

PRODUCT INFORMATION SHEET

**Lupin, Macadamia and Walnut
in Cereal Muesli (positive)**

PT originated REFERENCE MATERIAL (RM)

Description of the RM

Name / Material of related PT	DLA ptAL12 (2025) – Allergens XII: Lupin, Macadamia and Walnut in Cereal Muesli with "Spiking Level Sample" (3 different Samples) – Sample A (positive sample)
Identifier / LOT	RM 2025-AL12 A
Expiry date	December 2026
Matrix	Cereal Muesli
Physical description	Powder
Packaging / weight	Sealed foil poche / 25 g
Storage conditions	2 - 10°C (dry and dark)
Name and address manufacturer	DLA - Proficiency Tests GmbH Hauptstr. 80, 23845 Oering, Germany Tel. ++49-(0)4532-9183358, Fax. ++49(0)4102-9944976 eMail. pt@dla-lvu.de, website. www.dla-lvu.de

Composition of Material

Ingredients	Sample A present sample	Sample B	SP Sample
Wholemeal Oat Flakes Nutrients per 100 g: Fat 14 g, Carbohydrates 63 g, Protein 10 g	50,0 g/100 g	50,1 g/100 g	-
Muesli Crunchy Fruits, organic Ingredients: Wholemeal oat flakes, raw cane sugar, palm fat, rice flour, malted barley flour, sea salt, corn syrup, freeze dried wild-berry-strawberry mixture (raspberry, blueberry, strawberry, blackberry) and positive sample: allergenic ingredients as below Nutrients per 100 g: Fat 14 g, Carbohydrates 64 g, Protein 10 g	49,8 g/100 g	49,9 g/100 g	-
Potato Powder Ingredients: Potatoes, E471, E304, E223, E100	-	-	99,9 g/100 g
Lupin: Sweet lupin flour, mixture (4 products, Europe) – as lupin flour* – thereof 38,6% total protein**	29,7 mg/kg 11,4 mg/kg	-	33,5 mg/kg 12,9 mg/kg
Macadamia: Macadamia, roasted, milled mixture (21 products from Europe, Asia, USA) – as macadamia flour* – thereof 8,28 % total protein**	22,1 mg/kg 1,83 mg/kg	-	24,7 mg/kg 2,04 mg/kg
Walnut: Walnut, roasted, milled mixture (23 products from USA, Europe, Australia, Western Asia) – as almond* – thereof 15,8 % total protein**	14,8 mg/kg 2,32 mg/kg	-	16,8 mg/kg 2,64 mg/kg
<i>further Ingredients: Maltodextrin and silicon dioxide</i>	<0,2 g/100 g	-	<0,2 g/100 g

* Allergen contents as "total food" as described in the column ingredients according to the gravimetric mixture

** Protein contents according to laboratory analysis of the raw material (total nitrogen according to Kjeldahl with F=6,25 for Lupin protein and F=5,30 for Macadamia and Walnut protein)

Note: The metrological traceability of temperature, mass and volume during production of the PT samples is ensured by DAkkS-compliant calibrated reference materials.

Minimum Sample Size / Homogeneity

A minimum sample size of 5 g is recommended for sample preparation.

The homogeneity tests were performed with sample sizes of 5 g (Microtracer analysis) and 1 - 5 g (ELISA methods), respectively.

The mixture homogeneity was examined 10-fold by microtracer analysis. Homogeneity was sufficient with a probability of $\geq 25\%$ (excellent mixture) and a HorRat value in the range of acceptance (0,3 to 1,3). The homogeneity tests of the parameters Lupin and Macadamia were carried out by ELISA analyzing two subsets from 10 test items (according to ISO 13528:2015 Annex B). Homogeneity was sufficient with a standard deviation between the samples S_s of $\leq 15\%$ („heterogeneity standard deviation“) using ELISA test kits from different manufacturers, e.g. AgraQuant Allergen ELISA Romer Labs, GSD Allergen ELISA Gold Standard Diagnostics Kassel, Morinaga Food Allergen ELISA Kits MloBS, Veratox ELISA for Food Allergens Neogen (for more details see final report of PT).

Reference Values

All reference values were derived from the related PT round (for more details see final report).

Reference Values quantitative in mg/kg ELISA

Parameter	Lupin		
	Results Peak 23*	Method RS-F**	Method SP***
Number of results	12	8°	5
Number of outliers	-	2	-
Assigned Value (X_{pt})	22,6	43,3	22,2
Robust standard deviation	5,55	12,0	5,73
Standard uncertainty	2,00	5,32	3,21
Target standard deviation σ_{pt}	5,65	10,8	5,54
Target range	11,3 – 33,9	21,7 – 65,0	11,1 – 33,2

* ELISA “Peak 23” methods = AQ = AgraQuant, RomerLabs, BF = MonoTrace ELISA, BioFront Technologies, GSD = ELISA, Gold Standard Diagnostics, Kassel and SP = SensiSpec ELISA Kit, Gold Standard Diagnostics

** ELISA Method: RS-F= Ridascreen® Fast, R-Biopharm

*** ELISA Method: SP = SensiSpec ELISA Kit, Gold Standard Diagnostics

° without outlier

Parameter	Macadamia		
	Results Peak 4,6*	Method Peak 14**	Method SP***
Number of results	12	8°	6
Number of outliers	2	1	1
Assigned Value (X_{pt})	4,56	13,5	4,51
Robust standard deviation	1,11	2,80	0,822
Standard uncertainty	0,400	1,24	0,420
Target standard deviation σ_{pt}	1,14	3,38	1,13
Target range	2,28 – 6,84	6,76 – 20,3	2,26 – 6,77

* ELISA “Peak 4,6” methods: AQ-Pro = AgraQuant Pro, RomerLabs, GSD = ELISA, Gold Standard Diagnostics, Kassel and SP = SensiSpec ELISA Kit, Eurofins and not clearly assignable methods: AQ = AgraQuant, RomerLabs and BF = MonoTrace ELISA, BioFront Technologies

** ELISA “Peak 14” methods: 3M = 3M Protein ELISA Kit, Neogen and AQ-P = AgraQuant Plus, RomerLabs and not clearly assignable methods: AQ = AgraQuant, RomerLabs and BF = MonoTrace ELISA, BioFront Technologies;

*** ELISA Method: SP = SensiSpec ELISA Kit, Eurofins

° without outlier

Parameter	Walnut		
	All Results*	Method AQ**	Method SP***
Number of results	23°	8°	6
Number of outliers	2	1	0
Assigned Value (X_{pt})	34,6	41,0	32,7
Robust standard deviation	12,5	21,2	10,5
Standard uncertainty	3,25	9,38	5,34
Target standard deviation σ_{pt}	8,64	10,2	8,18
Target range	17,3 – 51,8	20,5 – 61,4	16,4 – 49,1

* ELISA Method: diverse methods

** ELISA Method: AQ = AgraQuant, RomerLabs

*** ELISA Method: SP = SensiSpec ELISA Kit, Gold Standard Diagnostics

° without outlier

Reference Values qualitative ELISA

Parameter	Lupin*	Macadamia*	Walnut*
Number positive	22	19	28
Number negative	0	0	0
Percent positive	100	100	100
Percent negative	0	0	0
Consensus value	positive	positive	positive

* Results of diverse PCR Methods (LODs positive results Lupin 0,13-2 mg/kg, Macadamia 0,08-2 mg/kg, Walnut 0,2-2 mg/kg)

Reference Values qualitative PCR

Parameter	Lupin*	Macadamia*	Walnut*
Number positive	15	4	15
Number negative	1	4	2
Percent positive	94	50	88
Percent negative	6	50	12
Consensus value	positive	none**	positive

* Results of diverse PCR Methods (LODs positive results Lupin 0,4-5 mg/kg, Macadamia 0,4-4 mg/kg, Walnut 0,4-20 mg/kg)

**no consensus value with at least 75% concurring results was obtained by the various PCR methods

Intended Use

- for laboratory use only, no food!
- validation of analytical methods
- control sample for quality control charts
- test material for inter-laboratory comparisons
- no medical use

Storage Instructions and Handling Information

The material should be stored as stated on page 1. Before use of the material should be warmed up to room temperature. The content should be mixed thoroughly prior to subsampling (see minimum sample size above). The material should be weighed immediately after opening of the foil poche/bottle and closed again afterwards in order to avoid uptake of moisture. Frequent freezing and thawing should be avoided as this can lead to changes in the properties of the material. The expiry date of this RM is based on the current knowledge and applies only for proper storage conditions in the originally closed foil poche/bottle.

Safety Precautions

The usual laboratory safety precautions should be applied when working with the RM considering the type of ingredients, parameters and its concentration.

Data Source

The material was analyzed by 37 laboratories within the related proficiency test (PT). Different analytical methods have been used.

Various

The user must determine the suitability of this RM for its particular purpose. DLA makes no warranty of any kind, expressed or implied, other than its products meet all quality control standards set by DLA. We do not guarantee this product can be used for a special application.



created	approved (PT-Coordinator)	updated
Ulrike Vorreiter	Matthias Besler-Scharf, PhD	-
<i>signed U. Vorreiter</i>	<i>signed M. Besler-Scharf</i>	-
10 December 2025	13 January 2026	-