

***Fusarium* toxins: adult intake from cereals and cereal-based products**

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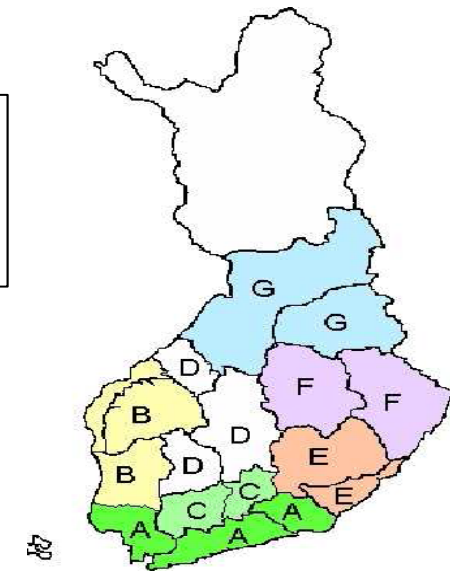
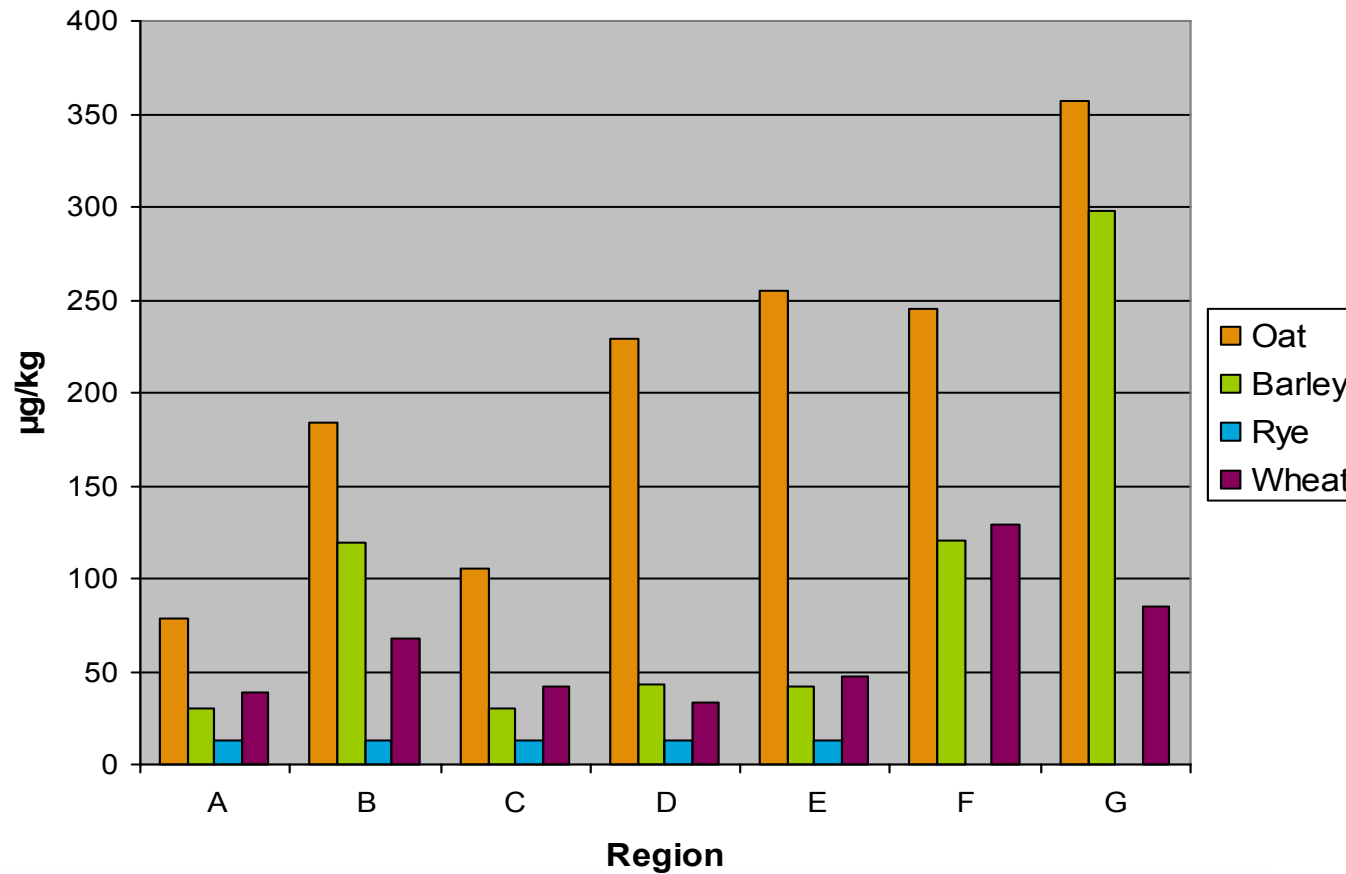
Co-operation

- Evira and MTT (Agrifood Research) : analysed data from the safety surveys of domestic grains (1999-2007) and control survey (2007)
- THL (National Institute for Health and Welfare): consumption data from Findiet 2007
- Evira, MTT, THL : intake estimations in expert group

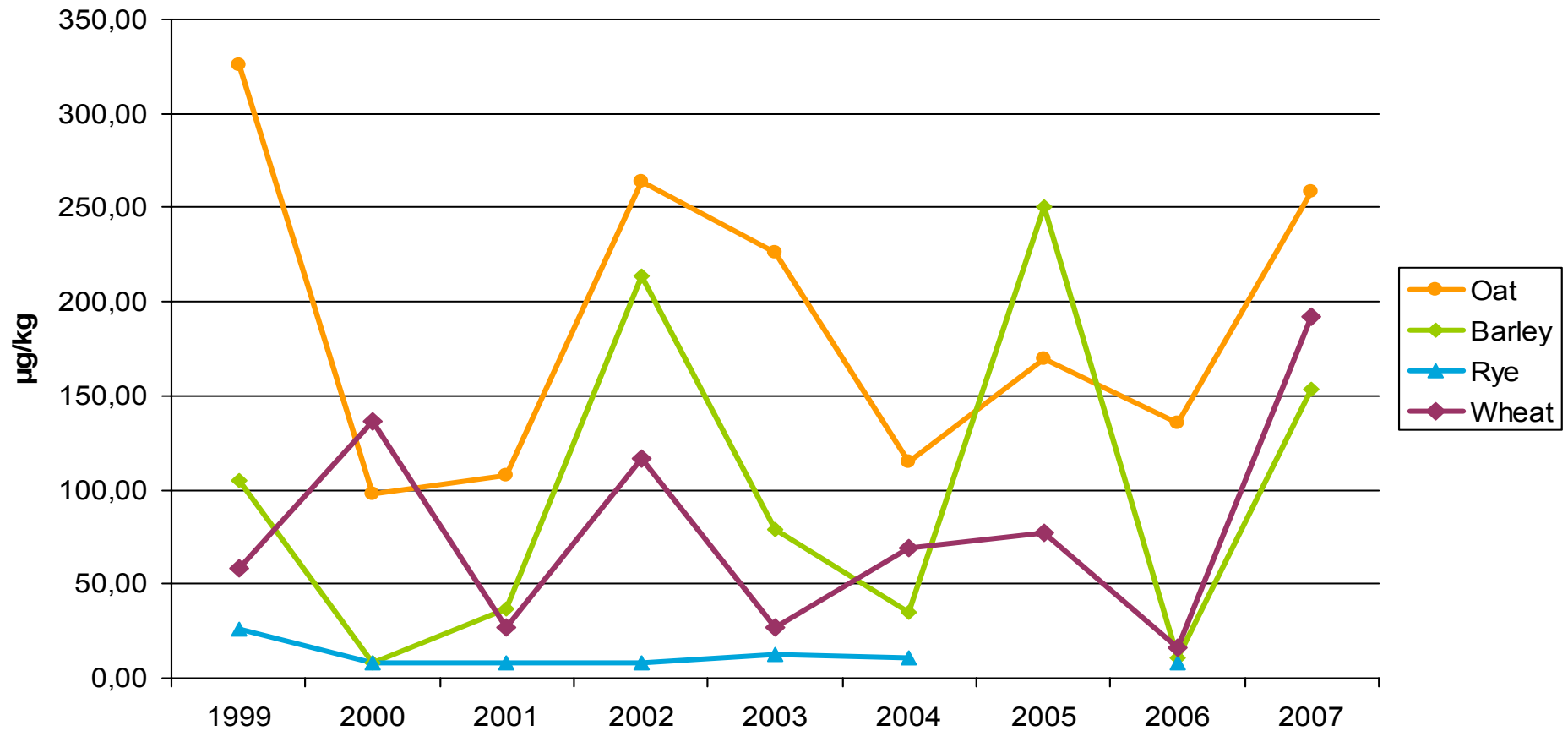
Fusarium toxins involved and TDIs

- Deoksinivalenol (DON)
 - TDI = 1 µg/kg bw/d
- T-2- ja HT-2-toxins
 - TDI = 0,06 µg/kg bw/d
- Zearalenone (ZEA)
 - TDI = 0,2 µg/kg bw/d
- Nivalenol (NIV)
 - TDI= 0,7 µg/kg bw/d
- All are Immunotoxic and acutic toxic substances ja suspected to be genotoxic

Variations of DON concentrations in cereals



Variations of DON-concentrations in cereals during 1999-2007



Results from 1999-2007 ($\mu\text{g}/\text{kg}$)

<i>Fusarium</i> -toxin	cereal	N	Mean	Min	Max	Median
DON	Oat	361	488,59	12,50	8800,00	169,00
	Barley	236	237,56	12,50	6801,63	65,40
	Rye	67	21,83	12,50	178,00	12,50
	Wheat	325	176,90	12,50	5865,13	46,16
T-2 + HT-2	Oat	361	195,20	12,50	3500,00	36,65
	Barley	236	22,53	12,50	315,99	12,50
	Rye	67	15,21	12,50	106,00	12,50
	Wheat	325	12,87	12,50	46,50	12,50

Intake = concentration x consumption

- In intake estimations of Fusarium toxins from cereals; sorting, unhulling or other processes in the cereal production were not considered
- 1) Median concentration x average consumption
 - 2) Median concentration x 95th percentile consumption
 - 3) Consumer eats only a single type of cereal species:
average ja 95th percentile consumption

Intake estimation of DON from data 1997-2007

Deoksinivalenol (TDI = 1,0 µg/kg/d)

1999-2007

Cereal	Concentration (µg/kg)		Consumption Female /Male (g/vrk)		Intake (1) µg/kg/vrk		Intake (2) µg/kg/vrk	
	N	Median	Mean	95th percentile	Female	Male	Female	Male
Oat	361	169,00	8,1 / 8,1	29,5 / 33,5	0,019	0,016	0,070	0,066
Barley	236	65,40	1,2 / 1,2	6,4 / 6,5	0,001	0,001	0,006	0,005
Rye	67	12,50	42,2 / 63,4	89,3 / 146,7	0,007	0,009	0,016	0,021
Wheat	325	46,16	74,5 / 88,7	126,7 / 159,2	0,049	0,048	0,083	0,086
Total	989				0,076	0,074	0,175	0,179

Intake estimation of T-2- ja HT-2-toxins from data 1997-2007

T-2 ja HT-2 (TDI = 0,06 µg/kg/d)

1999-2007

Cereal	Concentration (µg/kg)		Consumption Female / Male (g/vrk)		Intake (1) µg/kg/vrk		Intake (2) µg/kg/vrk	
	N	Median	Mean	95th percentile	Female	Male	Female	Male
Oat	361	36,65	8,1 / 8,1	29,5 / 33,5	0,004	0,003	0,015	0,014
Barley	236	12,50	1,2 / 1,2	6,4 / 6,5	0,000	0,000	0,001	0,001
Rye	67	12,50	42,2 / 63,4	89,3 / 146,7	0,007	0,009	0,016	0,021
Wheat	325	12,50	74,5 / 88,7	126,7 / 159,2	0,013	0,013	0,022	0,023
Total	989				0,025	0,026	0,055	0,060

Worst case: DON and T-2 and HT-2

Intakes of Deoxynivalenol and T-2- and HT-2-toxins of high consumers, who eat only one type of cereal = oat

MTT 1999-2007

Toxin	Concentration(μ g/kg)		Consumption Female / Male (g/d)		Intake (1) μ g/kg/d		Intake (2) μ g/kg/d	
	N	Median	Mean	95th percentile	Female	Male	Female	Male
DON	361	169,00	125,9 / 161,5	193,5 / 255,4	0,301	0,320	0,462	0,506
T-2- and HT-2	361	36,65	125,9 / 161,5	193,5 / 255,4	0,065	0,069	0,100	0,110

Comparison of *Fusarium* toxins intake in Finland and Norway (SCOOP 2003)

Toxin	Research	Region	Used values in calculations		Daily intake	
			concentration	consumption	µg/kg bw/d)	
					Female	Male
DON	MTT 1999–2007	Finland	mean mean	mean 95th percentile	0,259 0,572	0,25 0,582
	SCOOP 3.2.10	Norway	mean mean	mean 95th percentile	0,3 0,53	0,343 0,627
T-2 ja HT-2	MTT 1999–2007	Finland	mean mean	mean 95th percentile	0,045 0,127	0,044 0,13
	SCOOP 3.2.10	Norway	mean mean	mean 95th percentile	0,055 0,117	0,064 0,137
ZEA	MTT 1999–2007	Finland	mean mean	mean 95th percentile	0,032 0,08	0,032 0,085
	SCOOP 3.2.10	Norway	mean mean	mean 95th percentile	0,006 0,014	0,008 0,017
NIV	MTT 1999–2007	Finland	mean mean	mean 95th percentile	0,029 0,065	0,029 0,071
	SCOOP 3.2.10	Norway	mean mean	mean 95th percentile	0,05 0,094	0,057 0,11

CONCLUSIONS

- Intakes of *Fusarium*-toxins below the TDI-values
- Only those consumers, who eat a lot of unprocessed oat and oat products, can exceed TDI of T2- and HT-2-toxins. This is unlikely, if oat has been processed through sorting and dehulling.
- Control and reductive methods are needed, because there are big local variations in toxin concentrations because of different weather conditions

Thank you!

