

Länderarbeitsgemeinschaft Verbraucherschutz (Consumer Protection Consortium of the Federal States)  
Arbeitsgruppe Lebensmittel- und Bedarfsgegenstände, Wein und Kosmetika (ALB) (Working group on foodstuffs and consumer goods, wine and cosmetics)

Bund für Lebensmittelrecht und Lebensmittelkunde e.V. (German Federation for Food Law and Food Science)

## **Benchmark levels for mineral oil hydrocarbons (MOH) in foods**

### **Valid as of April 2019**

The representatives of the food control authorities of the federal states and the BLL as the leading association of the German food sector recommend the use of "benchmark levels" for contents of mineral oil hydrocarbons and their structural analogues. These benchmark levels were developed within the framework of a joint project based on current data as from June 2016.

The objective is to provide the food sector, consumers, consumer protection organizations and goods testers as well as the food control authorities with guidance on the level to which contamination with mineral oil-like hydrocarbons (MOH) can be expected, while taking into consideration and monitoring and mastering the previously familiar routes of entry.

In their derivation, the benchmark levels expressly take no account of any aspects of toxicology or exposure because the current status of scientific literature as well as the possible bioaccumulation of certain MOSH fractions does not permit health-based levels to be derived for the entirety of the mineral oil-like hydrocarbons at the present moment in time.

As contemplated by the resolution of the 13<sup>th</sup> consumer protection minister conference (VSMK) 2017, the benchmark levels can represent the starting point for further efforts aimed at minimization.

Phase-related actions, such as those in the BLL Toolbox for example, are recommended for the avoidance of recognized, specific contamination sources by adapting the good and state-of-the-art manufacturing and packaging practices (GMP), which can then be implemented in the process chains. Due to the diversity of sources, ubiquitous environmental influences, the complexity and variety of the process chains but also the use of approved processing aids, it becomes apparent that, even if an optimized good manufacturing and packaging practice is observed, it is not possible to avoid contents of mineral oil-like hydrocarbons in all cases.

### ***Parameters for the concept:***

- *Independence from source*
- *Consideration of current data based on generally accepted analytical procedures*
- *Entire range of fractions C<sub>10</sub> - C<sub>50</sub>*
- *No consideration of exposure and toxicity*
- *Statistical consideration of the situation within a product group*
- *No legal or health-related assessment*

The benchmark levels were drawn up by an "ALB/BLL Project Group" comprising relevant representatives of the federal states and the commercial groups involved, with the latter being coordinated by the BLL. To this end, more than 10,000 individual data records were collected in anonymized form and evaluated.

As a result, "Common MOH benchmark levels" (Table valid as of April 2019) are now available for initial food categories, which have been confirmed in parallel approval processes by BLL committees, ALB and finally confirmed by VSMK (May 2019).

From the point of view of the project group, the following information and notes are important:

- The benchmark levels were derived in accordance with statistical principles on the basis of the 90<sup>th</sup> percentile of current data on product groups for which it had already been possible to achieve and demonstrate a successful reduction of the contamination with MOH in the past. The benchmark levels based on the 90<sup>th</sup> percentile generally represent not less than achievable levels within the context of good manufacturing practice (GMP).
- The "MOSH levels" refer to the entirety of the analysable mineral oil-like hydrocarbons in a product (MOSH including the MOSH analogues such as POSH or MORE [=mineral oil refinery products]) irrespective of the sources of contamination, e.g. packaging materials or technical processing aids.
- With reference to MOAH, the maximum limits of quantification, LOQ<sub>max</sub>, described in the JRC report are considered as benchmark levels, but with reference to the overall fraction C<sub>10</sub> ∑ C<sub>50</sub>.
- In the analytical testing of adherence to the benchmark levels, the basis for methodological reference is provided by the Technical Report (*Guidance on sampling, analysis and data reporting for the monitoring of mineral oil hydrocarbons in food and food contact materials, 2019*) published by the European Reference Laboratory (JCR).
- A future project objective is to provide benchmark levels for additional product groups as well. The project group is currently working on the collecting, compiling and evaluation of further data records.

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## MOH BENCHMARK LEVELS

LAV and BLL jointly recommend the use of “benchmark levels” for the occurrence, regardless of source, of mineral oil hydrocarbons and their analogues (MOH as the sum of MOSH (including MOSH analogues) and MOAH) in foodstuffs as uniformly applicable, approved principles for assessment. The benchmark levels are based on the statistically verified basis of comparable data which the BLL and the federal states collected within the context of a joint project for the period starting in June 2016. The data were collected according to coordinated standards on analysis and collection (see project description dated June 2018) in an undifferentiated manner and independently of the potential sources of contamination. The “benchmark levels” have been derived from the extensive data pool with a sufficient data basis for certain food groups in a pragmatic statistical process (generally based on the 90<sup>th</sup> percentile of a distribution). The benchmark levels derived in this way are not based on toxicological or exposure assessments and do not represent a criterion for demonstration of conformity with food legislation. They reproduce the current state-of-the-art, taking into account the various routes of entry for mineral oil hydrocarbons and their analogues (cf. BLL Toolbox Concept, December 2017).

Consequently, the levels are recommendations and give guidance for practical use; by definition they are not to be interpreted or used as threshold limit levels. The levels apply to end consumer products and products on the market and represent the state-of-the-art for good agricultural, manufacturing and packaging practice for the respective process chains at the current point in time.

Examination of adherence to the benchmark levels uses the current guideline<sup>1</sup> of the European Reference Laboratory which serves as a methodological framework and also includes the minimum limits of quantification (LOQ<sub>max</sub>) to be achieved, the general analytical conditions and the notes on further characterization for difficult samples and matrices using additional analytical methods, such as GC-MS, LC-GC-FID/MS or GCxGC-FID/MS, the need for which, however, has to be determined in each individual case.

### DEFINITION “MOH Benchmark Levels”

**“The levels provide guidance on the content, regardless of source, of mineral oil-like hydrocarbons (MOH as the sum of MOSH and MOSH analogues (such as POSH, PAO, MORE) and as MOAH) in foodstuffs of a specific group that can be expected with high statistical probability as the result of a good technical manufacturing practice at the various process stages and due to ubiquitous influences.**

**If benchmark levels are exceeded, this may indicate possible sources of contamination along a supply chain, which may be avoidable by adopting good practice within the manufacturing and packaging process and may also provide a reason to instigate research into the causes. Further assessment of a product should consider**

- **the composition, type and duration of the packaging, shelf-life,**
- **information on the raw material situation, on processing methods and food contact materials at all stages as well as**
- **the intended purpose and the usual quantities consumed.”**

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<sup>1</sup> JRC Technical Report: Guidance on sampling, analysis and data reporting for the monitoring of mineral oil hydrocarbons in food and food contact materials, 2019, ISBN 978-92-76-00172-0

LAV-BLL: MOH Benchmark levels (April 2019)				
No.	Product group Food category	MOSH and analogues [mg/kg] C <sub>10</sub> -C <sub>50</sub>	MOAH [mg/kg] C <sub>10</sub> -C <sub>50</sub>	Notes on use (Notes on the food groups recorded / on non-recorded products and limitations / if appropriate on reasons, basis of the data or other special features)
1	Vegetable oils, (such as rapeseed oil, sunflower oil, linseed oil, olive oil) (excluding oils/fats of tropical plants and soya oil)	13	n.q. <sup>2</sup>	these benchmark levels are not intended for application to oils/fats that have been extracted from tropical plants (e.g. coconut oil) due to an insufficient base of statistical data (in Dec. 2018)
2	Bread and biscuits, fine pastries, cereal products and cereal-based products, cereals, rice, pasta	6	n.q. <sup>3</sup>	only applicable to end products for consumers, not to raw commodities or raw doughs
3	Confectionery (sugar confectionery except chewing gum), chocolate and cocoa-based confectionery	9	n.q. <sup>3</sup>	only applicable to end products for consumers

*n.q.* □ not quantifiable, i.e. contents < limit of quantification (here: LOQ<sub>max</sub> in mg/kg in accordance with the JRC Guidance on sampling, analysis and data reporting for monitoring of mineral oil hydrocarbons in food and food contact materials, Valid as of 2019)

<sup>2</sup> LOQ<sub>max</sub> for every fraction (cf. JRC Technical Report<sup>1</sup>) for fats/oils is equivalent to 2 mg/kg

<sup>3</sup> LOQ<sub>max</sub> for every fraction (cf. JRC Technical Report<sup>1</sup>) for low-fat foods < 4% fat is equivalent to 0.5 mg/kg; > 4% fat is equivalent to 1 mg/kg