



Update on the MCPD/GE Project

Determination of 2- and 3-MCPD, 2- and 3-MCPD esters and glycidyl esters in infant and adult/pediatric nutritional formula

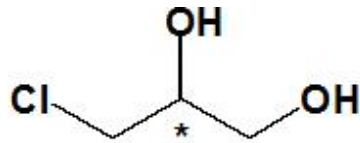
**Katerina Mastovska (ERP Chair)
Eurofins Food Integrity & Innovation**

August 25, 2018

SPIFAN, AOAC Annual Meeting, Toronto, ON, Canada

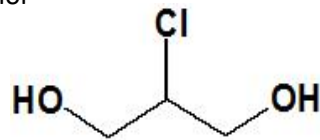
Background

Free analytes



3-MCPD

3-*mono*-chloropropane-1,2-diol
3-Chloropropane-1,2-diol



2-MCPD

2-*mono*-chloropropane-1,3-diol
2-Chloropropane-1,3-diol

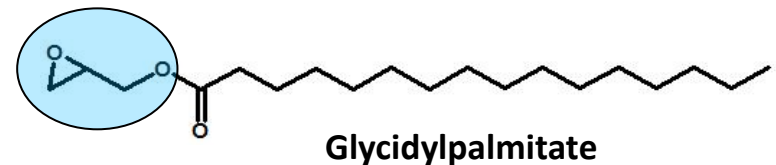
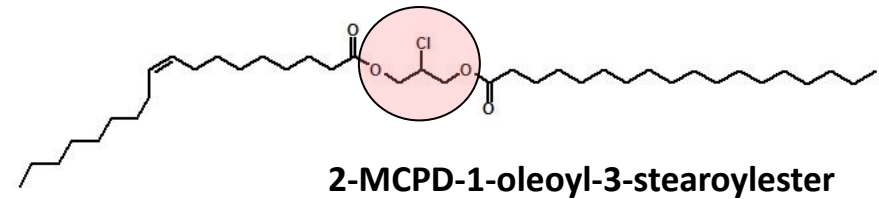
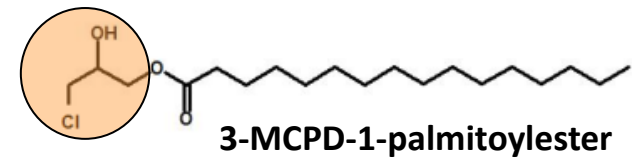
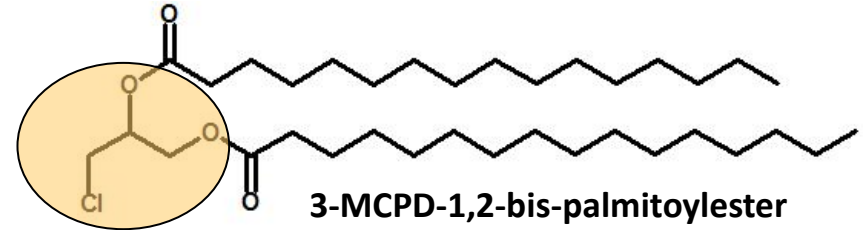


Glycidol

(2,3-Epoxy-1-propanol)

Bound analytes

just examples, all fatty acids of an oil/fat might be present



Slide adopted from Jan Kuhlmann

Background

- Working group launched in March 2017 (WG chair: Jan Kuhlmann, SGS, Germany)
- AOAC SMPR 2017.017 approved by SPIFAN in Sep 2017
- Call for methods issued – 2 methods received
- Expert Review Panel (ERP) meetings:
 - March 2018: Recommendations for the methods to obtain AOAC First Action *Official Method*SM status
 - July 2018: Both methods adopted as the AOAC First Action *Official Methods*SM

SMPR: 3-MCPD

Parameter		3-MCPD * in dry infant formula samples (powder)	3-MCPD* in liquid infant formula samples
Analytical range (µg/kg)		25 – ≥ 1000	3 – ≥ 120
LOQ (µg/kg)		≤ 25	≤ 3
Accuracy (%)		70-125	70-125
% RSD _r		≤ 22	≤ 22
% RSD _R	25-100 µg/kg	≤ 44	≤ 44
	>100 µg/kg	≤ 25	

* Total analyte content expressed as free 3-MCPD resulting either from separate or from combined determination of free 3-MCPD and bound 3-MCPD.

SMPR: 2-MCPD

Parameter		2-MCPD * in dry infant formula samples (powder)	2-MCPD* in liquid infant formula samples
Analytical range (µg/kg)		25 – ≥ 500	3 – ≥ 60
LOQ (µg/kg)		≤ 25	≤ 3
Accuracy (%)		70-125	70-125
% RSD _r		≤ 22	≤ 22
% RSD _R	25-100 µg/kg	≤ 44	≤ 44
	>100 µg/kg	≤ 25	

* Total analyte content expressed as free 2-MCPD resulting either from separate or from combined determination of free 2-MCPD and bound 2-MCPD.

SMPR: Glycidol

Parameter		Glycidol* in dry infant formula samples (powder)	Glycidol* in liquid infant formula samples
Analytical range (µg/kg)		15 – ≥ 400	2 – ≥ 48
LOQ (µg/kg)		≤ 15	≤ 2
Accuracy (%)		70-125	70-125
% RSD _r		≤ 22	≤ 22
% RSD _R	15-48 µg/kg	≤ 44	≤ 44
	>48 µg/kg	≤ 25	

* Analyte content resulting from the determination of bound glycidol.

EU Regulation 2018/290

27.2.2018

EN

Official Journal of the European Union

L 55/27

COMMISSION REGULATION (EU) 2018/290

of 26 February 2018

amending Regulation (EC) No 1881/2006 as regards maximum levels of glycidyl fatty acid esters in vegetable oils and fats, infant formula, follow-on formula and foods for special medical purposes intended for infants and young children

'Section 4: 3-monochloropropanediol (3-MCPD) and glycidyl fatty acid esters

	Foodstuffs ⁽¹⁾	Maximum level (µg/kg)
4.1	3-monochloropropanediol (3-MCPD)	
4.1.1	Hydrolysed vegetable protein ⁽³⁰⁾	20
4.1.2	Soy sauce ⁽³⁰⁾	20
4.2	Glycidyl fatty acid esters expressed as glycidol	
4.2.1.	Vegetable oils and fats placed on the market for the final consumer or for use as an ingredient in food with the exception of the foods referred to in 4.2.2	1 000
4.2.2.	Vegetable oils and fats destined for the production of baby food and processed cereal-based food for infants and young children ⁽³⁾	500
4.2.3	Infant formula, follow-on formula and foods for special medical purposes intended for infants and young children (powder) ⁽³⁾ ⁽²⁹⁾	75 until 30.6.2019 50 as from 1.7.2019
4.2.4	Infant formula, follow-on formula and foods for special medical purposes intended for infants and young children (liquid) ⁽³⁾ ⁽²⁹⁾	10,0 until 30.6.2019 6,0 as from 1.7.2019'

EU Regulation 2018/290

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EU Regulation 2018/290 vs. SMPR 2017.017

Parameter	Glycidol* in dry infant formula samples (powder)	Glycidol* in liquid infant formula samples
SMPR LOQ ($\mu\text{g}/\text{kg}$)	≤ 15	≤ 2
Maximum Level ($\mu\text{g}/\text{kg}$) Until 30.6.2019	75	10
Maximum Level ($\mu\text{g}/\text{kg}$) From 1.7.2019	50	6

* Analyte content resulting from the determination of bound glycidol.

First Action Official Methods

Indirect methods (ester cleavage to release bound analytes):

- M. Dubois, A.-M. Empl , G. Jaudzems, and E. Konings (Nestlé):
“Fatty Acid Esters of 2-Chloropropane-1,3-Diol (2-MCPD), 3-Chloropropane-1,2-Diol (3-MCPD) and Glycidol, Free 2-MCPD and Free 3-MCPD in Infant Formula and Adult/Pediatric Nutritional Formula”
- Jan Kuhlmann (SGS Germany):
“2-Monochloropropanediol (2-MCPD), 3-Monochloropropanediol (3-MCPD), and Glycidol in Infant and Adult/Pediatric Nutritional Formula: Gas Chromatographic-Mass spectrometric (GC-MS) Method”