European Commission

Joint Research Centre

Certified reference materials for quantification of GMOs

Matrix GMO CRMs for measurement results expressed in mass fractions

Regulation (EC) No 1830/2003 demands the labelling of food and feed products containing more than 0.9 % GMO. The following matrix GMO CRMs are suitable for the quality control or calibration of mass fraction based GMO measurements.
CRMs are available as powders containing different levels of GMO mass fractions. The nominal mass fraction are given as rough indication only – each CRM comes complete with a certificate of analysis, specifying the certified mass fraction, its uncertainty and the traceability of the certified value (see example).

Code	Species	Event name	Unique identifier	Nominal GM mass fraction [g/kg]
ERM-BF410k	Soya	GTS 40-3-2	MON-Ø4Ø32-6	0; 1; 10 and 100
ERM-BF425	Soya	356043	DP-356Ø43-5	0; 1; 10 and 100
ERM-BF426	Soya	305423	DP-3Ø5423-1	0; 5; 10 and 100
ERM-BF432	Soya	DAS-68416-4	DAS-68416-4	0; 5; 10 and 100
ERM-BF436	Soya	DAS-44406-6	DAS-444Ø6-6	0; 1000; 1; 10; 100
ERM-BF437	Soya	DAS-81419-2	DAS-81419-2	0; 1000; 1; 10; 100
ERM-BF421	Potato	EH92-527-1	BPS-25271-9	0 and 1000
ERM-BF430	Potato	AM04-1020	BPS-A1Ø2Ø-5	0; 1000; 10; 40 and 100
ERM-BF431	Potato	AV43-6-G7	AVE-436-G7	0; 1000; 10; 40 and 100
ERM-BF435	Potato	PH05-026-0048	BPS-PHØ48-1	0; identity
ERM-BF422	Cotton	281-24-236 x 3006-210-23	DAS-24236-5 x DAS-21Ø23-5	0; 1000; 10 and 100
ERM-BF428	Cotton	GHB119	BCS-GHØØ 5-8	0; 10 and 100
ERM-BF429	Cotton	T304-40	BCS-GHØØ 4-7	0; 10 and 100

Accredited CRM Producer: the JRC-IRMM is accredited according to ISO Guide 34:2000 for the production of GMO certified reference materials and to ISO 17025:2005 for GMO testing under the code BELAC 268RM

Confidence in measurements

All certificates and detailed production information can be found at https://crm.irmm.jrc.ec.europa.eu /

https://ec.europa.eu/jrc/

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Matrix GMO CRMs (continued)

Code	Species	Event name	Unique identifier	Nominal GM mass fraction [g/kg]
ERM-BF411	Maize	Bt176	SYN-EV176-9	0; 1; 5; 10; 20; 50 and 100
ERM-BF412	Maize	Bt11	SYN-BTØ11-1	0; 1; 5; 10; 20; 50 and 100
ERM-BF413k	Maize	MON 810	MON- ØØ81Ø-6	0; 5; 20 and 100
ERM-BF414	Maize	GA21	MON- ØØØ21-9	0; 1; 5; 10; 20; 50 and 100
ERM-BF415	Maize	NK603	MON- ØØ6Ø3-6	0; 1; 5; 10; 20; 50 and 100
ERM-BF416	Maize	MON 863	MON- ØØ863-5	0; 1; 10 and 100
ERM-BF417	Maize	MON 863 x MON 810	MON- ØØ863-5 x MON-ØØ81Ø -6	0; 1; 10 and 100
ERM-BF418	Maize	1507	DAS-Ø15Ø7-1	0; 1; 10 and 100
ERM-BF420	Maize	3272	SYN-E3272-5	0; 10 and 100
ERM-BF423	Maize	MIR604	SYN-IR6Ø4-5	0; 1; 10 and 100
ERM-BF424	Maize	59122	DAS-59122-7	0; 1; 10 and 100
ERM-BF427	Maize	98140	DP-Ø98140-6	0; 5; 20 and 100
ERM-BF433	Maize	DAS-40278-9	DAS-4Ø278-9	0; 5; 10 and 100
ERM-BF438	Maize	VCO-01981-5	VCO-Ø1981-5	0; 1000; 1; 10; 100
ERM-BF439	Maize	4114	DP-ØØ4114	0; 1000; 1; 10; 100
ERM-BF419	Sugarbeet	H7-1	KM-ØØØH71-4	0 and 1000
ERM-BF434	Rapeseed	73496	DP-Ø73496-4	0; 1000; 1; 10; 100

CERTIFICATE OF ANALYSIS
ERM-BF426b

	Mass fraction	
	Certified value [2] [g/kg]	Uncertainty [3] [g/kg]
305423 Soya[1]	5.0	0.8

1) Mass fraction of 305423 soya (unique identifier code MON-ØØ81Ø-6).
2) The certified value is traceable to the SI.
3) Expanded uncertainty, corresponding to a level of confidence of about 95 %.

User support

The following documents are available as free downloads from https://ec.europa.eu/jrc/en/reference-materials/user-support

- **ERM Application Note 4:** Use of certified reference materials for the quantification of GMO in food and feed
- **ERM Application Note 5:** Use of certified reference materials for the quantification of GMO in DNA copy number ratio
- **Guidance document on** measurement uncertainty for GMO testing laboratories

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Calibrant and matrix CRM combinations for measurement results expressed in copy number ratios

Recommendation 2004/787/EC suggests to express the measurement results of GMO quantification measurements as the 'the percentage of genetically modified DNA copy number in relation to target taxon specific DNA copy numbers, calculated in terms of haploid genomes'. The following calibrant and matrix GMO CRM combinations are suitable for the calibration and quality control of copy number ratio based GMO measurements.

Code	Species	Event name	Unique identifier	DNA copy number ratio
ERM-BF413ek	Maize	MON 810	MON- ØØ81Ø-6	Certified 0.77 %
ERM-AD413				Certified 1:1
ERM-BF415e	Maize	NK603	MON- ØØ6Ø3-6	Certified 0.95 %
ERM-AD415				Certified 1:1
ERM-BF425c	Soya	356043	DP-356Ø43-5	Certified 0.85 %
ERM-AD425				Certified 1:1
ERM-BF427c	Maize	98140	DP-Ø98140-6	Certified 1.75 %
ERM-AD427				Certified 1:1

ERM-AD442k certified for quantifying mass concentration of Lambda DNA

Parameter	Certified value
DNA mass concertration (ng/µL)	57.5 ± 1.1
Copy number concerntration	($1.20x10^9$ ± $0.17x10^9$)

(Values in brackets are not certified)

How to order reference materials

From JRC in Geel

Tel.: +32 14 571 705 • Fax: +32 14 590 406 • https://ec.europa.eu/jrc/en/reference-materials • E-mail: jrc-irmm-rm-distribution@ec.europa.eu

From authorised distributors

LGC Standards GmbH (DE)
http://www.lgcstandards.com/
E-mail: de@lgcstandards.com

Sigma-Aldrich Chemie GmbH (CH)
http://www.sigmaaldrich.com/irmm
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Sigma-Aldrich RTC Inc. (USA)
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ARMI (USA)
http://www.armi.com
E-mail: Info@ARMI.com

Industrial Analytical (RSA)
http://www.industrialanalytical.co.za
E-mail: info@industrialanalytical.co.za

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