UCT PRAGUE

University of Chemistry and Technology, Prague
Independent packaging laboratory of UCT Prague
Testing laboratory No. 1316 accredited by Czech Accreditation Institute according to ČSN EN ISO/IEC 17025
UCT Prague, Department of Food Preservation, Technická 5, 166 28 Prague 6, Czech Republic
homepage: nol.vscht.cz

ilac-MRA L 1316

TESTING PROTOCOL

No.: 042-en/18

Customer: **FARUSA emballage a/s**
Bygmarken 14,
DK-3520 Farum
Denmark
VAT DK27425518

Product: The sample of the plastic box. Material: HDPE, dimensions 54 cm × 34 cm × 13 cm.
Sample labelling in the laboratory: 042/18/1.

Producer: See customer.

Objective: See testing methods (page 2).

Processed by: Lenka Votavová, MSc, PhD

Appendix: Appendix no.1 – Certificate of Analysis PR1841255, ALS Czech Republic, s.r.o., Na Harfe 336/9, 190 00 Prague 9, Czech Republic.

ZKUŠEBNÍ LABORATOŘ AKREDITOVANÁ ČIA, o.p.s. VŠCHT PRAHA Nezávislá obalová laboratoř č. 1316

Prague, May 21, 2018

Assoc. Prof. Jaroslav Dobiáš, MSc, PhD
IPL manager

1. Basic information

Sample collection	**Samples collected by**		Customer
	Date of the collection		None
	Date of the transfer to IPL		April 18, 2018
Used testing methods IPL	**ZM-01**	**Determination of overall migration from packaging materials into evaporable food simulants** *(gravimetry, ČSN EN 1186; U.S. FDA, Code of Federal Regulations 21, chapter 175.300, p. d), e)).*	
	ZM-16	**Determination of migration of aromatic amines from products in contact with food into food simulants** *(spectrometry, §35 LMBG, L.00.00-6).*	
	ZM-42[N)]	**Determination of overall migration from plastics into vegetable oil** *(gravimetry, gas chromatography, ČSN EN 1186-10).*	
Sub-supplier of the accredited tests	**Name, address**		ALS Czech Republic, s.r.o., Na Harfě 336/9, CZ-190 00 Prague 9, Czech Republic
	Tests realized		**Determination of heavy metals leachable into 3% acetic acid[S)].**
Date of testing	April 24 – May 14, 2018		
Used devices	• analytical balance AND HR-200-EC (A&D Instruments LTD) • spectrophotometer PE Lambda 25 (Perkin-Elmer)		

[S)] Made by sub-supplier
[N)] Non accredited testing method.

2. Procedure of preparation of the samples for testing

4 pieces of plastic box were obtained. The tested boxes were cut into pieces of suitable size (5 cm × 5 cm). The migration tests were performed according to the European Parliament and Council Regulation (EC) No. 1935/2004 and the Commission Regulation (EU) No. 10/2011.

The test conditions of overall and specific migrations were as follows: the real use conditions – full immersion with surface area of 1 dm^2 into 100 ml of food simulant; the food simulants – simulant A (10% ethanol), simulant B (3% acetic acid), simulant D2 (vegetable oil); contact temperature – 20°C, 40°C (overall migration) and 60°C (specific migration); contact time – 48 hr, 240 hr (10 days). To prepare the heavy metal extracts into 3% acetic acid the same contact conditions as for the spe-

cific migration tests were used.

The results of migration parameters were expressed according to the Commission Regulation (EU) No. 10/2011 (Chapter V, Article 17, paragraph 1 and 2) in milligrams per square decimetre of the sample surface for overall migration and in milligrams per kilogram of food simulant applying a surface to volume ratio of 6 dm^2 per kg of food for specific migration.

The results of heavy metals migration obtained from the sub-suppliers expressed in milligrams per litre of food simulant were recalculated to milligrams per kilogram of food simulant assuming the contact conditions as given above.

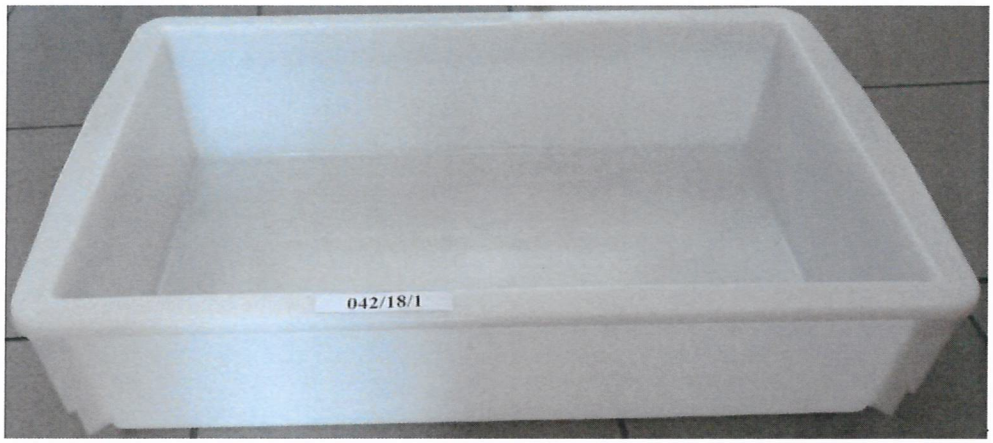

Figure 1 – Tested sample.

3. Results

Tested parameter	Conditions	Unit	Sample 042/18/1	Measure-ment uncer-tainty*)	Limit**)	Evaluation
Overall migration (ZM-01)	3% acetic acid/ 240 hr/40°C	mg/dm²	< 0.5	–	10	Within limit
	10% ethanol/ 240 hr/40°C		< 0.5			
Overall migration (ZM-42)N)	Vegetable oil/ 240 hr/40°C		2.4	± 1.0		
Aromatic amines migration (ZM-16)	3% acetic acid/ 240 hr/60°C	mg/kg+)	< 0.003	–	0.01	

Notes:
Symbol „ < "means less than the limit of detection of the method used.
+) Results of migrations are expressed as the mg/kg of food simulant, applying a surface to volume ratio of 6 dm² per kg of food.
Annnotations:
*) Stated uncertainty is expressed as expanded combined uncertainty based on standard deviation multiplied by coverage factor ($k = 2$), defines an interval having a level of confidence of approximately 95 %.
**) Limit according to Commission Regulation (EC) No 10/2011 as amended, Annex I; the required limits are not given to express migration parameters in mg/article.
N) Non accredited testing method.

Tested parameter		Unit	Sample 042/18/1	Measurement uncertainty	Limit**)	Evaluation
Migration of heavy metals from poly-mer material into 3% acetic acidS) (240 hr/60°C)	Al	mg/kg+)	0.028	*)	1.0***)	Within limit
	Ba		0.0103		1.0	
	Ca		0.575		–	
	Co		< 0.0012		0.05	
	Cu		0.0015		5.0	
	Fe		0.0146		48	
	Li		< 0.00060		0.6	
	Mn		< 0.00030		0.6	
	Ni		< 0.0012		0.02****)	
	Zn		0.0056		25	

Notes:
Symbol „ < "means less than the limit of detection of the method used. (See the testing protocol in appendix no. 1).
+) Results of migrations are expressed as the mg/kg of food simulant, applying a surface to volume ratio of 6 dm² per kg of food.
Annnotations:
*) See the testing protocol in appendix no. 1.
**) Limit according to the Commission Regulation (EC) no. 10/2011 as amended. Annex II.
***) The limit for aluminium will be obligatory from September 14, 2018.
****) The limit for nickel will be obligatory from May 19, 2019.
S) Determined on the base of the results of the sub-supplier.

4. Deviations from recorded testing procedures. additional information

None

5. Conclusions

The migration tests were performed according to Regulation (EC) No. 1935/2004 of the European Parliament and of the Council and Commission Regulation (EU) No. 10/2011. The resulting values are within the required limits.

UCT PRAGUE

University of Chemistry and Technology, Prague
Independent packaging laboratory of UCT Prague
UCT Prague, Department of Food Preservation, Technická 5, 166 28 Prague 6, Czech Republic
homepage: nol.vscht.cz

APPENDIX
OF TESTING PROTOCOL

Testing protocol no.: 042-en/18

Appendix no.: 1

Appendix content: Testing protocol no. PR1841256, ALS Czech Republic, s.r.o., Na Harfě 336/9, 190 00 Prague 9, Czech Republic.

Processed by: Lenka Votavová, MSc, PhD

NEZÁVISLÁ OBALOVÁ
LABORATOŘ (NOL)
VŠCHT Praha
Technická 3, 166 28 Praha 6

Prague, May 21, 2018

Assoc. Prof. Jaroslav Dobiáš, MSc, PhD
IPL manager

CERTIFICATE OF ANALYSIS

Work Order	: **PR1841256**	Issue Date	: 10-May-2018
Customer	: **Vysoka skola chemicko-technologicka v Praze**	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: JAROSLAV DOBIAS	Contact	: Client Service
Address	: Ustav konzervace potravin a technologie masa Technicka 3 166 28 Praha 6 Ceska republika	Address	: Na Harfe 336/9 Prague 9 - Vysocany 190 00 Czech Republic
E-mail	: jaroslav.dobias@vscht.cz	E-mail	: customer.support@alsglobal.com
Telephone	: ----	Telephone	: +420 226 226 228
Facsimile	: ----	Facsimile	: +420 284 081 635
Project	: Smlouva č. 002/752/04	Page	: 1 of 2
Order number	: ----	Date Samples Received	: 04-May-2018
C-O-C number	: ----	Quote number	: ----
Site	: ----	Date of test	: 08-May-2018 - 10-May-2018
Sampled by	: zakaznik	QC Level	: ALS CR Standard Quality Control Schedule

General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory.
The laboratory declares that the test results relate only to the listed samples.

Responsible for accuracy

Testing Laboratory No. 1163
Accredited by CAI according to
CSN EN ISO/IEC 17025:2005

Signatories		*Position*
Zdeněk Jirák		Environmental Business Unit Manager

L 1163

Issue Date	: 10-May-2018
Page	: 2 of 2
Work Order	: PR1841256
Customer	: Vysoka skola chemicko-technologicka v Praze

Analytical Results

Sub-Matrix: **LEACHATE**			Client sample ID	**042/18/1 - leaching into 3% acetic acid**		----		----	
			Laboratory sample ID	*PR1841256-001*		----		----	
			Client sampling date / time	03-May-2018 08:00		----		----	
Parameter	*Method*	*LOR*	*Unit*	**Result**	**MU**	**Result**	**MU**	**Result**	**MU**
Total Metals / Major Cations									
Aluminium	W-METAXFX1	0.010	mg/L	**0.047**	± 10.0%	----	----	----	----
Barium	W-METAXFX1	0.00050	mg/L	**0.0172**	± 10.0%	----	----	----	----
Calcium	W-METAXFX1	0.0050	mg/L	**0.958**	± 10.0%	----	----	----	----
Cobalt	W-METAXFX1	0.0020	mg/L	<0.0020	----	----	----	----	----
Copper	W-METAXFX1	0.0010	mg/L	**0.0025**	± 10.0%	----	----	----	----
Iron	W-METAXFX1	0.0020	mg/L	**0.0243**	± 10.0%	----	----	----	----
Lithium	W-METAXFX1	0.0010	mg/L	<0.0010	----	----	----	----	----
Manganese	W-METAXFX1	0.00050	mg/L	<0.00050	----	----	----	----	----
Nickel	W-METAXFX1	0.0020	mg/L	<0.0020	----	----	----	----	----
Zinc	W-METAXFX1	0.0020	mg/L	**0.0093**	± 10.0%	----	----	----	----

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, delivery date in brackets without a time component will be displayed instead. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.
Key: LOR = Limit of reporting; MU = Measurement Uncertainty

The end of result part of the certificate of analysis

Brief Method Summaries

Analytical Methods	*Method Descriptions*
Location of test performance: Na Harfe 336/9 Prague 9 - Vysocany Czech Republic 190 00	
W-METAXFX1	CZ_SOP_D06_02_001 (US EPA 200.7, ISO 11885, CSN EN 16192, US EPA 6010, SM 3120, CSN 75 7358 samples prepared as per CZ_SOP_D06_02_J02 chap. 10.1 and 10.2) Determination of elements by atomic emission spectrometry with inductively coupled plasma and stoichiometric calculations of compounds concentration from measured values including the calculation of total mineralization and calculating the sum of Ca+Mg. Sample was fixed by nitric acid addition prior to analysis.

A '*' symbol preceding any method indicates laboratory or subcontractor non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information. If the report contains subcontracted analysis, those are made in a subcontracted laboratory outside the laboratories ALS Czech Republic, s.r.o.
The calculation methods of summation parameters are available on request in the client service.