contaminations

Mycotoxins

Parameter	Amount (A.R.)	
Deoxynivalenol (DON) / Vomitoxin	910	ppb
Zearalenone (ZEA)	1720	ppb

Q - Analysis accredited by RvA

No analysis uncertainty
available even for an
accredited lab

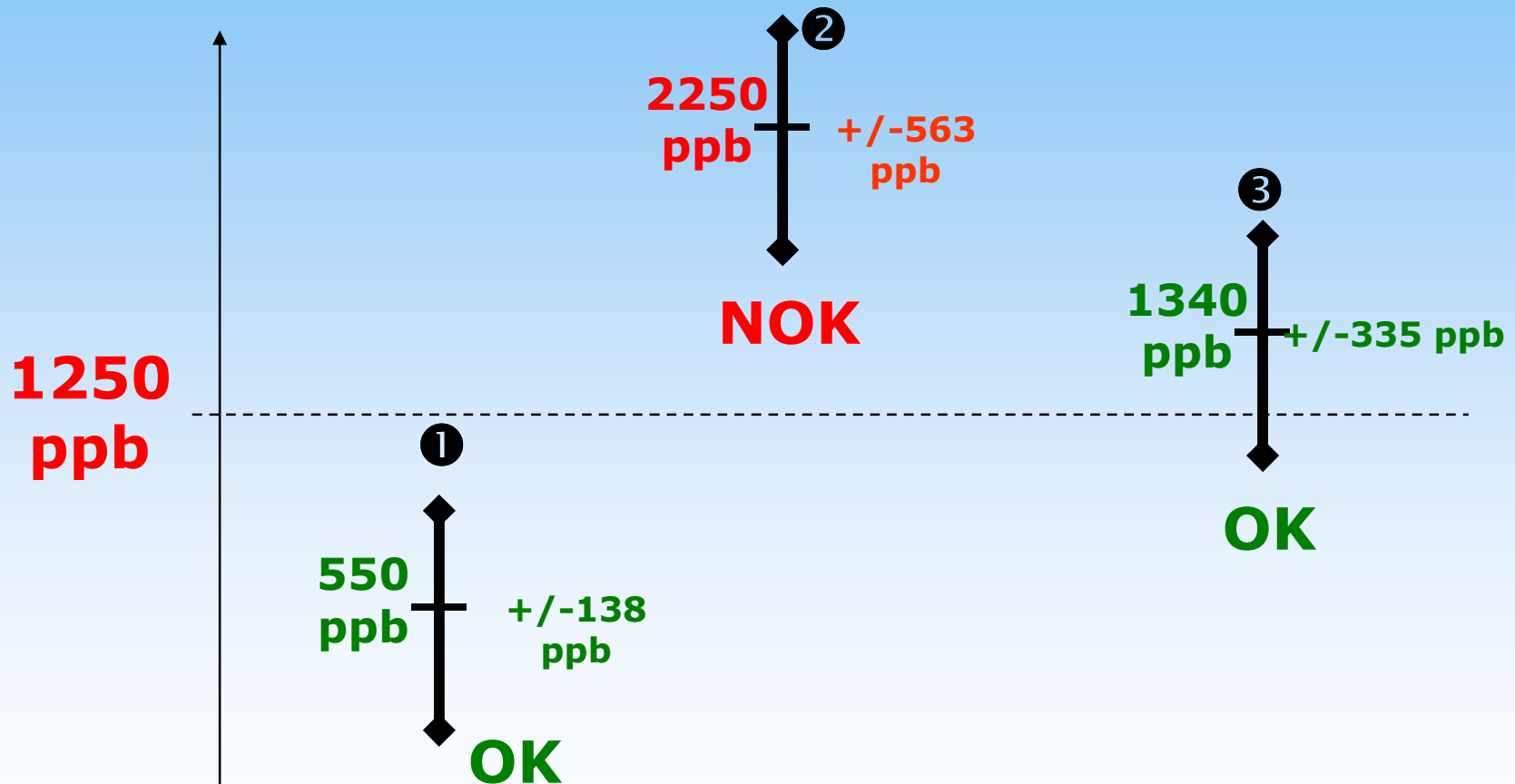
PARAMETRI CHIMICI

DEOSSINIVALENULO (VOMITOSSINA) 1.252 µg/kg
 [Metodo :M11216 rev.2:2002 (HPLC-RP/DAD)]
 Valori di riferimento : massimo 1250 µg/kg
 Data inizio prova : 25/09/2008 fine prova : 30/09/2008
 (Fonte dei limiti: REG.(CE)N.1126/2007)
 Incertezza = ± 387 µg/kg, secondo Horwitz-Thompson (k = 2; p = 95%)

DON 1252 ppb +- 387 ppb :
OK for food ?

Uncertainty about result analysis

Example : DON results on wheat for food chain
with uncertainty rate = 25%



**Results interpretation according to
Reg. CE/401/2006 Annex II.4.4**

Uncertainty about analysis result

- **Technical aspect**
 - ✓ How to calculate uncertainty : no standardized method, variation from lab to lab
- **Legal consequences**
 - ✓ How to take into account uncertainty to know whether a lot matches the food/feed safety regulations ?
 - ✓ Important to decide if a lot must be withdrawn from the market
 - ✓ No insurance available to cover mycotoxins risks
- **Commercial consequences**
 - ✓ Dispute between buyer and seller
 - ✓ Risk of rejection of goods
 - ✓ Logistical problems
 - ✓ High costs



What we advocate



- More support for farmers and more research in the prevention of field mycotoxins (seeds, use of inputs, GAP, etc)
- Harmonization and standardization of protocols
- Research and development on sampling and detection tools suited for the trade in bulk commodities
- Clarification about uncertainty of analysis results to have the same interpretation rules in official controls and trade all over the EU



Thank you for your attention

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