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Fusarium Toxins Levels – Compliance with Regulation 1126/2007

Commission Stakeholder Forum 10-11 January 2008

CIAA



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- SECTORS
 - 30 European Sector Associations
- COMPANIES
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Amended Fusarium Toxin Levels (DON)

- **Fusarium Mycotoxins – Regulation 1126/2007 Amending Regulation 1881/2006 – Wheat & Maize**

- Deoxynivalenol

- Unprocessed cereals other than durum wheat, oats and maize 1250ppb
- Unprocessed durum wheat and oats 1750 ppb
- Unprocessed maize (with exception of unprocessed maize intended to be processed by wet milling) 1750 ppb
- Cereals intended for direct human consumption, cereal flour, bran and germ (with exception of processed cereal-based foods for infants & young children & milling fractions of maize) 750 ppb
- Pasta 750 ppb
- Bread, pastries, biscuits, cereal snacks and breakfast cereals 500 ppb
- Milling fractions of maize with particle size >500 micron 750 ppb
- Milling fractions of maize with particle size \leq 500 micron 1250 ppb



Amended Fusarium Toxin Levels (ZEA)

- **Fusarium Mycotoxins – Regulation 1126/2007 Amending Regulation 1881/2006 – Wheat & Maize**
- **Zearalenone**

- Unprocessed cereals other than maize 100 ppb
- Unprocessed maize (with exception of unprocessed maize intended to be processed by wet milling) 350 ppb
- Cereals intended for direct human consumption, cereal flour, bran & germ (with exception of maize intended for direct human consumption, maize-based snacks, maize-based breakfast cereals, processed cereal-based foods for infants & young children, and milling fractions) 75 ppb
- Refined maize oil 400 ppb
- Maize intended for direct human consumption, maize-based snacks and maize-based breakfast cereals 100 ppb
- Milling fractions of maize w. particle size >500 micron 200 ppb
- Milling fractions of maize w. particle size ≤500 micron 300 ppb



Amended Fusarium Toxin Levels (FUM)

- **Fusarium Mycotoxins – Regulation 1126/2007 Amending Regulation 1881/2006 – Wheat & Maize**
- **Fumonisin**
 - Unprocessed maize (with exception of unprocessed maize intended to be processed by wet milling) 4000 ppb
 - Maize intended for direct human consumption, maize-based foods for direct human consumption, with exception of maize-based breakfast cereals and maize-based snacks and processed maize-based foods for infants & young children) 1000 ppb
 - Maize-based breakfast cereals & maize-based snacks 800 ppb
 - Milling fractions of maize with particle size >500 micron 1400 ppb
 - Milling fractions of maize with particle size ≤500 micron 2000 ppb



Experiences to Date (Wheat) (1)

- DON is a toxin that develops pre-harvest and continues to increase after harvest.
- High levels of fusarium in wheat in certain Member States for this crop year due to severe weather conditions;
- Levels often vary according to region: In France, for example, the south west and northern region were significantly affected, with more than 26% of wheat exceeding the levels in some areas.



Experiences to Date (Wheat)(2)

- Effects of processing on presence of mycotoxins in wheat and wheat-products:
 - Dry Milling
 - DON levels are reduced by about 50% between wheat grain & wheat flour. Hence, in the wheat bran, DON is increased between 200-250%
 - However, for the 2007 crop, some mills have experienced very limited reduction in DON (<10%)
 - ZEA is reduced by about 50-90% between wheat grain and wheat flour
 - ZEA is increased by up to 300% between bran and wheat flour



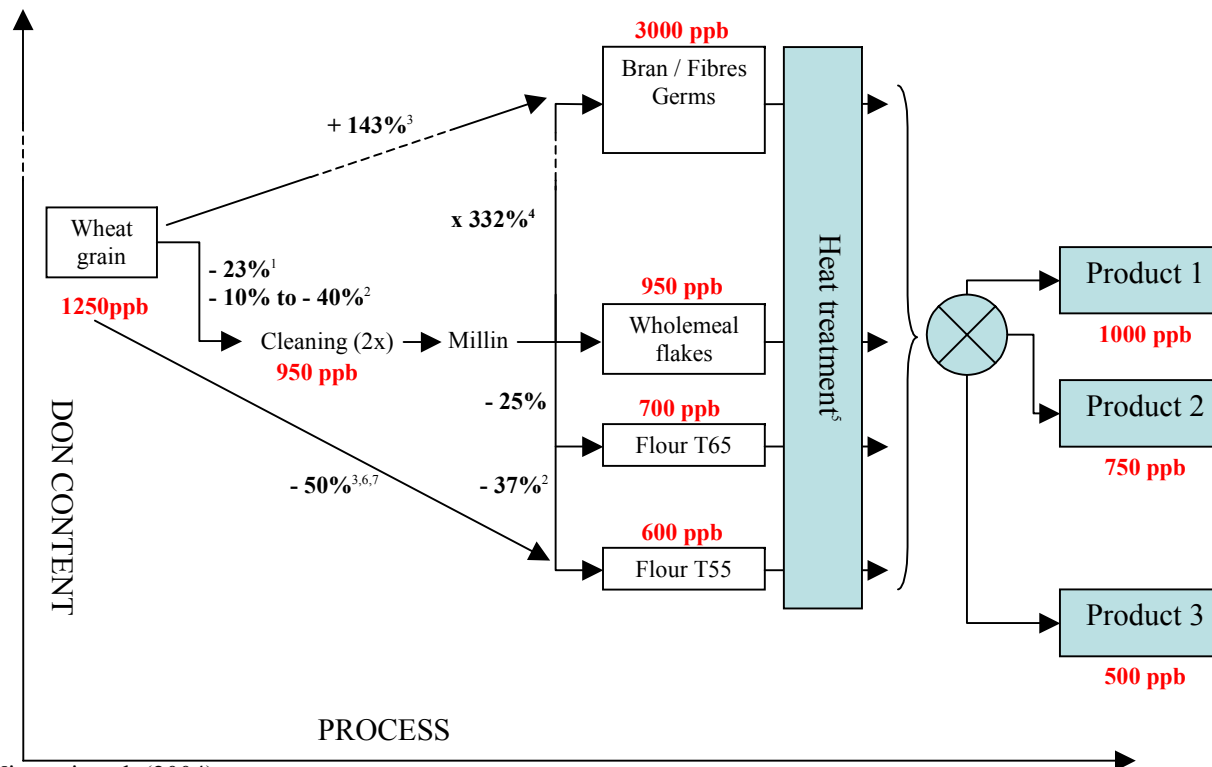
Experiences to Date (Wheat)(3)

- Effects of processing on presence of mycotoxins in wheat and wheat-products:
 - Wet milling (Starch production)
 - Starch production process has a dramatic reduction effect on DON and ZEA in wheat starch fractions (EU starch industry data from 2000 to 2006 shows levels below Limit of Detection in starch).
 - Other processes (Final processing)
 - DON not reduced by final processing, where biscuits are concerned, and may even be concentrated when specific fractions (e.g. bran) are used
 - ZEA not significantly reduced by processing



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Impact of Dry Milling Process on DON Content in Wheat



¹ Visconti et al. (2004)

² Grosjean et al. (2005)

³ Hazel and Patel (2004)

⁴ Hazel and Scudamore (2007) 4th Mycotoxin Forum

⁵ JECFA (2001) reviewing Kamimura (1989)

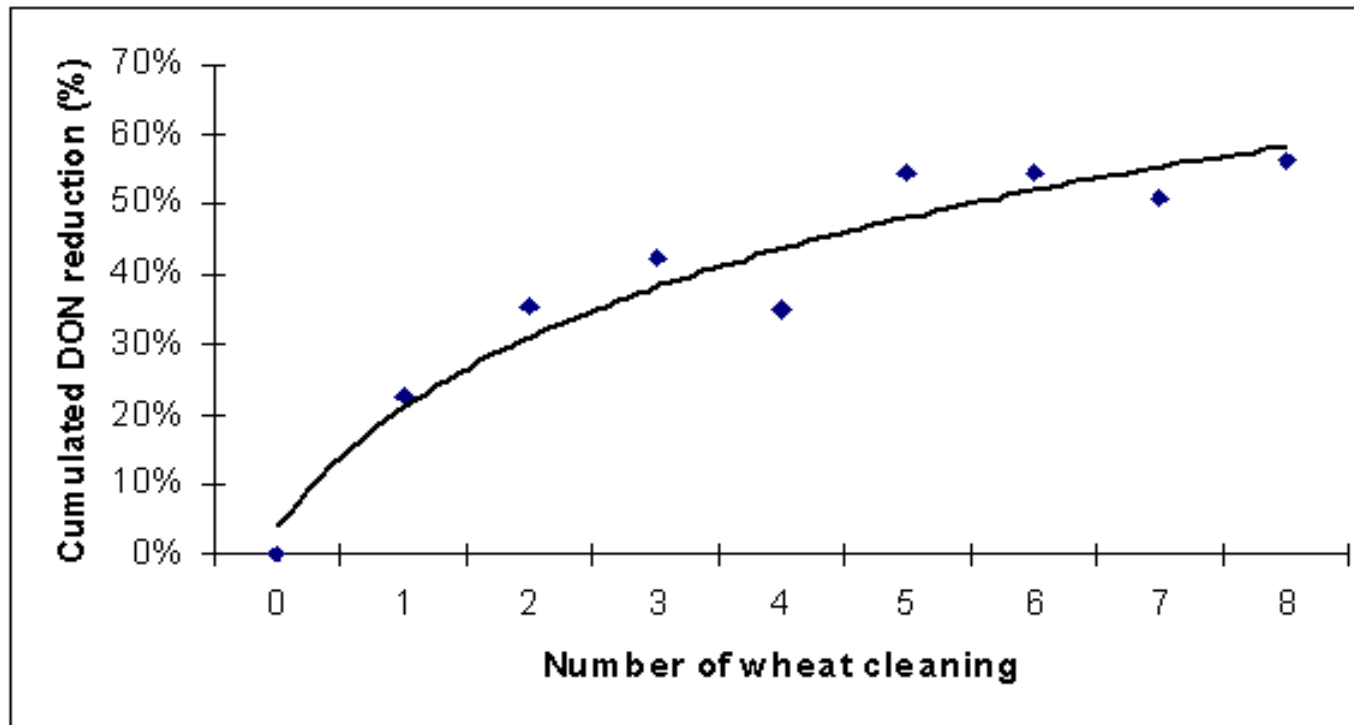
⁶ INTERCEREALS and SIFPAF (2003)

⁷ CODEX (2007)



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Impact of Wheat Cleaning Process on DON Reduction



•Test conducted in 2003 starting from a batch at 1500ppb

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Beware of losses : 6% after 8 cleaning



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Impact of Recipe on DON Content

	Ex type 1: Rusk with fibres and wolewheat			Ex type 2 :Standard rusk			Ex type 3 : Cereal biscuit		
	% of incorporation	DON cont. (ppb)	DON contribution (ppb)	% of incorporation	DON cont (ppb)	DON contribution (ppb)	% of incorporation	DON cont (ppb)	DON contribution (ppb)
WHEAT FLOUR T55	33.3	750	250	84.7	750	636			
RED WHEAT FLOUR	33.3	750	249						
EXTRUDED WHEAT BRAN RYE FLOUR T 70	19.7	3000*	591						
BARLEY FLOUR							1.8	750	13
WHEAT WHOLEMEAL FLOUR							13	750	98
FINE WHEAT BRAN							20.9	750	157
OAT FLOUR							1.8	3000*	54
							1.9	750	14
TOTAL DON CONTENT (ppb)			1090			636			350

* the 3000 ppb value was estimated as described on slide 9



Experiences to Date (Maize) (1)

- For whole unprocessed maize

In previous crop years, we have found about 300 ppb of DON in maize at harvest time and about 1200 ppb of DON later in the storage year (average values)

However, in the 2006 crop, we find up to 1500 ppb at harvest time, increasing to up to 3000 or even 4000 ppb later in the storage year.



Experiences to Date (Maize) (2)

- Effects of processing on the presence of mycotoxins in maize and maize-products
 - Dry Milling (Maize Grits and Maize Flour)
 - Mycotoxins not destroyed but unevenly redistributed between fractions – reduced in flaking grits but higher in maize flour and bran
 - Wet Milling (Starch production)
 - Starch production process has a dramatic reduction effect on DON, ZEA and FUM in corn starch fractions.
 - EU starch industry data from 2000 to 2006 shows levels below limit of detection in starch
 - Other processes (Final processing, e.g. Snacks, Fine Bakery Wares)
 - DON not reduced by processing
 - Fumonisin – Reduction varies with processing method



Cereal Composition of Foods

- Foods made from cereals are divergent in their composition of cereal ingredients, both quantitatively and qualitatively:
 - Levels of cereal ingredients in finished products vary greatly from one category of product to another (eg. Fresh bread & unleavened bread);
 - Levels of cereal ingredients can also vary significantly within the same category of cereal products (eg. Biscuits with cream filling & dry biscuits);
 - The cereal ingredients used are also qualitatively different (eg. products made mainly with white flour & those using more cereal grains and other cereal derivatives).



General Impact (1)

- Not possible to consistently make finished products which comply with the legislation by using the agreed levels of raw materials
- Inconsistencies between levels for finished products, intermediate products and raw materials have led to major difficulties for the food supply chain:
 - Example: In Southwest & Northern France, 25-30% of wheat in the 2007 harvest were above the limits, leading to significant analytical costs & even litigation, due to analytical & sampling differences
- Insurance: Insurers in certain MS are refusing to provide coverage in the event of contamination => **SIGNIFICANT** costs for industry



General Impact (2)

- Processors have had to specify processed product limits for intermediate materials => sourcing of raw materials is becoming problematic.

This has in turn led to:

- => Increased transport of raw materials over long distances
 - => negative environmental impact;
- => Rising cereal costs => negative impact on competitiveness of EU cereal market and food chain. This has been exacerbated by lack of possibility of obtaining insurance coverage in some MS;
- => Reduced consumer choice;
- => Certain nutritionally-rich ingredients will be excluded from innovation;
- => Increased risk of non-compliance from non EU imports (complex issues)



Economic Impact: Three Case Studies (1)

- 1) Climatic conditions in 2000, 2002, 2003 & 2007 led to high levels of DON in wheat grain in some Member States
 - This has led to an estimated **17 euro/tonne** increase in price of grain for 2007, due to additional analytical & storage costs, with no security as to quantity of supply
 - =>For companies, SMEs in particular, this could lead to millions of euro in extra cost, excluding risk of shortage
- 2) If a specifically controlled production chain is required, as is the case for baby biscuits, which fall under category of babyfoods, the impact of managing contaminants represents an extra cost of **50 euro/tonne**



Economic Impact: Three Case Studies (2)

- 3) Snacks have a relatively short shelf-life (typically 12 weeks), therefore post-production sampling & testing for *fusarium* is not practical. In order to avoid exceeding limits, the manufacturer specifies limits for raw materials in line with EU legislation. This results in:
- Additional sampling & testing;
 - Sourcing of maize from a wider area, increasing the food miles & the carbon foot print for the finished products;
- => For a snack manufacturer using 10,000 tonnes of maize grits & flour annually, the consequence is that the additional measures have added approx. **25 euro/tonne**, an increased cost to the producer of **250,000 euro**



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Conclusions and Recommendations (1)

- The food chain is committed to ensuring the safety of food products;
- However, the levels for mycotoxins in wheat and maize are not yet consistently achievable because:

Primary Production Stage

- GAP Guidelines need more time to be implemented and, in any case, do not address climatic factors;
- Agricultural reality, geographic and climatic factors have not been acknowledged



Conclusions and Recommendations (2)

Processing Stage

- As the effect of processing on fusarium levels is inconsistent, it is not possible to have a correlation factor which is appropriate in all instances
- The introduction of uniform limits is having serious supply chain implications for the whole of EU cereal food chain.
- Limits set for processed products, for example, do not appear to take the diverse composition of products, crop variety, geographic variation OR current agricultural reality adequately into account



Conclusions and Recommendations (3)

- Set relevant fusarium limits that are realistically achievable:
 - Set in accordance with a risk-benefit (eg. nutrition quality) approach;
 - Recognising the limitations of processing;
 - Consistent for raw and finished products;
 - Acknowledging that foods made from cereals are divergent in their composition of cereal ingredients, both quantitatively and qualitatively;
 - Taking agricultural feasibility into account (seasonal & geographic variations, longer-term impact of global warming, etc and set in accordance with GAP
- The limits should also stimulate a preventative approach at farm level

=> A review of the limits introduced for DON, ZEA and FUM in maize and wheat and consequent levels fixed for processed products is therefore necessary.