



# Update on FCM activities of the Joint Research Centre

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*EFSA, 17-19 Oct. 2023*

# Content

- Mineral oil in food and FCM
- Proficiency tests
- Update Kitchenware guideline on test conditions
- Vitreous materials
- Migration modelling

# Mineral oil

**JRC TECHNICAL REPORTS**

Guidance on sampling, analysis and data reporting for the monitoring of mineral oil hydrocarbons in food and food contact materials - 2<sup>nd</sup> Edition

*In the frame of Commission Recommendation (EU) 2017/84*

S. Bratinova, P. Robouch, E. Hoekstra

2023

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EUR 31473 EN

Joint Research Centre

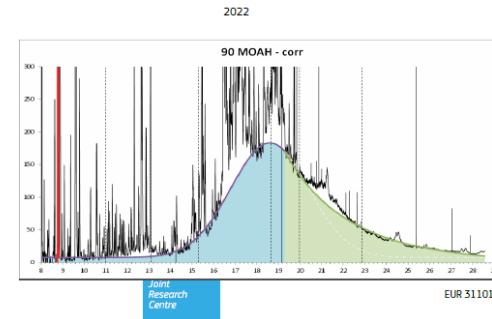


## JRC TECHNICAL REPORT

### Mineral oil in infant formulas - guidelines for integrating chromatograms

*JRC IF 2021-04: a virtual  
inter-laboratory comparison*

Robouch P., Bratinova S., Goncalves C., Karasek L.,  
Beldi G., Senaldi C., Valzacchi S. and Hoekstra E.



## JRC TECHNICAL REPORT

### Determination of MOSH/MOAH in Shell SN500\* mineral oil

*JRC IF 2021-03 - The third  
interlaboratory comparison*

Bratinova S., Robouch P., Goncalves C.,  
Karasek L., Beldi G., Senaldi C., Valzacchi S.,  
Hoekstra E.

2022



Determination of MOSH and MOAH  
in edible oil

# Proficiency tests

2022

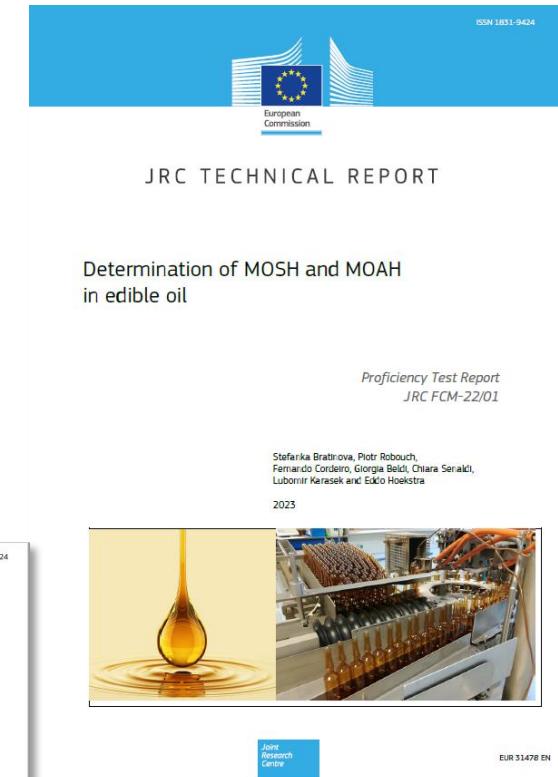
MOSH-MOAH in olive oil

PAA in food simulant B and spiked food  
simulant B migration extract

2023

Migration of melamine and formaldehyde  
from bamboo/melamine ware

Migration of styrene from PS cups into milk

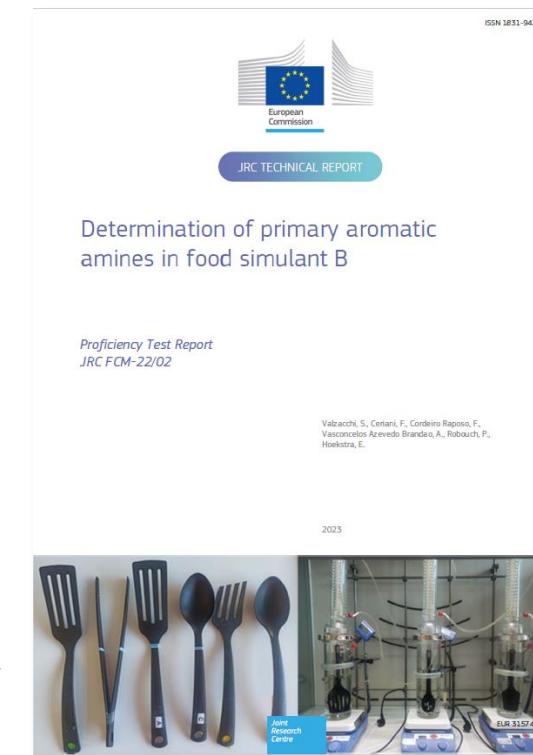


Proficiency Test Report  
JRC FCM-22/01

Stefánka Bratr'ová, Piotr Robouch,  
Fernando Cordero, Giorgia Beldi, Chiara Serafidi,  
Lubomír Karásek and Edo Hoekstra  
2023

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JRC TECHNICAL REPORT

Proficiency Test Report  
JRC FCM-22/02

Valtracchi, S., Cenari, F., Cordero Raposo, F.,  
Vasconcelos Arevedo Brando, A., Robouch, P.,  
Hoekstra, E.

2023

Joint Research Centre

EUR 31574 EN

# Proficiency tests

- Well controlled migration step is important
  - Temperature control
    - of the **food simulant** during the migration test
    - by recording with datalogger
  - Pre-heating of the test item?
  - Avoidance of evaporation during the migration test

# Kitchenware guidelines

Aim: comparability of measurement results

2019 – Guideline on "Testing conditions for kitchenware articles in contact with foodstuffs - Part 1: Plastics;

2020 – Part 2: Plastics and Metals;

2021 – Part 3: Plastics , Metals, Silicone & Rubber

2023 – Part 4: plastics , metals, silicone & rubber, paper & board next



Testing conditions for kitchenware articles in contact with foodstuffs - Part 1: Plastics  
The EUR-L-FCM harmonised approach series

G. Belotti, N. Jakubovska, P. Robauch, E. Hoekstra  
2019



JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT

Testing conditions for kitchenware articles in contact with foodstuffs: Plastics and Metals  
The EUR-L-FCM harmonised approach series  
N. Jakubovska, G. Belotti, P. Robauch, E. Hoekstra  
2020



JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT  
Testing conditions for kitchenware articles in contact with foodstuffs: Plastics, Metals, Silicone & Rubber  
The EUR-L-FCM harmonised approach series  
G. Belotti, C. Senaldi, P. Robauch, E. Hoekstra  
2021



Testing conditions for kitchenware articles in contact with foodstuffs: plastics, metals, silicone & rubber, paper & board

The EUR-L-FCM harmonised approach series

Belotti, G., Senaldi, C., Robauch, P., Hoekstra, E.



# How to select the test conditions (2)



## 2. When

- ✓ a **permanent label** on the article (e.g. embossed or engraved) **OR**
- ✓ **instructions ONLY** on the packaging of the article (can be discharged)

defining limiting conditions of use or providing operating instructions, then adapt the test conditions accordingly

BUT only if in-line with foreseeable conditions in this Guideline

## 3. When **no label/instructions** and this guideline assigns several possible test conditions for the same type of article, then select the **most severe** test conditions appropriate for the specific article.



Not fixed; 450°F (232°C)

# How to select the test conditions (4)

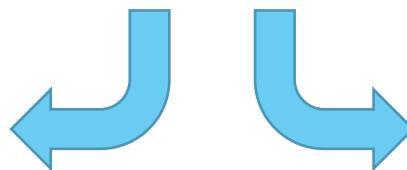
7. For materials (e.g. paper and board) that do not withstand the combination of test conditions and food simulants set for plastics, other migration/extraction methods may be defined.

## Coated/treated paper vs. uncoated/untreated paper

Migration according to Regulation (EU)

No 10/2011

- includes a barrier layer against fat/grease/water (e.g. a plastic layer)
- does not absorb moist and/or oil
- no loss of physical structure



“extraction”

- do not withstand migration test conditions and food simulants prescribed by Reg. (EU) No 10/2011
- lose physical structure

# Kitchenware – paper & board

Articles that do not withstand migration test conditions of Regulation (EU) No 10/2011:

- In absence of national requirements migration test results to be reported in mg/dm<sup>2</sup> taking into account
  - the one-sided area and
  - the grammage of the paper.
- Test results can be converted into mg/kg of food using the real S/V ratio in actual or foreseen use.
- For articles where it is impractical to estimate this ratio and for those articles with a capacity < 0.5 L or > 10 L, the conventional factor of 6 dm<sup>2</sup>/kg of food should be used.

# Kitchenware – paper & board

EN 15519 does not specify when ethanol 95 % or isoctane has to be used for extraction/migration,

Harmonisation with the last paragraph of section 2.1.3 of Annex V of Regulation (EU) No 10/2011 is made:

***The highest extraction in ethanol 95 % and isoctane shall be used for compliance assessment. If the temperature under the worst foreseeable conditions of intended use exceeds 100 °C the highest extraction in ethanol 95 %, isoctane and food simulant E shall be used for compliance assessment.***

# Ceramics, glass, enamel

- Support revision Ceramic Directive 84/500/EEC
- More elements than Cd, Pb
- Realistic test conditions
  - compared to current 22°C for 24 h using 4% v/v acetic acid
- Repeated use
- Replacement of acetic acid for elevated temperatures



# Migration modelling – data request form (1)

## Nature of the plastic FCM

- **The mandatory parameters are highlighted in bold**
- For a multi-layer plastic, please give information on the nature of each FCM layer (up to the absolute barrier if present).

## Type of polymer as specific as possible

## Migration test conditions

- Temperatures (T; °C)
- Contact times (t; min, h, day)

## Contact area between FCM and Food (A) during the migration test performed (dm<sup>2</sup>)

## Density of FCM ( $\rho_P$ ; kg/L)

## Thickness of the FCM layer (d)

## Specific contribution of the FCM to the diffusion activation energy (t) (only if determined)

## Polymer-specific constant ( $A_P^*$ ) (only if determined)

## FCM-Food partition coefficient (K) (only if determined)

# Migration modelling – data request form (2)

## Description of food/food simulant parameters

Type of food /food simulant

Volume of the food/food simulant (V) during the migration test performed (dm<sup>3</sup>)

Density of the food (ρF)

# Migration modelling – data request form (3)

## Description of the substance

**List of the substance(s)**

CAS No. for each substance (if available)

**SMILES for each substance**

**Molecular weight (M; Da) for each substance**

**Initial concentration for each substance in the FCM (Ci; mg/kg polymer)**

**Diffusion coefficient for each substance in FCM (DF; cm<sup>2</sup>/s)**

Octanol-water coefficient (in log10) (only if available)

**Migration result for each substance (M; mg/kg food)**

# Acknowledgements

- National Reference Laboratories
- Commission
- JRC FCM team
- TF kitchenware

# Thank you



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