

**Marabu GmbH & Co. KG**

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**Report**

**2018L28214 / 2**

Date of report 17. July 2018 / 07:49  
Your reference PO No. 1072660 / Order of 07.05.2018  
Type of order General tests  
Client Marabu GmbH & Co. KG, ██████████  
Sender Marabu GmbH & Co. KG

Report	Sample	Short assessment
2018L28214 / 2	Trinkflasche M- ARA Birds - bedruckt	Requirements fulfilled

Identification	690699900	Received on	08/05/2018
Amount	10 pcs.		
Packing	alu foil		

**Assessment**

Based on the assumed surface-to-volume ratio, the results of the analytics as described are in compliance with the Commission Regulation (EU) No 10/2011 and the Swiss Regulation on Food Contact Materials.

**References**

- Commission Regulation (EU) No 10/2011 of 14.01.2011, as amended by No 321/2011 (01.04.2011), No 1282/2011 (28.11.2011), No 1183/2012 (30.11.2012), No 202/2014 (03.03.2014), No 2015/174 (05.02.2015), No 2016/1416 (24.08.2016), No 2017/752 (28.04.2017), No 2018/79 (18.01.2018), No 2018/213 (12.02.2018) and 2018/831 (05.06.2018)
- Swiss Regulation on Food Contact Materials SR 817.023.21 (Bedarfsgegenstände VO) of 16.12.2016, updated 01.05.2017
- EN 1186 Materials and articles in contact with foodstuffs - Plastics, May 2002
- EN 1230-2:2010-02; Paper and board intended to come into contact with foodstuffs - Sensory analysis - Part 2: Off-flavour (taint)
- DIN 10955:2004-06; Sensory evaluation (Sensorische Prüfung - Prüfung von Packstoffen und Packmitteln für Lebensmittel), June 2004
- European and Swiss standard SN EN 13628-1: Packaging - Flexible packaging material - Determination of residual solvents by static headspace gas chromatography - Part 1: Absolute methods
- Regulation (EC) No 2023/2006 of 22.12.2006

## **Translation of SQTS No. 2018L18764/1**

### **Chemical Analysis**

#### **EU - Migration**

The migration was set-up according to Commission Regulation (EU) No 10/2011 and customer instructions. The sample material was exposed to the simulants as follows:

Migration preparation:

- food contact side (by filling)
  
- Overall Migration and Specific Migration:
  - simulant B: 3 % acetic acid, 24 h / 40 °C
  - simulant D1: 50 % ethanol, 24 h / 40 °C

The migration was performed according to EN 1186.

#### **Specifically analysed Parameters**

The 50 % ethanol migration solution was analysed for:

- substance 1+2 (GC-MS; disclosed to SQTS)
- substance 1+2 (LC-MS/MS; disclosed to SQTS)
- substance 1 (LC-MS/MS; disclosed to SQTS)
- acrylates of our investigation programme
- substances 1-4 (LC-MS/MS; disclosed to SQTS)
- substance 1 (LC-UV, disclosed to SQTS)
- substance 2 (LC-UV, disclosed to SQTS)

The sample material was directly analysed by Headspace-GC-MS for:

- Substance 1
- Substance 2
- Substance 3
- Substance 4

#### **Headspace-GC-MS-Screening**

According to EN 13628-1 the sample was weighed into a headspace vial and heated for 60 minutes at 100 °C. 1 ml of the headspace was analysed for ingredients and contaminants using a GC-MS screening method. The detected substances were compared with the MS database NIST.

#### **GC-QTOF-MS/FID Screening**

After concentrating, the 50 % ethanol migration solution was analysed using the GC-QTOF-MS/FID screening method (PTV injection, DB-5 column and electron impact ionization). All relevant substances were compared with the NIST library and our internal library. The concentrations were calculated with the averaged response of the added internal standards IS 1: heptadecane (CAS 629-78-7), IS 3: benzylbutyl phthalate-D4 (CAS 93951-88-3), IS 4: di-n-nonyl phthalate-3,4,5,6-D4 (CAS 1202865-43-7).

#### **Sensory Evaluation: Off-Flavour of a Test Food by Multi-Comparison Test (Simple Sensory Evaluation)**

The test was carried out in accordance with EN 1230-2 and DIN 10955 and in accordance with the Swiss Regulation.

The sample material was exposed to the test food. The ratio was 1 dm<sup>2</sup> with 100 g test food. The test food was in direct contact with the sample material.

The following side was facing the test food:

- food contact side (by filling)

The test food was:  
- chocolate (rasped)  
- cookies (rasped)  
- tap water

Storage was performed in a closed glass container under the following conditions:  
- 24 h / 40 °C (according to customer)

As a blank, the same test food was stored in the same way, but without sample material.

The sensory test was done with 6 testers.  
Each tester received one portion each of sample and blank. The testers knew which one was the sample and which was the blank. The test was carried out as simple comparison test between sample and blank.  
Both odour and taste of the test food were evaluated.

## Results

### Basis of Calculation

The conversion of the measured values to foodstuff is based on the following surface-to-volume ratio (S/V).  
For any other S/V the resulting migration values are different which might lead to another general assessment of the sample.

Dimensions: 4.8 dm<sup>2</sup> = 57 g  
Standard S/V: 6 dm<sup>2</sup> / 1 kg food (EU cube)

### EU - Overall Migration

The limits are 10 mg/dm<sup>2</sup> and 60 mg/kg food according to Regulation (EU) No 10/2011 and the Swiss Regulation on Food Contact Materials. The following deviations are tolerated:  
For all simulants except D2: 10 ± 2 mg/dm<sup>2</sup> and 60 ± 12 mg/kg food  
For simulant D2: 10 ± 3 mg/dm<sup>2</sup> and 60 ± 20 mg/kg food

The overall migration values obtained with the tested simulants are below the limit.

### Headspace-GC-MS-Screening

The following substances were detected in the GC-MS screening:

RT [min]	Substance	CAS No.	Conc. [mg/kg material]	Con. [mg/dm <sup>2</sup> material]	Standard S/V [mg/kg food]	SML [mg/kg food]
	limit of quantification		0.010	0.00012	0.00072	
3.2	acetone**	67-64-1	0.17	0.0020	0.012	60
10.0	toluene**	108-88-3	0.015	0.00018	0.0011	1.2
11.2	n-butyl acetate**	123-86-4	0.53	0.0063	0.038	60
various	hydrocarbons		6.2	0.074	0.44	

\*\* verification by external standard

n.e.: not evaluated according to Annex 10 to the Swiss Regulation on Food Contact Materials

n.a.: not authorised

The Headspace-GC-MS findings are not of concern as long as the GMP requirements of the Commission Regulation (EC) No 2023/2006 are fulfilled.

Specifically analysed Parameters

None of the specifically analysed substances were detectable above the respective specific migration limits.

GC-QTOF-MS/FID Screening

After subtracting the analysis blank, no substances > 0.010 mg/kg food (> 10 ppb) were detected.

Sensory Evaluation: Off-Flavour of a Test Food by Multi-Comparison Test (Simple Sensory Evaluation)

The sensory evaluation showed that the sample did not perceptibly influence the odour and did just perceptibly influence the taste of the test food.

The grading of the odour or taste difference is based on a scale from 0 to 4. Values > 2 are considered as deviant. 0 - not perceptible | 1 - just perceptible | 2 - moderate | 3 - distinct | 4 - strong

The sensory evaluation was carried out in June 2018 in Dietikon (ZH), Switzerland.

<b>Migration / Extraction</b>				
Parameter Method	Result	Units	limit / requirement	
<b>24 h / 40°C</b>				
<b>Overall migration 3 % acetic acid</b> <i>LMPMET0705 gravimetry</i>	<1	mg/dm <sup>2</sup>	10	LOQ: 1
<b>Overall migration 3 % acetic acid</b> <i>LMPMET0705 gravimetry</i>	<6	mg/kg food	60	LOQ: 6
<b>Overall migration 50 % ethanol</b> <i>LMPMET0705 gravimetry</i>	<1	mg/dm <sup>2</sup>	10	LOQ: 1
<b>Overall migration 50 % ethanol</b> <i>LMPMET0705 gravimetry</i>	<6	mg/kg food	60	LOQ: 6

<b>Specific substances</b>				
Parameter Method	Result	Units	limit / requirement	
<b>Acrylate programme</b> <i>FCMMET02ACR LC-QTOF-MS</i>	<b>done</b>			
<b>50 % ethanol</b>				
<b>Substance 1</b> <i>LSPMET17 Glycole (na) GC-MS</i>	<b>not detected</b>	mg/dm <sup>2</sup>		LOQ: 0.0033 LOD: 0.0017
<b>Substance 1</b> <i>LSPMET17 Glycole (na) GC-MS</i>	<b>not detected</b>	mg/kg food	60	60 LOQ: 0.020 LOD: 0.010
<b>Substance 2</b> <i>LSPMET17 Glycole (na) GC-MS</i>	<b>not detected</b>	mg/dm <sup>2</sup>		LOQ: 0.033 LOD: 0.017
<b>Substance 2</b> <i>LSPMET17 Glycole (na) GC-MS</i>	<b>not detected</b>	mg/kg food	6	6 LOQ: 0.20 LOD: 0.10
<b>Substance 1</b> <i>LCCMETITQM FCM LC-MS/MS</i>	<b>not detected</b>	µg/dm <sup>2</sup>		LOQ: 1.0 LOD: 0.50
<b>Substance 1</b> <i>LCCMETITQM FCM LC-MS/MS</i>	<b>not detected</b>	µg/kg food		50 LOQ: 6.0 LOD: 3.0
<b>Substance 2</b> <i>LCCMETITQM FCM LC-MS/MS</i>	<b>not detected</b>	µg/dm <sup>2</sup>		LOQ: 1.0 LOD: 0.50

LOD: limit of detection  
LOQ: limit of quantification

na: not in the accredited range

nd: not detectable

Experimental conditions will be given on request. The results are valid for the listed samples only. It is not allowed to use a shortened version of this report nor parts of it. Our general conditions of business apply (www.sqts.ch).



Specific substances				
Parameter Method	Result	Units	max. value	limit / requirement
<b>50 % ethanol</b>				
<b>Substance 2</b> LCCMETITQM FCM LC-MS/MS	not detected	µg/kg food	3300	LOQ: 6.0 LOD: 3.0
<b>Substance 1</b> LCCMET_LC-MS/MS FCM LC-MS/MS	not detected	mg/dm <sup>2</sup>		LOQ: 0.0017 LOD: 0.001
<b>Substance 1</b> LCCMET_LC-MS/MS FCM LC-MS/MS	not detected	mg/kg food	0.01	LOQ: 0.010 LOD: 0.005
<b>50 % Ethanol</b>				
<b>Substance 1</b> LCAMET101 LC-UV	not detected	mg/dm <sup>2</sup>		LOQ: 0.10 LOD: 0.05
<b>Substance 1</b> LCAMET17 LC-UV	not detected	mg/kg food	6	LOQ: 0.60 LOD: 0.3
<b>Substance 1 after cleavage</b> LCAMET101 LC-UV	not detected	mg/dm <sup>2</sup>		LOQ: 0.10 LOD: 0.05
<b>Substance 1 after cleavage</b> LCAMET101 LC-UV	not detected	mg/kg food		LOQ: 0.6 LOD: 0.3
<b>Substance 2</b> LCAMET101 LC-UV	not detected	mg/dm <sup>2</sup>		LOQ: 0.10 LOD: 0.05
<b>Substance 2</b> LCAMET101 LC-UV	not detected	mg/kg food	6	LOQ: 0.6 LOD: 0.3
<b>Substance 2 after cleavage</b> LCAMET101 LC-UV	not detected	mg/dm <sup>2</sup>		LOQ: 0.10 LOD: 0.05
<b>Substance 2 after cleavage</b> LCAMET101 LC-UV	not detected	mg/kg food		LOQ: 0.6 LOD: 0.3
<b>Acrylate programme</b> FCMMET02ACR LC-QTOF-MS	not detected	µg/dm <sup>2</sup>		LOQ: 1.0 LOD: 0.50
<b>Acrylate programme</b> FCMMET02ACR LC-QTOF-MS	not detected	µg/kg food		LOQ: 6.0 LOD: 3.0
<b>Screening GC-QTOF-MS/FID</b> FCMMET03SCR GC-QTOF-MS/FID	done			
<b>Substance 1</b> FCMMET03SCR GC-QTOF-MS/FID	not detected	µg/dm <sup>2</sup>		LOQ: 10 LOD: 5.0
<b>Substance 1</b> FCMMET03SCR GC-QTOF-MS/FID	not detected	µg/kg food	CCI	LOQ: 60 LOD: 30
<b>Substance 2</b> FCMMET03SCR GC-QTOF-MS/FID	not detected	µg/dm <sup>2</sup>		LOQ: 2.0 LOD: 1.0
<b>Substance 2</b> FCMMET03SCR GC-QTOF-MS/FID	not detected	µg/kg food	3000	LOQ: 12 LOD: 6.0
<b>Substance 3</b> FCMMET03SCR GC-QTOF-MS/FID	not detected	µg/dm <sup>2</sup>		LOQ: 2.0 LOD: 1.0
<b>Substance 3</b> FCMMET03SCR GC-QTOF-MS/FID	not detected	µg/kg food	CCIII	LOQ: 12 LOD: 6.0
<b>Substance 4</b> FCMMET03SCR GC-QTOF-MS/FID	not detected	µg/dm <sup>2</sup>		LOQ: 10 LOD: 5.0
<b>Substance 4</b> FCMMET03SCR GC-QTOF-MS/FID	not detected	µg/kg food	600	LOQ: 60 LOD: 30

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**Specific substances**

Parameter Method	Result	Units	max. value	limit / requirement
<b>— direct analysis</b>				
<b>Screening GC-MS</b> LSPMET02 DCB (na) HS GC-MS	<b>done</b>			
<b>Substance 1</b> LSPMET02 DCB (na) HS GC-MS	<b>not detected</b>	mg/kg material		
<b>Substance 1</b> LSPMET02 DCB (na) HS GC-MS	<b>not detected</b>	mg/dm <sup>2</sup>		
<b>Substance 1</b> LSPMET02 DCB (na) HS GC-MS	<b>not detected</b>	mg/kg food	6	6
<b>Substance 2</b> LSPMET02 DCB (na) HS GC-MS	<b>not detected</b>	mg/kg material		
<b>Substance 2</b> LSPMET02 DCB (na) HS GC-MS	<b>not detected</b>	mg/dm <sup>2</sup>		
<b>Substance 2</b> LSPMET02 DCB (na) HS GC-MS	<b>not detected</b>	mg/kg food		1
<b>Substance 3</b> LSPMET02 DCB (na) HS GC-MS	<b>0.015</b>	mg/kg material		
<b>Substance 3</b> LSPMET02 DCB (na) HS GC-MS	<b>0.00018</b>	mg/dm <sup>2</sup>		
<b>Substance 3</b> LSPMET02 DCB (na) HS GC-MS	<b>0.0011</b>	mg/kg food		1.2
<b>Substance 4</b> LSPMET02 DCB (na) HS GC-MS	<b>not detected</b>	mg/kg material		
<b>Substance 4</b> LSPMET02 DCB (na) HS GC-MS	<b>not detected</b>	mg/dm <sup>2</sup>		
<b>Substance 4</b> LSPMET02 DCB (na) HS GC-MS	<b>not detected</b>	mg/kg food		

**Sensory evaluation**

Date of analysis: 13/07/2018

Parameter Method	Result	Units
<b>— 24 h / 40°C</b>		
<b>Sensory assessment with water (smell/taste)</b> LMPMET0707 (na) sensory	<b>0/1</b>	

Report released by: [redacted] Technical Manager  
This report is signed electronically and therefore valid.

For further inquiries you can contact your customer consultant:  
[redacted] phone number (direct) +41 58 577 [redacted]

LOD: limit of detection      na: not in the accredited range      nd: not detectable  
LOQ: limit of quantification

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