eurofins | Product Testing

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Migration Report

14 July 2020

1 Sample Information

Sample name	WORKTOP OIL
Sample reception	23/11/2018
Sample no.	392-2018-00483801
Analysis period	29/11/2018 - 07/01/2020

2 Brief Evaluation of the Results

Type of analysis	Conclusion	Regulation or protocol
Sensory Analysis	Pass	(EU) No 1935/2004 article 3c
Specific migration	Pass	(EU) No 10/2011 and SR 817.023.21
NIAS Screening (GC/MS)	No objection	(EU) No 10/2011
Migration of mineral oil	Pass	German mineral oil ordinance (DRAFT - 4th edition)

Full details based on the testing and direct comparison with limit values are available in the following pages

Eurofins Product Testing A/S

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3 Applied Test Methods

3.1 General Test References

Method	Parameter	Analysis principle	LOD	Um(%)
DIN 10955¤[1]	Sensory analysis	Assessment of odour and taste by 6 judges	Grade scale 0-4	-
Internal *¤[2]	Preparation for sensory test	Exposure to chocolate	-	-
EN 1186-5:2002	Preparation for migration	Exposure to 10% ethanol by cell	-	-
71M546208 ¤ *	Ethylbenzene	HS-GC-MS	0.01 mg/kg	20%
71M546208 ¤ *	Xylene	HS-GC-MS	0.01 mg/kg	20%
AWTR2 *[4]	2-butoxyethanol	GC-MS	1.7	-
EN 1186-14:2002	Preparation for migration	Exposure to isooctane by cell	-	-
GC-MS *	Polycyclic aromatic hydrocarbons (PAHs)	GC-MS	0.02 mg/kg	20%
DS/EN 14338:2004	Preparation for migration	Exposure to MPPO (Tenax) by cell	-	-
Internal Method 1¤[2]	MOAH (aromatic hydrocarbons) C16-35	LC-GC-FID	LOQ : 0.15 mg/kg	-
Internal Method 1¤[2]	MOSH/POSH (saturated, longer ch.) C20-35	LC-GC-FID	LOQ : 0.6 mg/kg	-
DS/EN 14338:2004	Preparation for migration	Exposure to MPPO (Tenax) by cell	-	-
Internal Method 1¤[2]	NIAS Screening	TD-GC-MS	0.01 mg/kg	-
EN 1186-5:2002	Preparation for migration	Exposure to 3% acetic acid by cell	-	-
71M548007m ¤ *	Formaldehyde	LC-DAD	0.1 mg/kg	20%
EPA 3052m *¤[3]	Metals	ICP-MS	0.0005 - 0.05 mg/kg	30%

3.2 Test Conditions

Simulant	Technique	Area exposed [dm²]	Amount (Simulant)	Migration Conditions
3% acetic acid	Cell	2	100 mL	2 Hours at 40°C
MPPO (Tenax)	Cell	1.3	4 g	2 Hours at 40°C
Isooctane	Cell	2	100 mL	2 Hours at 20°C
10% ethanol	Cell	2	100 mL	2 Hours at 40°C
Chocolate	Spread	1	10g	2 Hours at 20°C

[1] Eurofins Analytik GmbH : DIN EN ISO/IEC 17025:2005 D-PL-14251-01-00
[2] Eurofins Consumer Product Testing GmbH : DIN EN ISO/IEC 17025:2005 D-PL-14435-01-00
[3] Eurofins Miljø A/S : DS EN ISO/IEC 17025 DANAK 168
[4] SQTS: Swiss Quality Testing Services

*: Not accredited
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The results are only valid for the tested sample(s).

4 Results

4.1 Specific Migration of PAH

Parameter	CAS No.	Food Simulant	Average [mg/kg]	SML value [mg/kg]
Acenaphthene *	83-32-9	Isooctane	< 0.02	ND
Acenaphthylene *	208-96-8	Isooctane	< 0.02	ND
Anthracene *	120-12-7	Isooctane	< 0.02	ND
Benzo-(a)-anthracene *	56-55-3	Isooctane	< 0.02	ND
Benzo-(a)-pyrene *	50-32-8	Isooctane	< 0.02	ND
Benzo-(b)-fluoranthene *	205-99-2	Isooctane	< 0.02	ND
Benzo(e)pyrene *	192-97-2	Isooctane	< 0.02	ND
Benzo-(ghi)-perylene *	191-24-2	Isooctane	< 0.02	ND
Chrysene *	218-01-9	Isooctane	< 0.02	ND
Dibenzo-(ah)-anthracene *	53-70-3	Isooctane	< 0.02	ND
Fluoranthene *	206-44-0	Isooctane	< 0.02	ND
Fluorene *	86-73-7	Isooctane	< 0.02	ND
Indeno-(1,2,3-cd)-pyrene *	193-39-5	Isooctane	< 0.02	ND
Naphthalene *	91-20-3	Isooctane	< 0.02	ND
Phenanthrene *	85-01-8	Isooctane	< 0.02	ND
Pyrene *	129-00-0	Isooctane	< 0.02	ND

4.2 Specific Migration of Mineral Oil

Parameter	CAS No.	Food Simulant	Average [mg/kg]	SML value [mg/kg]
MOAH (aromatic hydrocarbons) C_{16}-C_{35}	-	MPPO (Tenax)	< 0.15	0.5#[1]
MOSH/POSH (saturated, longer ch.) C_{20}-C_{35}	-	MPPO (Tenax)	< 0.6	-

#[1] German mineral oil ordinance (DRAFT - MOSH removed in 4th edition from March 2017)

4.3 Sensory Analysis

Parameter	Food Simulant	Median Grade	Limit value#[2]
Odour	Chocolate	0 No recognizable deviation	2.5
Taste	Chocolate	0 No recognizable deviation	2.5

#[2] From 61. Statement of BfR, Bundesgesundheitsbl. 46, 2003, 362-5.

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4.4 Specific Migration

Parameter	CAS No.	Food Simulant	Average [mg/kg]	SML value [mg/kg]
Ethylbenzene *	100-41-4	10% ethanol	< 0.01	0.6#
Xylene *	1330-20-7	10% ethanol	< 0.01	1#
2-butoxyethanol *	111-76-2	10% ethanol	< 1.7	38#
Aluminium (Al) *	7429-90-5	3% acetic acid	0.103	1
Barium (Ba) *	7440-39-3	3% acetic acid	0.240	1
Cobalt (Co) *	7440-48-4	3% acetic acid	0.043	0.05
Copper (Cu) *	7440-50-8	3% acetic acid	0.0019	5
Iron (Fe) *	7439-89-6	3% acetic acid	0.05	48
Lithium (Li) *	7439-93-2	3% acetic acid	< 0.005	0.6
Manganese (Mn) *	7439-96-5	3% acetic acid	< 0.01	0.6
Nickel (Ni) *	7440-02-0	3% acetic acid	0.0015	0.02
Zinc (Zn) *	7440-66-6	3% acetic acid	1.1	5
Formaldehyde *	50-00-0	3% acetic acid	1.6	15

Swiss Ordinance, SR 817.023.21

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4.5 NIAS Screening

Determination of volatile organic compounds (VOC) and semivolatile organic compounds (SVOC) by thermal desorption GC/MS

Volatile organic compounds of the tenaxmigrate of the sample were extracted in a thermal extraction unit (280 °C/ 15 min) by trapping these volatiles on an adsorption tube and then this tube was desorbed in a thermal desorption unit and analytes were focused in the inlet of a GC/MS system by cold trapping and then injected for analysis.

Migration conditions:
Time: 2 h
Temperature: 40 °C
Cell

Migration in mg/kg (real filled foodstuff-here Tenax) as d-Toluene equivalent (TE):

Scan #	RT min.	MW	mg/kg*	Identification	CAS #
1	6,704			IS	
2	9,931			IS	
3	14,905	116	0,91	Hexanoic acid	142-62-1
4	15,704	N/MW	0,02	Alkyllactone	N/P
5	17,81	N/MW	0,28	Branched unsaturated Alcohol	N/P
6	18,147	N/MW	0,05	Branched unsaturated Alcohol	N/P
7	18,411	N/MW	0,15	Alkylaldehyde	N/P
8	19,761	144	0,57	Hexanoic acid, 2-ethyl-	149-57-5
9	20,964			IS	
10	21,338	144	0,41	Octanoic acid	124-07-2
11	21,961	N/MW	0,05	Unsaturated Alkylacid	N/P
12	22,057	N/MW	0,03	Unsaturated Ketone	N/P
13	24,103	158	0,45	Nonanoic acid	112-05-0
14	25,152	N/MW	0,15	Cyclic unsaturated Alcohol	N/P
15	26,326	N/MW	0,04	Unsaturated Aldehyde	N/P
16	26,81	216	0,05	Propanoic acid, 2-methyl-, 3-hydroxy-2,2,4-trimethylpentyl ester	77-68-9
17	27,514	N/MW	0,04	Unsaturated Alkylacid	N/P
18	27,668	186	0,06	Probably Isopentyl 3-hydroxy-2-methylenebutanoate	80758-72-1
19	28,248	N/MW	0,08	Possibly unsaturated Alkylester	N/P
20	29,231	N/MW	0,07	Branched Alkylacid	N/P
21	29,502	N/MW	0,04	Branched Alcohol	N/P
22	30,016	N/MW	0,04	Unsaturated Alkylacid	N/P
23	34,622	204	0,03	Irgacure 184	947-19-3
24	39,119	N/MW	0,03	Unsaturated Alcohol	N/P
25	43,263	N/MW	0,04	Alkylalcohol	N/P
26	54,083	N/MW	0,08	Alkylester	N/P
27	61,579	N/MW	0,09	Alkylester	N/P
Sum			3,74		

Key:

N/MW	Not possible to determine molecular weight
N/CAS	No CAS Number Assigned to this compound
N/P	Not possible to assign a CAS Number because only functionality is named.
IS	Internal standard
mg/kg*:	for the EU-convention of 6 dm2 packaging for 1 kg food

Probably: 80 % fit with spectra library
Possibly: 60 % fit with spectra library

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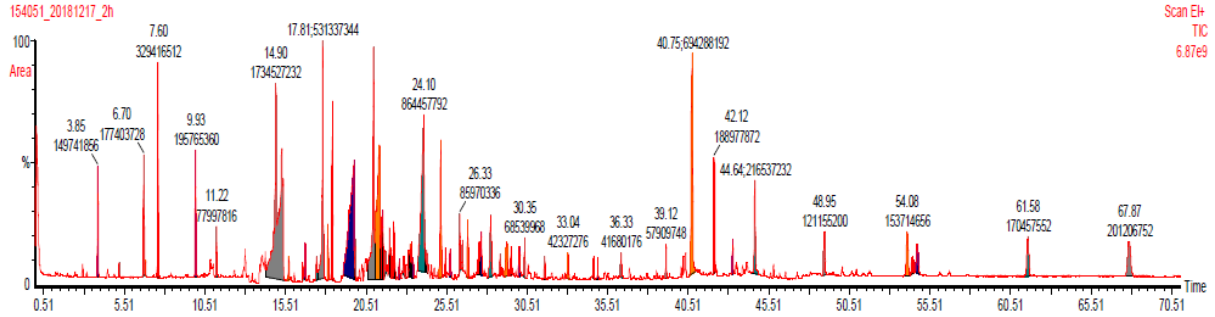
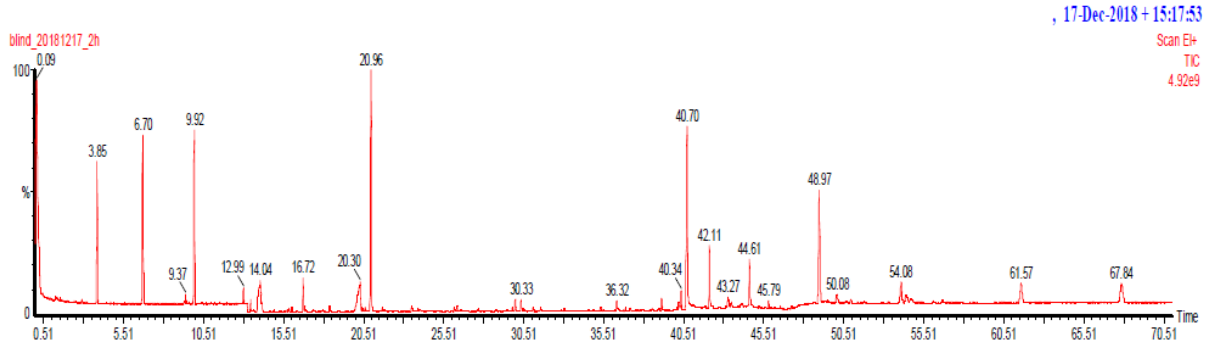
4.5.1 NIAS Screening – Chromatograms





Not integrated peaks: Chromatography artefacts

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4.5.2 NIAS Screening – Judgement

According to §31 of the German Food and Feed Code (Lebensmittel- und Futtermittelgesetz, LFGB) and the European Framework-Regulation VO (EC) No. 1935/2004 food contact materials may not release substances in food or its surface in quantities that could
1. endanger human health
2. bring about an unacceptable deterioration of the composition or the organoleptic properties (smell, taste) or the appearance of food (e.g. colour)

During the manufacturing process reaction- and degradation-products of formulation components may be formed (so-called NIAS, non-intentionally added substances). If yes, the manufacturer has to prove their harmlessness according to internationally accepted scientific standards for risk-assessment.
In the NIAS-screening substances were detected above the detection limit of 10 ppb (complete list see attachment)

Listed acc. Plastics-Regulation (EU) 10/2011, Annex I:
- hexanoic acid (FCM 329, SML = 60 mg/kg, scan #3)
- octanoic acid (FCM 304, SML = 60 mg/kg, scan #10)

Plastic oligomers / POSH:
Some of the detected substances were technically not avoidable plastic oligomers (POSH, polyolefine saturated hydrocarbons), for which the authority labs so far do not issue complaints.

Regulation from EDI about materials and articles, which are intended to get into contact with food (Regulation about articles of daily use) 2017:
- CAS 149-57-5 (SML = 0,05 mg/kg according CHVO, scan #8) - limit value exceeded, substance specific quantification recommended
- CAS 112-05-0 (SML = 60 mg/kg according CHVO, scan #13)
- CAS 947-19-3 (SML = 0,01 mg/kg according CHVO, scan #8) - limit value exceeded, substance specific quantification recommended

Not-listed substances / NIAS:
- CAS 77-68-9, scan #16
- CAS 80758-72-1, scan #18

For all these not-listed substances (NIAS) the manufacturer has to prove (according to internationally accepted scientific standards for risk-assessment) that Article 3 of the Framework-Regulation (EU) Nr. 1935/2004 is fulfilled, according to which food-contact-materials may not endanger human health. For this purpose, it should be checked whether the raw-material-suppliers might already have toxicological data in the form of TDI-values (tolerable daily intake) for them. If not, a risk-assessment needs to be performed.

5 Summary and Evaluation of the Results

The results for the **sensory analyses are below** the threshold values.
Consequently the product tested **complies** with the requirements in (EC) No 1935/2004 article 3c on materials and articles intended to come into contact with food for the above mentioned test conditions.

The results for **specific migration are below** the specific migration limit according to (EU) No 10/2011.
Consequently the product tested **complies** with the requirements in Commission Regulation (EU) No 10/2011 with amendments up to and including Commission Regulation (EU) 2018/831 on plastic materials and articles intended to come into contact with food for the above mentioned test conditions.

The results for **specific migration are below** the specific migration limit according the Swiss Ordinance
Consequently the product tested **complies** with the requirements in Swiss Ordinance, SR 817.023.21 for the above mentioned test conditions.

The result for **specific migration of MOAH** according to the German mineral oil ordinance (DRAFT) is **below** the proposed specific migration limit for MOAH for the applied test conditions.
Please note that MOSH has been removed in the 4th edition of the draft from March 2017.

Evaluation of NIAS
Migration of not listed substances was detected during the screening analyses for not intended added substances (NIAS) and a risk assessment need to be performed.
Substances with specific migration limits were detected above the specific migration limit and specific quantitative analyses are recommended.
Consequently it cannot be judged if the product complies with the requirements in (EU) No 1935/2004 for materials and articles intended to come into contact with food for the tested parameters at the above mentioned test conditions.

UPDATE
A risk assessment of the not listed substances was carried out which showed that the measured migration levels can **be judged as safe** for human consumption (see attachment).

6 Picture of Sample

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