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the bioanalytical company



Can Legal Limits for GMO be Enforced ?

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NO

***Thank you for your
attention!***

1829/2003 *Traceability of GMO in the Food & Feed chain*

1830/2003 *Labelling threshold of 0.9% for GMO*

65/2004 *Unique coding system for GMO*

:

:

2004/787 *Recommendations on sample taking and analysis*

... In order to establish that the presence of this material is adventitious, operators must be in a position to supply evidence to *satisfy the competent authorities* that they have taken appropriate steps to avoid using the genetically modified organisms (or produce thereof) referred to in the previous paragraph as a source.'



Freie und Hansestadt Hamburg
Behörde für Umwelt und Gesundheit

Herr Dr. **Bert P ö p p i n g**

geboren am in

wird hiermit auf seinen Antrag vom 22. April 2003 die Zulassung als

Sachverständiger für die
mikrobiologische, molekularbiologische, immunchemische Untersuchung
sowie für die
physikalische Untersuchung von Lebensmitteln auf Bestrahlung
von **ämtlich zurückgelassenen Proben**

im Sinne von § 42 Absatz 2 des Lebensmittel- und Bedarfsgegenständegesetzes für das Gebiet der Freien und Hansestadt Hamburg erteilt.

Diese Zulassung ist gebunden an Ihre Eigenschaft als Bereichsleiter des Fachbereichs „Biologie / Bestrahlte Lebensmittel“ bei der Firma W.E.J. GmbH – Handels- und Umweltschutzlaboratorium -, Stenzelring 14 b, 21107 Hamburg, Fachbereich Biologie: Großmoorbogen 25, 21079 Hamburg.

Hamburg, den 01.10.2003



Sabine Kleeblatt
(Regierungsoberinspektorin)



The Equipment



But...

UK FSA-funded study on processed products containing GM soya:

Table 3: Results of the 2nd round

Product	Actual % GM Soya (m/m)	% GM Soya (m/m) (std. Deviation)			
		Laboratory 1	Laboratory 2	Laboratory 3	Laboratory 4
Biscuits					
	1.0%	0.7	0.8	0	1.0 (0.3)
	5.5%	3.9	5.4	10	5.6 (1.6)
	3.3%	3.0	3.4	10	2.8 (0.8)
Canned Pate					
	0.5%	3.5	0.4	NRR	0.4 (0.2)
	2.6%	-1.8	0.6	NRR	0.6 (0.3)
	5.1%	-4.8	5.2	NRR	4.7 (3.7)
Vegetable puree					
	1.0%	2.1	0.9	<2	NRR
	2.0%	2.4	2.4	<2	NRR
	6.0%	6.0	5.9	7 to 10	NRR

NRR = No Results Reported

Seitenbruch

Table 2: Results of the 1st round

Product	Actual % GM Soya (m/m)	% GM Soya (m/m) (std. Deviation)			
		Laboratory 1	Laboratory 2	Laboratory 3	Laboratory 4
Biscuits					
	0.1%	0.5 0.6	2.2 (0.7) 1.7 (1.7)	0.35 (0.17) 0.41 (0.62)	0.75 (0.04) 0.82 (0.09)
	0.3%	1.5 1.5	0 (0) 1.7 (0.6)	1.18 (1.14) 0.89 (1.14)	1.1 (0.23) 1.32 (0.54)
	1.0%	5.0 5.0	3.1 (0.7) 4.1 (2.3)	1.24 (1.10) 0.30 (0.20)	1.42 (0.41) 2.7 (1.56)
	10.0%	28.5 31.3	23.4 (1.6) 19.5 (2.9)	> 5.00 > 5.00	20.40 (3.69) 18.18 (3.83)
Canned Pate					
	0.1%	0.5 0.5	2.2 (0.8) 1.1 (0.1)	NRR NRR	0.0 (0.0)
	0.5%	5.0 5.0	2.6 (2.2) 6.5 (2.9)	NRR NRR	0.0 (0.0)
	10.0%	29.7 32.4	26.2 (5.3) 16.8 (1.3)	NRR NRR	NRR NRR
	50.0%	50-100 50-100	49.4 (2.6) 45.7 (3.4)	NRR NRR	NRR NRR
Vegetable puree					
	0.0%	0.0 0.0	0.1 (0.0) 0.1 (0.1)	0.37 (0.19) 0.17 (0.15)	0.0 (0.0) 0.0 (0.0)
	0.2%	0.6 0.8	0.1 (0.0) 0.1 (0.1)	0.30 (0.14) 0.33 (0.18)	1.33 (0.01) 0.95 (0.02)
	2.0%	5.0 6.4	1.8 (0.4) 1.9 (0.5)	1.80 (0.65) 2.40 (1.34)	2.00 (0.57) 1.55 (0.37)
	10.0%	28.5 32.9	8.6 (11.8) 6 (0.4)	2.92 (1.10) > 5.00	11.34 (1.66) 10.89 (1.94)

NRR = No Results Reported

Important Factors influencing the result:

- **Particle size (large/small) of GM material in comparison to other components containing extractable DNA**
- **Type of composite food: high/low fat; high/low sugar; tannins; acidic**
- **Extraction method: CTAB / WIZARD**
- **Quantification method (amplicon systems: large/small ; different size amplicons for target and reference standard**
- **Recovery**
- **Reference Material**

Verfügbar als CRMC's:

Soja: *RoundupReady®*

Mais: *Bt 11*
Bt 176
MON 810

IRMM-410S-0	GENETICALLY MODIFIED ROUNDUP READY SOYA (0 %)
IRMM-410S-1	GENETICALLY MODIFIED ROUNDUP READY SOYA (0.1 %)
IRMM-410S-2	GENETICALLY MODIFIED ROUNDUP READY SOYA (0.5 %)
IRMM-410S-3	GENETICALLY MODIFIED ROUNDUP READY SOYA (1 %)
IRMM-410S-4	GENETICALLY MODIFIED ROUNDUP READY SOYA (2 %)
IRMM-410S-5	GENETICALLY MODIFIED ROUNDUP READY SOYA (5 %)
IRMM-411R-0	GENETICALLY MODIFIED Bt-176 MAIZE (0 %)
IRMM-411R-1	GENETICALLY MODIFIED Bt-176 MAIZE (0.1 %)
IRMM-411R-2	GENETICALLY MODIFIED Bt-176 MAIZE (0.5 %)
IRMM-411R-3	GENETICALLY MODIFIED Bt-176 MAIZE (1 %)
IRMM-411R-4	GENETICALLY MODIFIED Bt-176 MAIZE (2 %)
IRMM-411R-5	GENETICALLY MODIFIED Bt-176 MAIZE (5 %)
IRMM-412R-0	GENETICALLY MODIFIED Bt-11 MAIZE (0 %)
IRMM-412R-1	GENETICALLY MODIFIED Bt-11 MAIZE (0.1 %)
IRMM-412R-2	GENETICALLY MODIFIED Bt-11 MAIZE (0.5 %)
IRMM-412R-3	GENETICALLY MODIFIED Bt-11 MAIZE (1 %)
IRMM-412R-4	GENETICALLY MODIFIED Bt-11 MAIZE (2 %)
IRMM-412R-5	GENETICALLY MODIFIED Bt-11 MAIZE (5 %)
IRMM-413-0	GENETICALLY MODIFIED MON810 MAIZE (0 %)
IRMM-413-1	GENETICALLY MODIFIED MON810 MAIZE (0.1 %)
IRMM-413-2	GENETICALLY MODIFIED MON810 MAIZE (0.5 %)
IRMM-413-3	GENETICALLY MODIFIED MON810 MAIZE (1 %)
IRMM-413-4	GENETICALLY MODIFIED MON810 MAIZE (2 %)
IRMM-413-5	GENETICALLY MODIFIED MON810 MAIZE (5 %)

Source: www.irmm.jrc.be ; April 2004

Corn

			Approved for Import			
Trait Owner	Trait Name	Corn Brands	U.S.	Europe (EU)	Japan	Canada
Trait Designation	Characteristic					
Monsanto (YGCB) YieldGard ¹ Corn Borer MON810	Corn borer resistance	Pioneer DeKalb Cargill Golden Harvest Others	Yes	Yes	Yes	Yes
Monsanto (YGRW) YieldGard ¹ Rootworm MON863	Corn rootworm resistance	Pioneer DeKalb Asgrow Others	Yes	No	Yes	Yes
Syngenta (YGCB, LL) YieldGard Corn Borer & LibertyLink ² Bt 11	Corn borer resistance, Glufosinate tolerance	NK Brand	Yes	Yes	Yes	Yes
Monsanto & Bayer AG (YGCB, LL) YieldGard Corn Borer & LibertyLink MON810 & T25	Corn borer resistance, Glufosinate tolerance	Pioneer	Yes	No	Yes	Yes
Pioneer & DowAgroSciences (HX1, LL) Herculex ³ I Insect Protection & LibertyLink TC1507	Corn borer, black cutworm, fall armyworm & western bean cutworm resistance. Glufosinate tolerance	Pioneer Others	Yes	No	Yes	Yes

			Approved for Import			
Trait Owner	Trait Name	Corn Brands	U.S.	Europe (EU)	Japan	Canada
Trait Designation	Characteristic					
Roundup Ready ⁴ GA21	Glyphosate tolerance	DeKalb Others	Yes	No	Yes	Yes
Monsanto (RR) Roundup Ready NK603	Glyphosate tolerance	Pioneer DeKalb Others	Yes	Yes	Yes	Yes
Monsanto (YGCB, RR) YieldGard Corn Borer & Roundup Ready MON810 & NK603	Corn borer resistance, Glyphosate tolerance	Pioneer Others	Yes	No	Yes	Yes
Monsanto (YGRW, RR) YieldGard Rootworm & Roundup Ready MON863 & NK603	Corn rootworm resistance, Glyphosate tolerance	Pioneer Others	Yes	No	Yes	Yes
Monsanto (YGPL) YieldGard ¹ Plus MON810 & MON863	Corn borer resistance, Corn rootworm resistance	Pioneer Others	Yes	No	Yes	Yes
Monsanto (YGPL & RR) YieldGard Plus & Roundup Ready MON810, MON863 & NK603	Corn borer resistance, Corn rootworm resistance, Glyphosate tolerance	Pioneer Others	Yes	No	Yes	Yes
Pioneer & DowAgroSciences Monsanto (HX1, RR) Herculex ³ I Insect Protection & Roundup Ready TC1507 & NK603	Corn borer, black cutworm, fall armyworm & western bean cutworm resistance. Glyphosate tolerance, Glufosinate tolerance	Pioneer Others	Yes	No	No	Yes

>> 3 Sorten Mais

Soja:

IRMM-410R (1999/2000):
Homozygous High Cycle Brand
9988.21.RR soy / T 77 seeds;
Single step grinding, Wet-mixing
with cooling (Trapmann et al.
2000a)

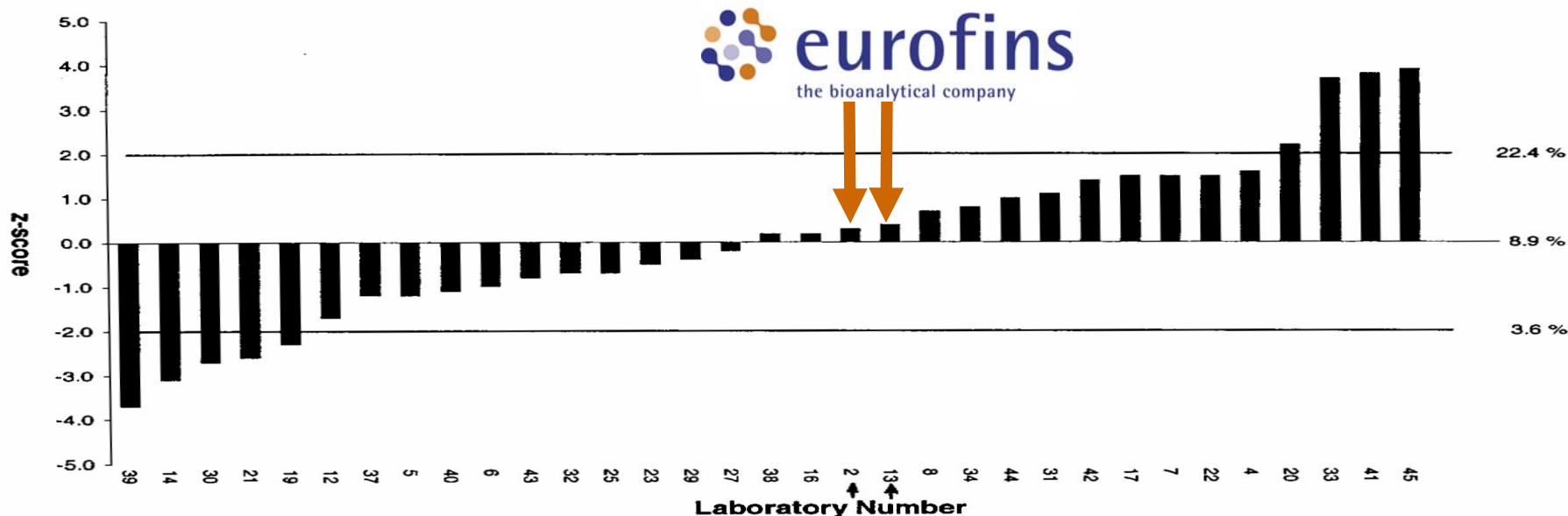
IRMM-410S (2001): Homozygous
RR line AG5602 RR / AG line
A1900 seeds ; Single step
grinding, Dry-mixing,
Partial second step grinding
(Trapmann et al. 2002c)

„quantitative rt-PCR method the
GM values obtained for **410S** are
in average around **12% lower**
than the one obtained for **410R**“

„Additionally we observed
inhibition effects in the
concentrations containing more
than 1% GM, the **inhibition**
appears to be **higher for 410R**.“

Source: IRMM e-mail to Paul Reece Juli 2003

Proficiency Tests



GIPSA Proficiency Program: Historical Record
 Participant: GeneScan Analytics GmbH, Freiburg
 DNA-Based Testing



Percentage Correct for Each Biotech Event

Month/Year	Test Used	Corn Events									Soybean
		35S	NOS	T25	CBH351	MON810	GA21	E176	Bt11	NK603	CP4 EPSPS
February 2002	DNA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
May 2002	DNA	100.0%	100.0%	100.0%	66.7%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
August 2002	DNA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
November 2002	DNA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
February 2003	DNA	NR*	NR	100.0%	91.7%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
May 2003	DNA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
September 2003	DNA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

*NR indicates No Result was reported by the participant

Two issues:

know-how of world commodity market:

- e.g GM soya: > 50%
- e.g. GM maize: > 10%

Proficiency Tests:

- FSA / IFR
- FAPAS / GeMMA
- US: AOAC / AACCC / USDA checksamples

Not precisely to the 0.9% labelling threshold *but,*

Allowing for greater measurement uncertainty inherent to the method *and* taking the world-market situation into account, adventitious GMO 'contamination' can clearly be distinguished from fraudulently unlabelled GMO products

Thank you

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