# PRODUCT INFORMATION SHEET

## *Heavy Metals and Trace Elements in Moringa Leaf Powder*

*PT originated REFERENCE MATERIAL (RM)*

**Description of the RM**

| | |
|---|---|
| Name / Material of related PT | *DLA 49-2019 Heavy Metals and Trace Elements in Plant Food* |
| Identifier / LOT | *RM 2019-49* |
| Expiry date | *August 2028* |
| Matrix | *Moringa leaf powder* |
| Physical description | *Powder* |
| Packaging / weight | *Sealed foil pouche / 8 g* |
| Storage conditions | *Room temperature (dry and dark)* |
| Name and address manufacturer | ***DLA - Proficiency Tests GmbH***<br>*Kalte Weide 21, 24641 Sievershütten, Germany*<br>*Tel. ++49-(0)4532-9183358, Fax. ++49(0)4102-9944976*<br>*eMail. pt@dla-lvu.de, website. www.dla-lvu.de* |

**Composition of Material**

| **Ingredients** | **Amounts** |
|---|---|
| Organic Moringa Powder (Origin: India)<br>Ingredients: Moringa leafs, dried | 100 g/100 g |
| Sn - Tin<br>Standard solution: Tin(IV)-Chloride in HCl | 1,5 mg/kg |
| U - Uranium<br>Standard solution: Uranium(VI)-Nitrate in $HNO_3$ | 0,30 mg/kg |

**Minimum Sample Size**
A minimum sample size of 5 g is recommended for sample preparation.

The homogeneity was examined by 8-fold determination of copper and uranium by ICP/MS (DIN EN ISO 17294-2). The repeatability standard deviations were 0,97% and 3,8% and thus within the range of repeatability standard deviations of comparable methods (e.g. ASU §64 L 00.00-144).

The calculation of the repeatability standard deviations $S_r$ of the participants was also used as an indicator of homogeneity. The coefficient of variation ($CV_r$) for all analytes ranges from 0,8% - 2,9%. Thus they were similar to the repeatability standard deviations of the corresponding official methods (e.g. ASU §64 L 00.00-144).

**Reference Values**
All reference values were derived from the related PT round (for more details see final report).

**Reference Values quantitative in mg/kg**

| Parameter | Al – Aluminium | B – Boron |
|---|---|---|
| Numbers of results | 9 | 7 |
| Number of outliers | 0 | 0 |
| ***Assigned Value (Xpt)*** | ***44,3*** | ***31,5*** |
| Robust standard deviation | 5,33 | 2,89 |
| Standard uncertainty | 2,22 | 1,37 |
| Target standard deviation σpt | 4,01 | 3,00 |
| ***Target range*** | ***36,3 – 52,3*** | ***25,5 – 37,5*** |

| Parameter | Ba – Barium | Ca – Calcium |
|---|---|---|
| Numbers of results | 8 | 9 |
| Number of outliers | 0 | 0 |
| ***Assigned Value (Xpt)*** | ***71,3*** | ***19600*** |
| Robust standard deviation | 2,00 | 1730 |
| Standard uncertainty | 0,884 | 719 |
| Target standard deviation σpt | 6,00 | 1490 |
| ***Target range*** | ***59,3 – 83,3*** | ***16600 – 22600*** |

| Parameter | Cu – Copper | Fe – Iron |
|---|---|---|
| Numbers of results | 9 | 10 |
| Number of outliers | 0 | 0 |
| ***Assigned Value (Xpt)*** | ***4,86*** | ***108*** |
| Robust standard deviation | 0,291 | 6,65 |
| Standard uncertainty | 0,121 | 2,63 |
| Target standard deviation σpt | 0,613 | 8,56 |
| ***Target range*** | ***3,64 – 6,09*** | ***91,2 – 125*** |

| Parameter | K – Potassium | Mg – Magnesium |
|---|---|---|
| Numbers of results | 9 | 8 |
| Number of outliers | 0 | 0 |
| ***Assigned Value (Xpt)*** | ***12400*** | ***4700*** |
| Robust standard deviation | 1220 | 261 |
| Standard uncertainty | 510 | 116 |
| Target standard deviation σpt | 701 | 211 |
| ***Target range*** | ***11000 – 13800*** | ***4280 – 5130*** |

| **Parameter** | **Mn – Manganese** | **Mo – Molybdenum** |
|---|---|---|
| Numbers of results | 10 | 8 |
| Number of outliers | 0 | 0 |
| ***Assigned Value (Xpt)*** | ***61,9*** | ***0,449*** |
| Robust standard deviation | 4,93 | 0,0385 |
| Standard uncertainty | 1,95 | 0,0170 |
| Target standard deviation σpt | 5,32 | 0,0810 |
| ***Target range*** | ***51,3 – 72,6*** | ***0,287 – 0,610*** |

| **Parameter** | **Na – Sodium** | **Ni – Nickel** |
|---|---|---|
| Numbers of results | 8 | 10 |
| Number of outliers | 0 | 0 |
| ***Assigned Value (Xpt)*** | ***2480*** | ***0,709*** |
| Robust standard deviation | 92,0 | 0,122 |
| Standard uncertainty | 40,7 | 0,0481 |
| Target standard deviation σpt | 122 | 0,119 |
| ***Target range*** | ***2230 – 2720*** | ***0,470 – 0,947*** |

| **Parameter** | **P – Phosphorus** | **Pb – Lead** |
|---|---|---|
| Numbers of results | 6 | 9 |
| Number of outliers | 0 | 0 |
| ***Assigned Value (Xpt)*** | ***2310*** | ***0,258*** |
| Robust standard deviation | 167 | 0,0288 |
| Standard uncertainty | 85,4 | 0,0120 |
| Target standard deviation σpt | 173 | 0,0506 |
| ***Target range*** | ***1960 – 2660*** | ***0,157 – 0,359*** |

| **Parameter** | **Se – Selenium** | **Sn – Tin** |
|---|---|---|
| Numbers of results | 8 | 6 |
| Number of outliers | 0 | 0 |
| ***Assigned Value (Xpt)*** | ***0,578*** | ***1,52*** |
| Robust standard deviation | 0,0961 | 0,0731 |
| Standard uncertainty | 0,0425 | 0,0373 |
| Target standard deviation σpt | 0,100 | 0,229 |
| ***Target range*** | ***0,377 – 0,779*** | ***1,06 – 1,98*** |

| **Parameter** | **U – Uranium** | **Zn – Zinc** |
|---|---|---|
| Numbers of results | 6 | 9 |
| Number of outliers | 0 | 0 |
| ***Assigned Value (Xpt)*** | ***0,300*** | ***14,5*** |
| Robust standard deviation | 0,0310 | 2,19 |
| Standard uncertainty | 0,0158 | 0,914 |
| Target standard deviation σpt | 0,0576 | 1,55 |
| ***Target range*** | ***0,185 – 0,416*** | ***11,4 – 17,6*** |

**Intended Use**
- for laboratory use only, no food!
- validation of analytical methods
- control sample for quality control charts
- test material for inter-laboratory comparisons
- no medical use

**Storage Instructions and Handling Information**
The material should be stored as stated on page 1. Before use of the material should be warmed up to room temperature. The content should be mixed thoroughly prior to subsampling (see minimum sample size above). The material should be weighed immediately after opening of the foil pouche/bottle and closed again afterwards in order to avoid uptake of moisture. Frequent freezing and thawing should be avoided as this can lead to changes in the properties of the material. The expiry date of this RM is based on the current knowledge and applies only for proper storage conditions in the originally closed foil pouche/bottle.

**Safety Precautions**
The usual laboratory safety precautions should be applied when working with the RM considering the type of ingredients, parameters and its concentration.

**Data Source**
The material was analyzed by 11 laboratories within the related proficiency test (PT). Different analytical methods have been used.

**Various**
The user must determine the suitability of this RM for its particular purpose. DLA makes no warranty of any kind, expressed or implied, other than its products meet all quality control standards set by DLA. We do not guarantee this product can be used for a special application.

DLA Proficiency Tests

| approved (PT-Coordinator) | updated |
|---|---|
| Matthias Besler-Scharf, PhD | Ulrike Vorreiter |
| *signed M. Besler-Scharf* | *signed U. Vorreiter* |
| 11 February 2020 | 1 September 2026 |