



Update on FCM activities of the Joint Research Centre

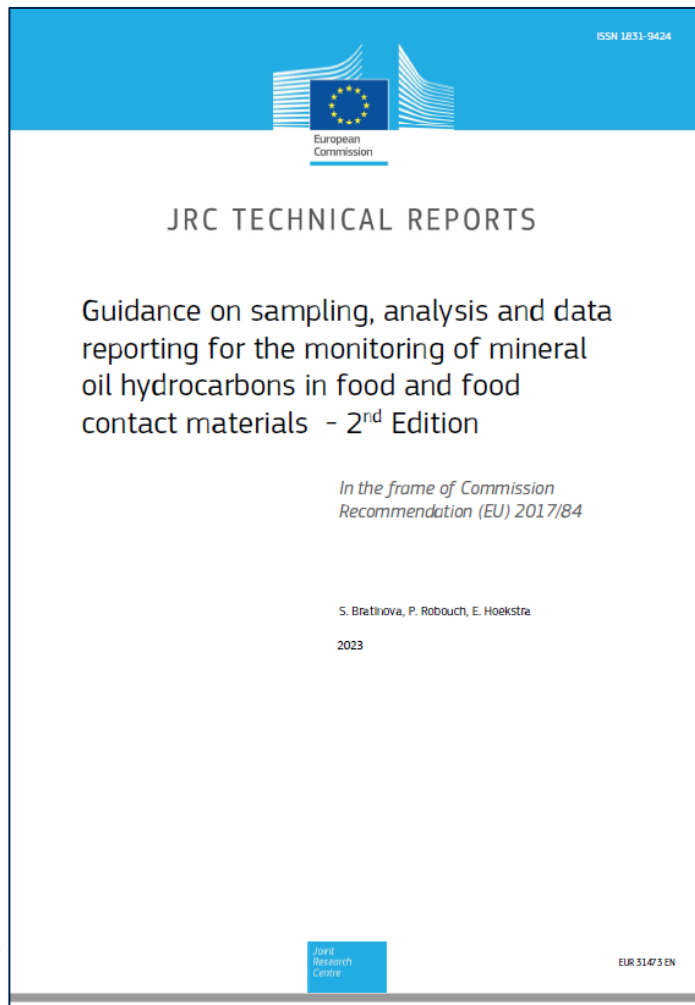
Eddo Hoekstra

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



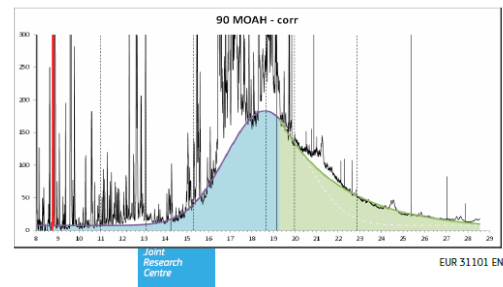
JRC TECHNICAL REPORT

Mineral oil in infant formulas - guidelines for integrating chromatograms

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

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

2022



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.,
Keresek L., Beldi G., Senaldi C., Valzacchi S.,
Hoekstra E.

2022



Joint
Research
Centre

EUR 30990 EN

Proficiency tests

2022

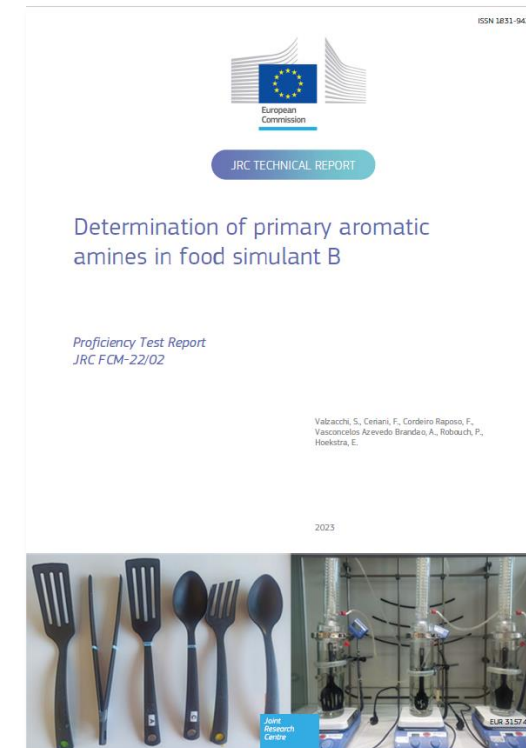
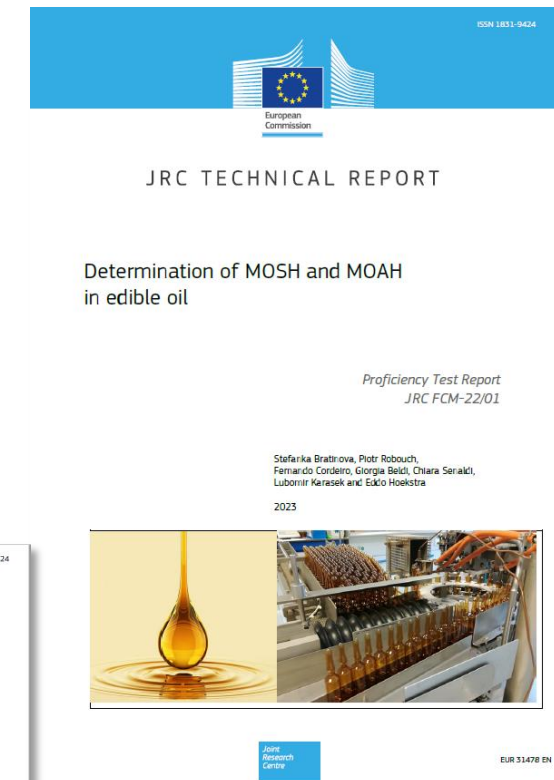
MOSH-MOAH in olive oil

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 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 EURL-FCM harmonised approach series

G. Badii, N. Jakubowicz,
P. Rodaurch, E. Hoekstra

2019



JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT

Testing conditions for kitchenware articles in contact with foodstuffs: Plastics and Metals

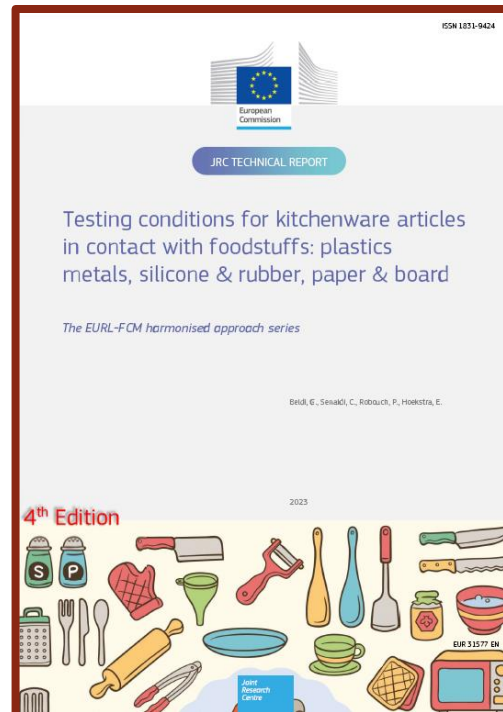
The EURL-FCM harmonised approach series

N. Jakubowicz (G. Badii),
P. Rodaurch, E. Hoekstra

2020



2nd Edition



How to select the test conditions (2)



Embossed; 260°C

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)

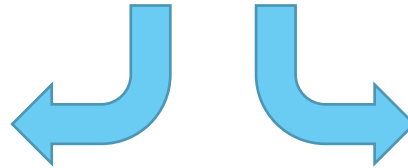
How to select the test conditions (4)

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^2 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 $< 0.5 \text{ L}$ or $> 10 \text{ L}$, the conventional factor of $6 \text{ dm}^2/\text{kg}$ of food should be used.

Kitchenware – paper & board

EN 15519 does not specify when ethanol 95 % or isooctane 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 isooctane 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 %, isooctane 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 (dm²)

Density of FCM (ρ_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 (dm³)

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 (C_i ; mg/kg polymer)

Diffusion coefficient for each substance in FCM (D_F ; cm²/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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