Test report

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Assignment	Testing of food contact materials
Sample details	235-2022-00243102: HDPE bottle, Marlex HXM 50100P Samples arrived on 19.5.2022.
Testing period	3.6 – 27.6.2022

Methods and results

The overall migration testing *

SFS-EN 1186-1 Materials and articles in contact with foodstuffs. Plastics. Part 1: Guide to the selection of conditions and test methods for overall migration.

SFS-EN 1186-9 Materials and articles in contact with foodstuffs. Plastics. Part 9: Test methods for overall migration into aqueous food simulants by article filling.

SFS-EN 1186-2 Materials and articles in contact with foodstuffs. Plastics. Part 2: Test methods for overall migration into olive oil by total immersion.

The overall migration testing* using 10 % ethanol and 3 % acetic acid was performed with three parallel tests. Four parallel test was performed with olive oil. The testing conditions were 10 days in + 40°C. The surface to volume ratio was 2.9 dm²/410ml (filling) when using 10% ethanol and 3% acetic acid and measurement uncertainty is 1 mg/dm². The surface to volume ratio was 1.0 dm²/100ml when using olive oil (total immersion) and measurement uncertainty is 3 mg/dm². Overall migration into olive oil was tested by subcontractor. The test results were:

Sample	Simulant/Time/Temperature	Result, overall migration mg/dm²	Limit, overall migration mg/dm²
235-2022-00243102	3% acetic acid/ 10 days/ 40 °C	< 1.5	10
		< 1.5	
		< 1.5	
	10% ethanol/ 10 days/ 40 °C	< 1.5	10
		< 1.5	
		< 1.5	
	Olive oil / 10 days/ 40 °C	< 2	10
		< 2	
		< 2	
		< 2	

The specific migration of selected elements into 3% acetic acid* was evaluated by subcontractor by ICP-MS using internal method. Testing conditions were +40°C / 10d. The surface to simulant volume ratio was 1.0 dm² / 100 ml (total immersion). The results were recalculated for migration ratio 6 dm² of the sample/ 1kg food simulant.

Substance	232-2022-00243102 (mg/kg food simulant)	Limit EU 10/2011	Pass/Failed
Zinc, Zn	< 0.100	5	P [2]
Aluminium, Al	< 0.100	1	P [2]
Arsenic, As	< 0.001	N.D [1]	P [2]
Cadmium, Cd	< 0.001	N.D [1]	P [2]
Chromium, Cr	< 0.005	N.D [1]	P [2]
Lead, Pb	< 0.005	N.D [1]	P [2]
Mercury, Hg	< 0.002	N.D [1]	P [2]

1) N.D =not detectable (below 0.01 mg/kg, cadmium 0.002 mg/kg)
2) In accordance with ILAC-G08 – Binary statement for the simple acceptance rule (measurement uncertainty is not taken into consideration for evaluation

Specific migration of restricted substances into food simulant A (10 % ethanol), B (3% acetic acid), D2 (olive oil) and substitute fatty food simulants (95% ethanol and isooctane) was evaluated by subcontractor by UFLC (FCM 760, outside the scope of accreditation) and GC-MS (FCM 356)* using internal methods. The test conditions with 10% ethanol, 95% ethanol, olive oil and 3% acetic acid were 10d, +40°C and with isooctane 2d, +20°C. The surface to simulant volume ratio was 1.0 dm^2 / 100 ml. The results were recalculated for migration ratio 6 dm^2 of the sample/ 1kg food simulant.The test results were:

Restricted substances	Simulant	232-2022-00243102 (mg/kg food simulant)	Limit value according to Commission Regulation 10/2011 mg/kg
FCM 356	10% ethanol	< 0.4	3
	3% acetic acid	< 0.4	
	olive oil	< 0.4	
FCM 760	10% ethanol	< 2	18
	3% acetic acid	< 2	
	95% ethanol	< 2	
	isooctane	< 2	

The off-flavour test* was performed in accordance with method EN 1230-2.To test for taste impairment, the sample was kept in sealed vessel with the test food for 44-48 h at a 75 % relative humidity. The test was carried out as an extended triangle test using milk chocolate as the test food.

0 = no perceptible off-flavour
1 = just perceptible off-flavour
2 = weak off-flavour
3 = clear off-flavour
4 = strong off-flavour

Sample	Intensity of off-flavour 0 - 4	Statistical Significance of off-flavour test results**	Description
235-2022-00243102	0	0/10, ns	-
Measurement uncertainty	± 0.6	-	-

**In the triangle test the statistical significance difference between the sample and the reference sample is: p<0.001 = highly significant, p<0.01 = significant, p<0.05 = nearly significant and ns. = not significant.

Accredited test methods are marked with asterisk *.

Espoo, 8.7.2022

Riitta-Maija Osmonen
Senior Expert

Distribution Customer, electronically approved