Evaluation Report

proficiency test

DLA ptSU09/2020

Total Amino Acid Composition:

in Food (dietetic food, drink powder as a meal replacement)

DLA - Proficiency Tests GmbH
Kalte Weide 21
24641 Sievershütten/Germany

proficiency-testing@dla-lvu.de *www.dla-lvu.de*

Coordinator of this PT:
Dr. Matthias Besler-Scharf

1st Correction 1/03/2021:

A transfer error occurred in the overview table of the z-scores of participants (p. 58). For L-valine, the valid z-scores for the assessment were not given, but the z-scores for information. The table has been corrected accordingly.

Allgemeine Informationen zur Eignungsprüfung (EP)
General Information on the proficiency test (PT)

EP-Anbieter *PT-Provider*	**DLA - Proficiency Tests GmbH** Kalte Weide 21, 24641 Sievershütten, Germany Geschäftsführer/CEO: Dr. Matthias Besler-Scharf Stellv. Leitung/Deputy Lead: Alexandra Scharf MSc. Tel. ++49-(0)4532-9183358 Mob. ++49(0)171-1954375 Fax. ++49(0)4102-9944976 eMail. proficiency-testing@dla-lvu.de
EP-Nummer *PT-Number*	DLA ptSU09/2020
EP-Koordinator *PT-Coordinator*	Dr. Matthias Besler-Scharf
Status des EP-Bericht *Status of PT-Report*	Abschlussbericht / Final report (1 March 2021) 1. Korrektur / 1st Correction Gültig ist die jeweils letzte Version/Korrektur des Berichts. Sie ersetzt alle vorangegangenen Versionen. Only the latest version/correction of the report is valid. It replaces all preceding versions.
EP-Bericht Freigabe *PT-Report Authorization*	Dr. Matthias Besler-Scharf (Technischer Leiter / Technical Manager) *- gezeichnet / signed M. Besler-Scharf* Alexandra Scharf MSc. (QM-Beauftragte / Quality Manager) *- gezeichnet / signed A. Scharf* Datum / Date: 1 March 2021
Unteraufträge *Subcontractors*	Im Rahmen dieser Eignungsprüfung wurden nachstehende Leistungen im Unterauftrag vergeben: Keine As part of the present proficency test the following services were subcontracted: none
Vertraulichkeit *Confidentiality*	Die Teilnehmerergebnisse sind im EP-Bericht in anonymisierter Form mit Auswertenummern benannt. Daten einzelner Teilnehmer werden ausschließlich nach vorheriger Zustimmung des Teilnehmers an Dritte weitergegeben. Participant result are named anonymously with evaluation numbers in the PT report. Data of individual participants will be passed on to third parties only with prior consent of the participant.

Contents

1. Introduction

The participation in proficiency testing schemes is an essential element of the quality-management-system of every laboratory testing food and feed, cosmetics and food contact materials. The implementation of proficiency tests enables the participating laboratories to prove their own analytical competence under realistic conditions. At the same time they receive valuable data regarding the verification and/or validation of the particular testing method [1, 5].
The purpose of DLA is to offer proficiency tests for selected parameters in concentrations with practical relevance.
Realisation and evaluation of the present proficiency test follows the technical requirements of DIN EN ISO/IEC 17043 (2010) and DIN ISO 13528:2009 / ISO 13528:2015 [2, 3].

2. Realisation

2.1 Test material

The test material is a mixture of common in commerce dietetic drink powder as a meal replacement with a protein content of < 20% (soy and milk protein).

Parameters to be determined are amino acids after protein hydrolysis.

The raw materials were each sieved (*mesh size* <500 µm), added, milled and homogenised.

Afterwards the samples were portioned to approximately 10 g into metallised PET film bags and chronologically numbered.

The composition (list of ingredients) as well as the amino acid contents calculated according to the manufacturers' specifications are given in table 1.

Table 1: Composition of DLA-Samples and contents of amino acids according to manufacturers' specifications

Dietic drink powder

Drink powder 1 (meal for weight control):

Ingredients: 54% soy protein isolate, 21% skimmed milk-yoghurt powder, 20% honey, tricalcium phosphate, potassium citrate, flavouring, trimagnesium dicitrate, release agents: silicon dioxide E551, palm oil, iron fumarate, L-ascorbic acid, sweeteners: sucralose E955, DL-alpha-tocopheryl acetate, nicotinamide, zinc oxide, calcium-D-pantothenate, manganese sulfate, pyridoxine hydrochloride, thiamin mononitrate, riboflavin, Cholecalciferol, copper gluconate, retinyl acetate, folic acid, potassium iodine, sodium selenide, D-biotin, cyanocobalamin.

Nutritional values per 100 g: fat 1,4 g, carbohydrates 29 g thereof sugar 27 g, protein 53 g, salt 1,9 g

Drink powder 2 (meal replacement)

Ingredients: soy protein isolate (47%), honey (20%), soy oil(14%), sweet whey powder, yoghurt powder (6%), glucose syrup, potassium phosphate, cream powder, calcium phosphate, release agents: silicon dioxide; flavouring, magnesium hydroxide, milk protein, ascorbic acid (vitamin C), sweeteners: steviol glycosides; iron diphosphate, nicotinamide, DL-alpha-tocopheryl acetate (vitamin E), retinyl acetate (vitamin A), calcium-D-pantothenate (pantothetic acid), zinc oxide, manganese sulfate, cyanocobalamin (vitamin B12), pyridoxine hydrochloride (vitamin B6), cholecalciferol (Vitamin D3), thiamin hydrochloride (Vitamin B1), riboflavin (vitamin B2), sodium selenide, pteroylmonoglutamic acid(folic acid), potassium iodine, D-biotin, copper carbonate, phylloquinone (vitamin K1).

Nutritional values per 100 g: fat 13 g, carbohydrates 28 g thereof sugar 16 g, protein 43 g, salt 1,9 g

additionally:
Maltodextrin

Amino acids

L-Alanine	1,7	%	L-Lysine	2,4	%
L-Arginine	2,7	%	L-Methionine	0,59	%
L-Aspartic acid	4,6	%	L-Phenylalanine	2,1	%
L-Cystine	0,47	%	L-Proline	2,4	%
L-Glutamic acid	8,1	%	L-Serine	2,2	%
Glycine	1,6	%	L-Threonine	1,6	%
L-Histidine	1,0	%	L-Tryptophan	0,42	%
L-Isoleucine	1,9	%	L-Tyrosine	1,4	%
L-Leucine	3,4	%	L-Valine	2,1	%

Note: *The metrological traceability of temperature, mass and volume during production of the PT samples is ensured by DAkkS calibrated reference materials.*

2.1.1 Homogeneity

The **mixture homogeneity before bottling** was examined 8-fold by **microtracer analysis**. It is a standardized method that is part of the international GMP certification system for feed [14].
Before mixing dye coated iron particles of µm size are added to the sample and the number of particles is determined after homogenization in taken aliquots. The evaluation of the mixture homogeneity is based on the Poisson distribution using the chi-square test. A probability of ≥ 5 % is equivalent to a good homogeneous mixture and of ≥ 25% to an excellent mixture [14, 15].
The microtracer analysis of the present PT sample showed a probability of 80%. Additionally, particle number results were converted into concentrations, statistically evaluated according to normal distribution and compared to the standard deviation according to Horwitz. For the assessment HorRat values between 0,3 and 1,3 are to be accepted under repeat conditions (measurements within the laboratory) [16, 17]. This gave a HorRat value of 0,91. The results of microtracer analysis are given in the documentation.

The calculation of the **repeatability standard deviation S_r of the participants** was also used as an indicator of homogeneity. For all analytes it ranges from 1,34% to 8,95%. Therefore, the repeatability standard deviations are similar to precision data of the referring standardized methods (e.g. ASU §64, s. 3.6.2) (see Tab. 3) [18-20]. The repeatability standard deviations of the participants' results are given in the tables of statistic data (see 4.1 to 4.18).

Table 2: Repeatability standard deviation S_r of double determinations of the participants (coefficient of variation CV_r in %)

Parameter	CV_r	Parameter	CV_r
L-Alanine	1,45 %	L-Lysine	1,96 %
L-Arginine	2,33 %	L-Methionine	3,30 %
L-Aspartic acid	1,56 %	L-Phenylalanine	1,88 %
L-Cystine	5,37 %	L-Proline	4,39 %
L-Glutamic acid	5,65 %	L-Serine	8,95 %
Glycine	5,32 %	L-Threonine	2,63 %
L-Histidine	4,35 %	L-Tryptophan	2,59 %
L-Isoleucine	1,52 %	L-Tyrosine	3,62 %
L-Leucine	2,31 %	L-Valine	1,34 %

Furthermore, the homogeneity was graphically characterised for information by the **trend line function of participants' results for chronological bottled single samples** (s. 5.2.1).

In case the criterion for sufficient homogeneity of the test items is not fulfilled the impact on the target standard deviation will be verified. If necessary the evaluation of results will be done considering the standard uncertainty of the assigned value by z'-scores (s. 3.8 and 3.11) [3].

2.1.2 Stability

An water activity (a_W) of < 0,5 is an important factor to ensure the stability of dry or dried products during storage. Optimum conditions for storage is the a_W value range of 0,15 - 0,3. In this range the lowest possible degradation rate is to be expected [16].

The experience with various DLA test materials showed good storage stability with respect to the durability of the sample (spoilage) and the content of the PT parameters for comparable food matrices and activity of water (a_W value <0,5).

The a_W value of the PT samples was approx. 0,48 (24,3°C). The stability of the sample material was thus ensured during the investigation period under the specified storage conditions.

2.2 Sample shipment and information to the test

Two portions of test material were sent to every participating laboratory in the 36th week of 2020. The testing method was optional. The tests should be finished at 30th October 2018 the latest.

With the cover letter along with the sample shipment the following information was given to participants:

The two portions contain identical samples of a dietetic food (drink powder as a meal replacement) with a protein content <20% from soy and milk protein. Parameters to be determined are amino acids after protein hydrolysis. The analysis method is optional.

Please note the attached information on the proficiency test.
(see documentation, section 5.4 Information on the PT)

2.3 Submission of results

The participants submitted their results in standard forms, which have been handed out with the samples (by email).

The finally calculated concentrations of the parameter as average of duplicate determinations of both numbered samples were used for the statistical evaluation. For the calculation of the repeatability- and reproducibility standard deviation the single values of the double determination were used.

Queried and documented were single results, recovery and the used testing methods. In case participants submitted several results for the same parameter obtained by different methods these results were evaluated with the same evaluation number with a letter as a suffix and indication of the related method.

12 out of 15 participants submitted their results in time. Three participants have not submitted any results.

3. Evaluation

3.1 Consensus value from participants (assigned value)

The robust mean of the submitted results was used as assigned value (X_{pt}) („consensus value from participants") providing a normal distribution. The calculation was done according to algorithm A as described in annex C of ISO 13528 [3]. If there are < 12 quantitative results and an increased difference between robust mean and median, the median may be used as the assigned value (criterion: Δ median - rob. mean > 0,3 σ_{pt}) [3].

The condition is that the majority of the participants' results show a normal distribution or are distributed unimodal and symmetrically. To this end, an examination of the distribution is carried out, inter alia, using the kernel density estimate [3, 12].

In case there are indications for sources of higher variability such as a bimodal distribution of results, a cause analysis is performed. Frequently different analytical methods may cause an anomaly in results' distribution. If this is the case, separate evaluations with own assigned values (X_{pti}) are made whenever possible.

The statistical evaluation is carried out for all the parameters for a minimum of 7 values are present, in justified cases, an evaluation may also be carried out from 5 results onwards.

The actual measurement results will be drafted. Individual results, which are outside the specified measurement range of the participating laboratory (for example with the result > 25 mg/kg or < 2,5 mg/kg) or the indicating "0" will not be considered for the statistic evaluation [3].

3.2 Robust standard deviation

For comparison to the target standard deviation σ_{pt} (standard deviation for proficiency assessment) a robust standard deviation (S^x) was calculated. The calculation was done according to algorithm A as described in annex C of ISO 13528 [3].

3.3 Repeatability standard deviation

The repeatability standard deviation S_r is based on the laboratory´s standard deviation of (outlier free) individual participant results, each under repeatability conditions, that means analyses was performed on the same sample by the same operator using the same equipment in the same laboratory within a short time. It characterizes the mean deviation of the results within the laboratories [3] and is used by DLA as an indication of the homogeneity of the sample material.

In case single results from participants are available the calculation of the repeatability standard deviation S_r, also known as standard deviation within laboratories S_w, is performed by: [3, 4].

The relative repeatability standard deviation as a percentage of the mean value is indicated as coefficient of variation CV_r in the table of stat-

istical characteristics in the results section in case single results from participants are available.

3.4 Reproducibility standard deviation

The reproducibility standard deviation S_R represents a inter-laboratory estimate of the standard deviation for the determination of each parameter on the bases of (outlier free) individual participant results. It takes into account both the repeatability standard deviation S_r and the within-laboratory standard deviation S_S. Reproducibility standard deviations of PT´s may differ from reproducibility standard deviations of ring trials, because the participating laboratories of a PT generally use different internal conditions and methods for determining the measured values.
In the present evaluation, the specification of the reproducibility standard deviation, therefore, does not refer to a specific method, but characterizes approximately the comparability of results between the laboratories, assumed the effect of homogeneity and stability of the sample are negligible.

In case single results from participants are available the calculation of the reproducibility standard deviation S_R is performed by: [3, 4].

The relative reproducibility standard deviation CV_R in percent of the mean is given as variation coefficient in the statistical data of participant for each parameter. The significance of CV_R is further explained in section 3.9.

3.5 Exclusion of results and outliers

Before statistical evaluation obvious blunders, such as those with incorrect units, decimal point errors, too few significant digits (valid digits) or results for another proficiency test item can be removed from the data set [2]. Even if a result e.g. with a factor >10 deviates significantly from the mean and has an influence on the robust statistics, a result of the statistical evaluation can be excluded [3].
All results should be given at least with 2 significant digits. Specifying 3 significant digits is usually sufficient.

Results obtained by different analytical methods causing an increased variability and/or a bi- or multimodal distribution of results, are treated separately or could be excluded in case of too few numbers of results. For this results are checked by kernel density estimation [3, 12].

Results are tested for outliers by the use of robust statistics (algorithm A): If a value deviates from the robust mean by more than 3 times the robust standard deviation, it can be classified as an outlier (see above) [3]. Due to the use of robust statistics outliers are not excluded, provided that no other reasons are present [3]. Detected outliers are only mentioned in the results section, if they have been excluded from the statistical evaluation.

3.6 Target standard deviation (for proficiency assessment)

The target standard deviation of the assigned value σ_{pt} (= standard deviation for proficiency assessment) can be determined according to the following methods.

If an acceptable quotient S^*/σ_{pt} is present, the target standard deviation of the general model by Horwitz is preferably used for the proficiency assessment. It is usually suitable for evaluation of interlaboratory studies, where different methods are applied by the participants. On the other hand the target standard deviation from the evaluation of precision data of an precision experiment is derived from collaborative studies with specified analytical methods.

In cases where both above-mentioned models are not suitable, the target standard deviation is determined based on values by perception, see under 3.6.3.

For information, the z-scores of both models are given in the evaluation, if available.

For the valuation of the following parameters the target standard deviation from precision experiments (s. 3.6.2) (German official ASU §64 methods) was applied for all amino acids but L-Phenylalanine. For valuation of L-Phenylalanine the target standard deviation according to the general model of Horwitz was applied (see 3.6.1).

Additionally, for L-Alanine, L-Glutamic acid, L-Isoleucine, L-Phenylalanine, L-Serine, L-Tryptophan and L-Valine the standard uncertainty was considered by evaluation using z'-scores (see 3.6.8).

3.6.1 General model (Horwitz)

Based on statistical characteristics obtained in numerous PTs for different parameters and methods Horwitz has derived a general model for estimating the reproducibility standard deviation σ_R [6]. Later the model was modified by Thompson for certain concentration ranges [10]. The reproducibility standard deviation σ_R can be applied as the relative target standard deviation σ_{pt} in % of the assigned values and calculated according to the following equations [3]. For this the assigned value X_{pt} is used for the concentration c.

Equations	Range of concentrations	corresponds to
$\sigma_R = 0{,}22c$	$c < 1{,}2 \times 10^{-7}$	< 120 µg/kg
$\sigma_R = 0{,}02c^{0{,}8495}$	$1{,}2 \times 10^{-7} \leq c \leq 0{,}138$	≥ 120 µg/kg
$\sigma_R = 0{,}01c^{0{,}5}$	$c > 0{,}138$	> 13,8 g/100g

with c = mass content of analyte (as relative size, e.g. 1 mg/kg = 1 ppm = 10^{-6} kg/kg)

3.6.2 Value by precision experiment

Using the reproducibility standard deviation σ_R and the repeatability standard deviation σ_r of a precision experiment (collaborative trial or proficiency test) the target standard deviation σ_{pt} can be derived considering the number of replicate measurements m of participants in the present PT [3]:

$$\sigma_{pt} = \sqrt{\sigma_R^2 - \sigma_r^2 \left(m - 1 / m \right)}$$

The values given in Table 3 relative repeatability standard deviation (RSD_r) and relative reproducibility standard deviation (RSD_R) were determined in collaborative trials using the specified methods. The in the table indicated resulting target standard deviation σ_{pt} is additionally given in the evaluation for information.

Table 3: Relative repeatability standard deviations (RSD_r) and relative reproducibility standard deviations (RSD_R) from precision experiments and resulting target standard deviations σ_{pt} [18-20]

Parameter	**Matrix**	**Mean [g/100g]**	**RSD_r**	**RSD_R**	**σ_{pt}**	**Method / Literature**
L-Alanine	Dietetic food	2,15	2,33%	5,12%	4,8% [1]	ASU 49.07-2
L-Arginine	Dietetic food	1,86	2,69%	6,99%	6,7% [1]	ASU 49.07-2
L-Aspartic acid	Dietetic food	4,16	1,92%	7,45%	7,3% [1]	ASU 49.07-2
L-Cysteine / L-Cystine	Dietetic food Protein concen-trate	1,07 0,506	5,61% 2,6%	15,0% 12,3%	14,5% [1] 12,2%	ASU 49.07-2 Reg 152/ 2009/EC
L-Glutamic acid	Dietetic food	4,72	1,91%	5,08%	4,9% [1]	ASU 49.07-2
Glycine	Dietetic food	1,60	2,50%	6,88%	6,6% [1]	ASU 49.07-2
L-Histidine	Dietetic food	1,10	2,73%	10,90%	10,7% [1]	ASU 49.07-2
L-Isoleucine	Dietetic food	1,91	2,09%	5,24%	5,0% [1]	ASU 49.07-2
L-Leucine	Dietetic food	3,09	1,62%	5,50%	5,4% [1]	ASU 49.07-2
L-Lysine	Dietetic food Protein concen-trate	3,61 4,77	1,94% 2,4%	8,95% 3,0%	8,8% [1] 2,5%	ASU 49.07-2 Reg 152/ 2009/EC
L-Methionine	Dietetic food Protein concen-trate	1,30 1,2	5,38% 2,2%	7,69% 13%	6,7% [1] 12,9%	ASU 49.07-2 Reg 152/ 2009/EC
L-Phenylalan-ine	Dietetic food	-	-	-	-	ASU 49.07-2
L-Proline	Dietetic food	2,33	3,00%	8,15%	7,9% [1]	ASU 49.07-2
L-Serine	Dietetic food	2,28	2,63%	4,82%	4,4% [1]	ASU 49.07-2
L-Threonine	Dietetic food Protein concen-trate	2,74 2,23	2,19% 2,7%	5,84% 3,8%	5,6% [1] 3,3%	ASU 49.07-2 Reg 152/ 2009/EC
L-Tryptophan	Dietetic food	0,30/0,24	3,75%	7,50%	7,0% [1]	ASU 49.07-3
L-Tyrosine	Dietetic food	3,05	2,62%	6,89%	6,6% [1]	ASU 49.07-2
L-Valine	Dietetic food	2,48	2,02%	6,05%	5,9% [1]	ASU 49.07-2

[1] *used/given in evaluation (s. chapter 4)*

3.6.3 Value by perception

The target standard deviation for proficiency assessment can be set at a value that corresponds to the level of performance that the coordinator would wish laboratories to be able to achieve [3].

For the present evaluation the target standard deviation according to 3.6.1 or 3.6.2 was regarded suitable.

Table 4 shows selected statistic data of participants results of present PT compared to PT results of previous years.

3.7 z-Score

To assess the results of the participants, the z-score is used. It indicates about which multiple of the target standard deviation (σ_{pt}) the result (x_i) of the participant is deviating from the assigned value (X_{pt}) [3].
Participants' z-scores are derived from:

$$z_i = \frac{\left(x_i - x_{pt}\right)}{\sigma_{pt}}$$

The requirements for the analytical performance are generally considered as fulfilled if

$$-2 \leq z \leq 2 \ .$$

The valid z-Score for each parameter is indicated as z-Score (σ_{pt}). The value indicated as z-Score (Info) only obtains a informative character. The both z-Scores were calculated with the different target standard deviations in accordance with 3.6.

3.7.1 Warning and action signals

In accordance with the norm ISO 13528 it is recommended that a result that gives rise to a *z*-score above 3,0 or below −3,0, shall be considered to give an "action signal" [3]. Likewise, a *z*-score above 2,0 or below −2,0 shall be considered to give a "warning signal". A single "action signal", or "warning signal" in two successive PT-rounds, shall be taken as evidence that an anomaly has occurred which requires investigation. For example a fault isolation or a root cause analysis through the examination of transmission error or an error in the calculation, in the trueness and precision must be performed and if necessary appropriate corrective measures should be applied [3].

In the figures of z-scores DLA gives the limits of warning and action signals as yellow and red lines respectively. According to ISO 13528 the

signals are valid only in case of a number of ≥ 10 results [3].

Table 4: Characteristics of the present PT (on dark grey) in comparison to previous PTs since 2016 (SD = standard deviation, CV = coefficient of variation).

Parameter	Matrix (powder)	robust Mean [g/100g]	rob. SD (S*) [g/100g]	rel. SD (CV_{S*}) [%]	Quotient S^*/σ_{pt}	DLA-Report
L-Alanine	Dietetic food	1,70	0,0562	3,31	0,90	DLA 59/2016
L-Alanine	Dietetic food	0,593	0,0528	8,91	1,9	DLA 50/2018
L-Alanine	Dietetic food	1,68	0,176	10,5	1,7 [1]	DLA ptSU09/2020
L-Arginine	Dietetic food	2,72	0,218	8,01	1,2	DLA 59/2016
L-Arginine	Dietetic food	0,524	0,0511	9,75	1,5	DLA 50/2018
L-Arginine	Dietetic food	2,67	0,285	10,7	1,6	DLA ptSU09/2020
L-Aspartic acid	Dietetic food	4,55	0,130	2,86	0,90	DLA 59/2016
L-Aspartic acid	Dietetic food	1,38	0,131	9,49	1,3	DLA 50/2018
L-Aspartic acid	Dietetic food	4,58	0,583	12,7	1,7	DLA ptSU09/2020
L-Cystine	Dietetic food	0,487	0,133	27,3	1,9	DLA 59/2016
L-Cystine	Dietetic food	0,165	0,0229	13,9	0,9	DLA 50/2018
L-Cystine	Dietetic food	0,467	0,105	22,5	1,6	DLA ptSU09/2020
L-Glut-amic acid	Dietetic food	8,29	0,502	6,05	1,2	DLA 59/2016
L-Glut-amic acid	Dietetic food	3,52	0,253	7,17	1,3	DLA 50/2018
L-Glut-amic acid	Dietetic food	8,14	0,880	10,8	1,7 [1]	DLA ptSU09/2020
Glycine	Dietetic food	1,54	0,0933	6,06	1,6	DLA 59/2016
Glycine	Dietetic food	0,325	0,0300	9,20	1,9	DLA 50/2018
Glycine	Dietetic food	1,55	0,186	12,0	1,8	DLA ptSU09/2020
L-Histid-ine	Dietetic food	1,10	0,0915	8,32	0,8	DLA 59/2016
L-Histid-ine	Dietetic food	0,429	0,0485	11,3	1,1	DLA 50/2018
L-Histid-ine	Dietetic food	1,03	0,164	15,9	1,5	DLA ptSU09/2020

Parameter	Matrix (powder)	robust Mean [g/100g]	rob. SD (S*) [g/100g]	rel. SD (CV_{S*}) [%]	Quotient S^*/σ_{pt}	DLA-Report
L-Isoleucine	Dietetic food	1,94	0,173	8,92	1,8	DLA 59/2016
L-Isoleucine	Dietetic food	0,862	0,0635	7,37	1,3	DLA 50/2018
L-Isoleucine	Dietetic food	1,94	0,310	16,0	2,0 [1]	DLA ptSU09/2020
L-Leucine	Dietetic food	3,45	0,248	7,19	1,3	DLA 59/2016
L-Leucine	Dietetic food	1,61	0,104	6,47	1,2	DLA 50/2018
L-Leucine	Dietetic food	3,37	0,314	9,3	1,7	DLA ptSU09/2020
L-Lysine	Dietetic food	2,71	0,168	6,20	1,8	DLA 59/2016
L-Lysine	Dietetic food	1,33	0,0968	7,30	0,8	DLA 50/2018
L-Lysine	Dietetic food	2,43	0,293	12,1	1,4	DLA ptSU09/2020
L-Methionine	Dietetic food	0,572	0,0608	10,6	1,6	DLA 59/2016
L-Methionine	Dietetic food	0,398	0,0486	12,2	1,5	DLA 50/2018
L-Methionine	Dietetic food	0,588	0,0840	14,3	2,1	DLA ptSU09/2020
L-Phenylalanine	Dietetic food	2,14	0,144	6,73	1,9	DLA 59/2016
L-Phenylalanine	Dietetic food	0,761	0,0551	7,24	1,7	DLA 50/2018
L-Phenylalanine	Dietetic food	2,12	0,211	10,0	1,9 [1]	DLA ptSU09/2020
L-Proline	Dietetic food	2,42	0,161	6,65	0,85	DLA 59/2016
L-Proline	Dietetic food	1,54	0,0726	4,71	0,60	DLA 50/2018
L-Proline	Dietetic food	2,41	0,294	12,2	1,6	DLA ptSU09/2020
L-Serine	Dietetic food	2,23	0,110	4,93	1,4	DLA 59/2016
L-Serine	Dietetic food	0,897	0,0739	8,24	1,5	DLA 50/2018
L-Serine	Dietetic food	2,18	0,209	9,6	1,7 [1]	DLA ptSU09/2020
L-Threonine	Dietetic food	1,60	0,0914	5,71	1,5	DLA 59/2016

Parameter	Matrix (powder)	robust Mean [g/100g]	rob. SD (S*) [g/100g]	rel. SD (CV_{S*}) [%]	Quotient S^*/σ_{pt}	DLA-Report
L-Threonine	Dietetic food	0,761	0,0516	6,79	1,2	DLA 50/2018
L-Threonine	Dietetic food	1,57	0,171	10,9	1,9	DLA ptSU09/2020
L-Tryptophan	Dietetic food	0,563	0,0590	10,5	1,5	DLA 59/2016
L-Tryptophan	Dietetic food	0,213	0,0512	24,0	2,0	DLA 50/2018
L-Tryptophan	Dietetic food	0,416	0,153	36,8	2,0 [1]	DLA ptSU09/2020
L-Tyrosine	Dietetic food	1,56	0,166	10,6	1,6	DLA 59/2016
L-Tyrosine	Dietetic food	0,653	0,0669	10,2	1,4	DLA 50/2018
L-Tyrosine	Dietetic food	1,40	0,181	12,9	1,9	DLA ptSU09/2020
L-Valine	Dietetic food	2,06	0,197	9,56	1,6	DLA 59/2016
L-Valine	Dietetic food	1,01	0,0600	5,92	0,95	DLA 50/2018
L-Valine	Dietetic food	2,14	0,318	14,9	1,8 [1]	DLA ptSU09/2020

[1] *with targed standard deviation σpt'*

3.8 z'-Score

The z'-score can be used for the valuation of the results of the participants, in cases the standard uncertainty has to be considered (s. 3.8). The z'-score represents the relation of the deviation of the result (x) of the participant from the respective consensus value (X) to the square root of quadrat sum of the target standard deviation (σ_{pt}) and the standard uncertainty (Ux_{pt}) [3].

The calculation is performed by:

$$z'_i = \frac{x_i - x_{pt}}{\sqrt{\sigma_{pt}^2 + u_{(x_{pt})}^2}}$$

If carried out an evaluation of the results by means of z 'score, we have defined below the expression in the denominator as a target standard deviation σ_{pt}'.

The requirements for the analytical performance are generally considered as fulfilled if

$$-2 \leq z' \leq 2 \ .$$

For warning and action signals see 3.7.1.

3.9 Reproducibility cofficient of variation (CV_R)

The variation coefficient (CV) of the reproducibility (= *relative reproducibility standard deviation)* is calculated from the standard deviation and the mean as follows [4, 13]:

$$CV_R = \frac{S_R * 100}{X}$$

In contrast to the standard deviation as a measure of the absolute variability the CV gives the relative variability within a data region. While a low CV, e.g. <5-10% can be taken as evidence for a homogeneous set of results, a CV of more than 50% indicates a "strong inhomogeneity of statistical mass", so that the suitability for certain applications such as the assessment of exceeded maximum levels or the performance evaluation of the participating laboratories possibly can not be done [3].

3.10 Quotient S*/σ_{pt}

Following the HorRat-value the results of a proficiency-test (PT) can be considered convincing, if the quotient of robust standard deviation S* and target standard deviation σ_{pt} does not exceed the value of 2.
A value > 2 means an insufficient precision, i.e. the analytical method is too variable, or the variation between the test participants is higher than estimated. Thus the comparability of the results is not given [3].

3.11 Standard uncertainty of the assigned value

Every assigned value has a standard uncertainty that depends on the analytical method, differences between the analytical methods used, the test material, the number of participating laboratories (P) and on other factors. The standard uncertainty ($U_{(Xpt)}$) for this PT is calculated as follows [3]:

$$u_{(x_{pt})} = 1{,}25 \times \frac{s^*}{\sqrt{p}}$$

If $U_{(Xpt)} \leq 0{,}3\ \sigma_{pt}$ the standard uncertainty of the assigned value needs not to be included in the interpretation of the results of the PT [3]. Values exceeding 0,3 imply, that the target standard deviation could be too low with respect to the standard uncertainty of the assigned value.

The traceability of the assigned value is ensured on the basis of the consensus value as a robust mean of the participant results.

4. Results

Comments to the distribution of the results:

The kernel density plots showed for all parameters nearly a symmetrical distribution of results (figures see documentation 5.3). Partly slight shoulders and separated smaller peaks can be seen, which are due to individual results, outliers or values outside the target range.

Comments to the statistic data:

For all parameters except from L-Phenylalanine, the standard deviation calculated from precision data were used (German official methods ASU §64). For L-Phenylalanine, the standard deviation was calculated according to the model of Horwitz. For information, the standard deviation calculated according to the model of Horwitz is also stated in the respective tables.

The submitted results of Cystine, Cysteine and the sum of Cystine and Cysteine were statistically evaluated together. Therefore, the results of Cystein were converted by DLA via the molar mass of Cysteine (121,16 g/mol) to half of the molar mass of Cystin (0,5 x 240,30 g/mol = 120,15 g/mol).

For L-Alanine, L-Glutamic acid, L-Isoleucine, L-Phenylalanine, L-Serine und L-Valine the distribution of results showed an increased variability with a quotient above 2,0. Therefore, these results were evaluated considering the standard uncertainty by z´-scores. The quotients S^*/σ_{pt}' then were near a ratio of 2,0. Other parameters' distribution of results showed a normal variability. The quotients S^*/σ_{pt} were in the range of 1,4 to 2,1 (see table 4).

The robust standard deviation and the repeatability and reproducibility standard deviations were in the expected range of usual values for the used determination methods (s. 3.6.2).

The comparability of results is given.

64% to 91% of results were in the respective target range.

All following tables are anonymized. With the delivering of the evaluation report the participants are informed about their individual evaluation number.

In the first table the characteristics are listed:

Statistic Data
Number of results
Number of outliers
Mean
Median
Robust mean(X_{pt})
Robust standard deviation (S^*)
Number with m replicate measurements
Repeatability standard deviation (S_r)
Coefficient of Variation (CV_r)in %
Reproducibility standard deviation (S_R)
Coefficient of Variation (CV_R)in %
Target range:
Target standard deviation σ_{pt} or σ_{pt}'
Target standard deviation for information
lower limit of target range ($X_{pt} - 2\sigma_{pt}$) or ($X_{pt} - 2\sigma_{pt}$') *
upper limit of target range ($X_{pt} + 2\sigma_{pt}$) or ($X_{pt} + 2\sigma_{pt}$´) *
Quotient S/σ_{pt} or S*/σ_{pt}'*
Standard uncertainty U(X_{pt})
Number of results in the target range
Percent in the target range

* Target range is calculated with z-score or z'-score

In the table below, the results of the participating laboratories are formatted in 3 valid digits**:

Auswerte-nummer	**Parameter [Einheit / Unit]**	**Abweichung**	**z-Score σpt**	**z-Score** (Info)	**Hinweis**
Evaluation number		**Deviation**			**Remark**

*** In the documentation part, the results are given as they were transmitted by the participants.*

4.1 L-Alanin/L-Alanine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	1,68
Median	1,70
Robust Mean (X)	**1,68**
Robust standard deviation (S*)	**0,176**
Number with 2 replicates	11
Repeatability SD (S_r)	0,0244
Repeatability (CV_r)	1,45%
Reproducibility SD (S_R)	0,165
Reproducibility (CV_R)	9,83%
Target range:	
Target standard deviation σ_{pt}'	**0,105**
Target standard deviation (for Information)	0,0623
lower limit of target range	**1,47**
upper limit of target range	**1,89**
Quotient S/σ_{pt}'*	*1,7*
Standard uncertainty $U_{(Xpt)}$	*0,0662*
Quotient $U_{(Xpt)}/\sigma_{pt}$'	*0,63*
Results in the target range	*10*
Percent in the target range	*91%*

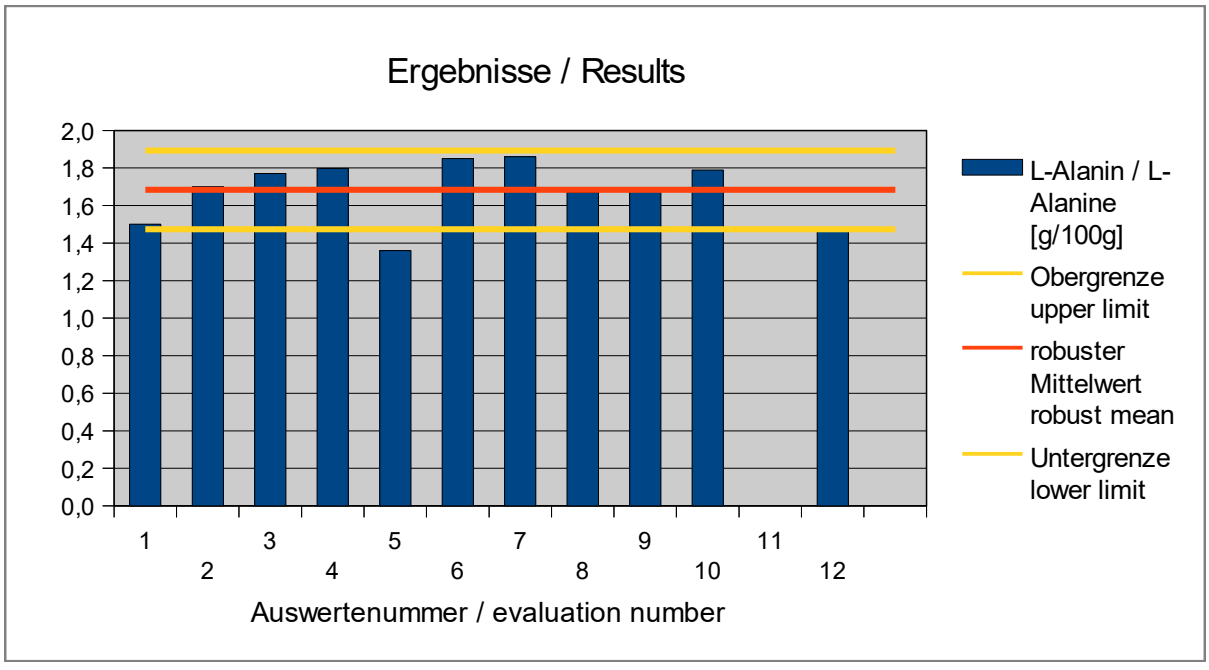


Abb. / Fig. 1: Ergebnisse L-Alanin / Results L-Alanine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Alanin / L-Alanine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z'-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	1,50	-0,183	-1,7	-2,9	
2	1,70	0,017	0,16	0,27	
3	1,77	0,087	0,82	1,4	
4	1,80	0,114	1,1	1,8	
5	1,36	-0,323	-3,1	-5,2	
6	1,85	0,167	1,6	2,7	
7	1,86	0,177	1,7	2,8	
8	1,67	-0,013	-0,13	-0,2	
9	1,69	0,007	0,06	0,11	
10	1,79	0,107	1,0	1,7	
11					
12	1,47	-0,213	-2,0	-3,4	

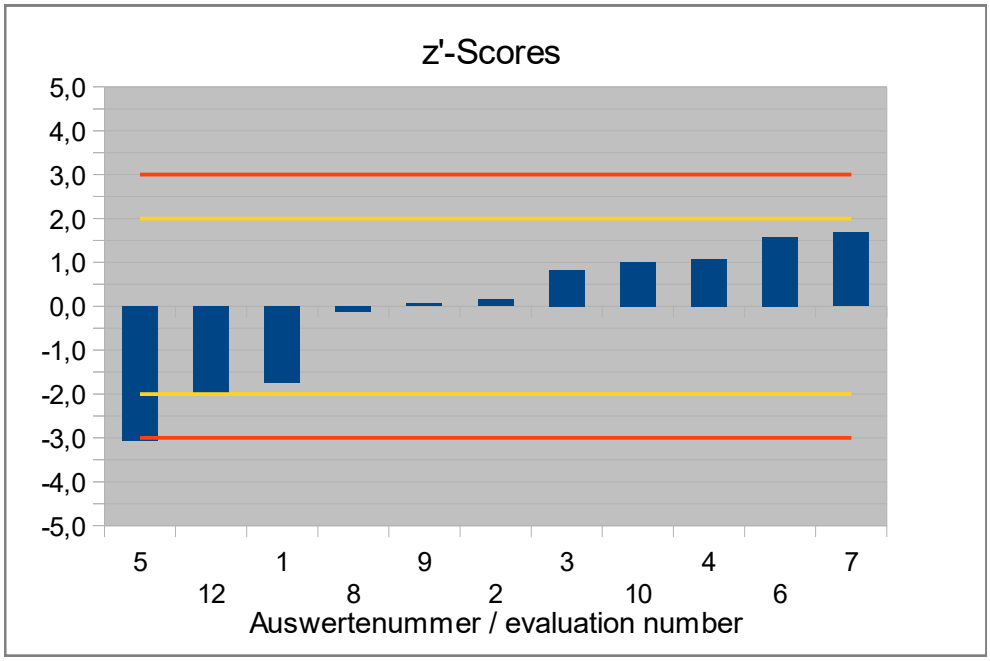


Abb. / Fig. 2: z'-Scores L-Alanin/L-Alanine

4.2 L-Arginin/L-Arginine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	2,63
Median	2,72
Robust Mean (X)	**2,67**
Robust standard deviation (S*)	**0,285**
Number with 2 replicates	11
Repeatability SD (S_r)	0,0613
Repeatability (CV_r)	2,33%
Reproducibility SD (S_R)	0,343
Reproducibility (CV_R)	13,1%
Target range:	
Target standard deviation σ_{pt}	**0,179**
Target standard deviation (for Information)	0,0920
lower limit of target range	**2,31**
upper limit of target range	**3,02**
Quotient S^*/σ_{pt}	*1,6*
Standard uncertainty $U_{(Xpt)}$	*0,107*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,60*
Results in the target range	*10*
Percent in the target range	*91%*

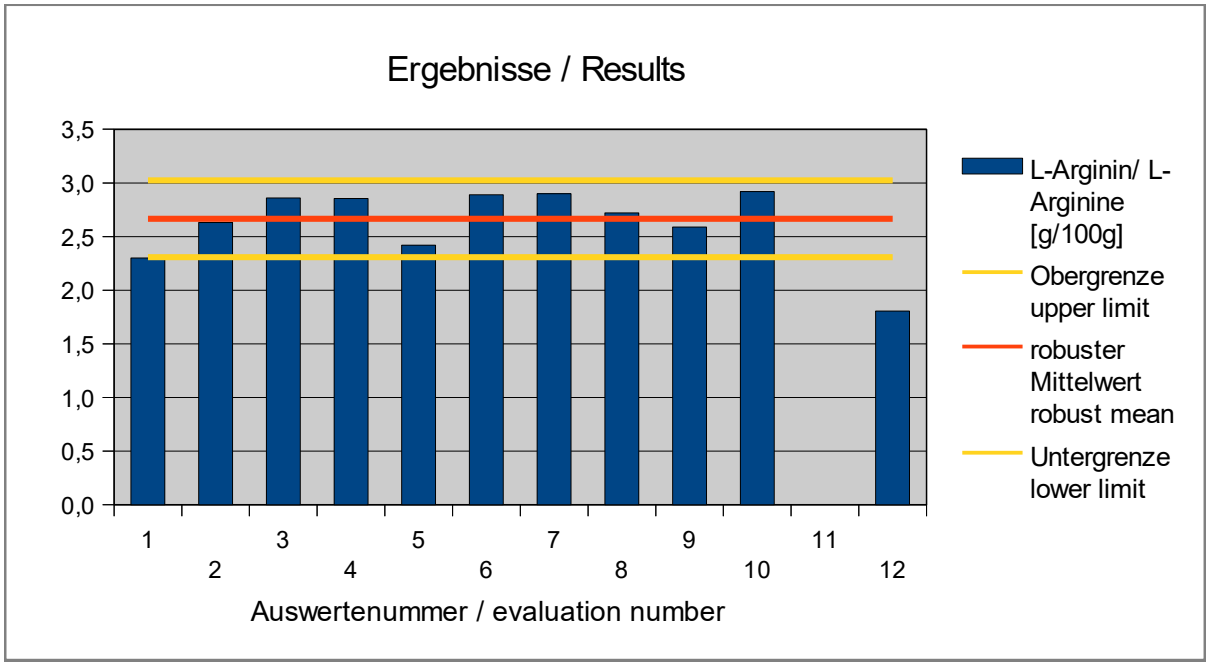


Abb. / Fig. 3: Ergebnisse L-Arginin / Results L-Arginine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Arginin / L-Arginine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	2,30	-0,366	-2,0	-4,0	
2	2,63	-0,036	-0,20	-0,39	
3	2,86	0,194	1,1	2,1	
4	2,86	0,190	1,1	2,1	
5	2,42	-0,246	-1,4	-2,7	
6	2,89	0,224	1,2	2,4	
7	2,90	0,234	1,3	2,5	
8	2,72	0,054	0,30	0,59	
9	2,59	-0,076	-0,4	-0,83	
10	2,92	0,254	1,4	2,8	
11					
12	1,81	-0,859	-4,8	-9,3	

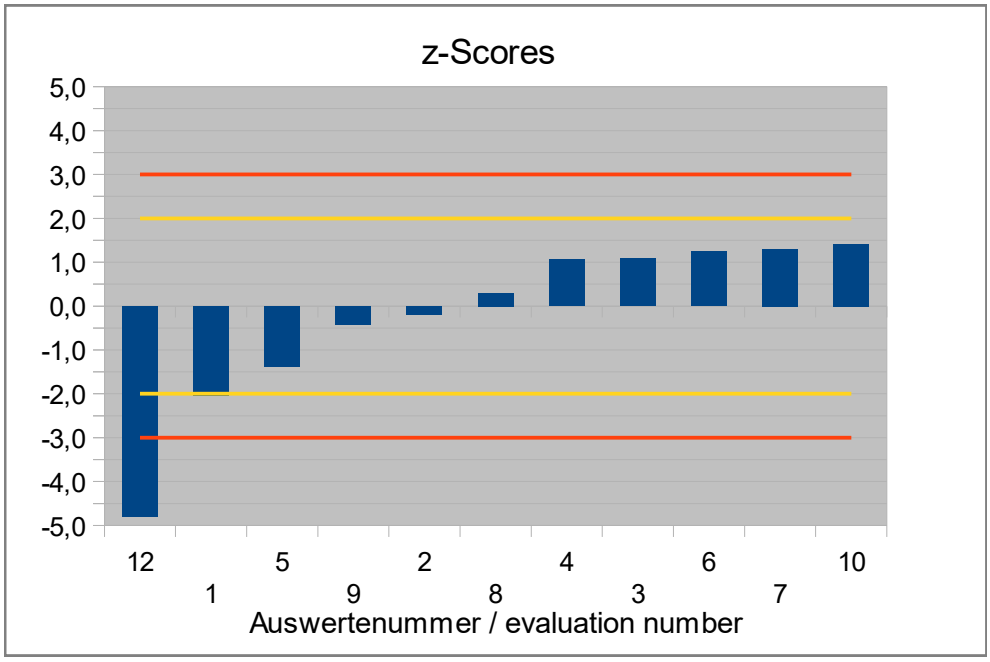


Abb. / Fig. 4: z-Scores L-Arginin/L-Arginine

4.3 L-Asparaginsäure/L-Aspartic acid in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	4,53
Median	4,73
Robust Mean (X)	**4,58**
Robust standard deviation (S*)	**0,583**
Number with 2 replicates	11
Repeatability SD (S_r)	0,0708
Repeatability (CV_r)	1,56%
Reproducibility SD (S_R)	0,627
Reproducibility (CV_R)	13,8%
Target range:	
Target standard deviation σ_{pt}	**0,335**
Target standard deviation (for Information)	0,146
lower limit of target range	**3,91**
upper limit of target range	**5,25**
Quotient S/σ_{pt}*	*1,7*
Standard uncertainty $U_{(Xpt)}$	*0,220*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,66*
Results in the target range	*9*
Percent in the target range	*82%*

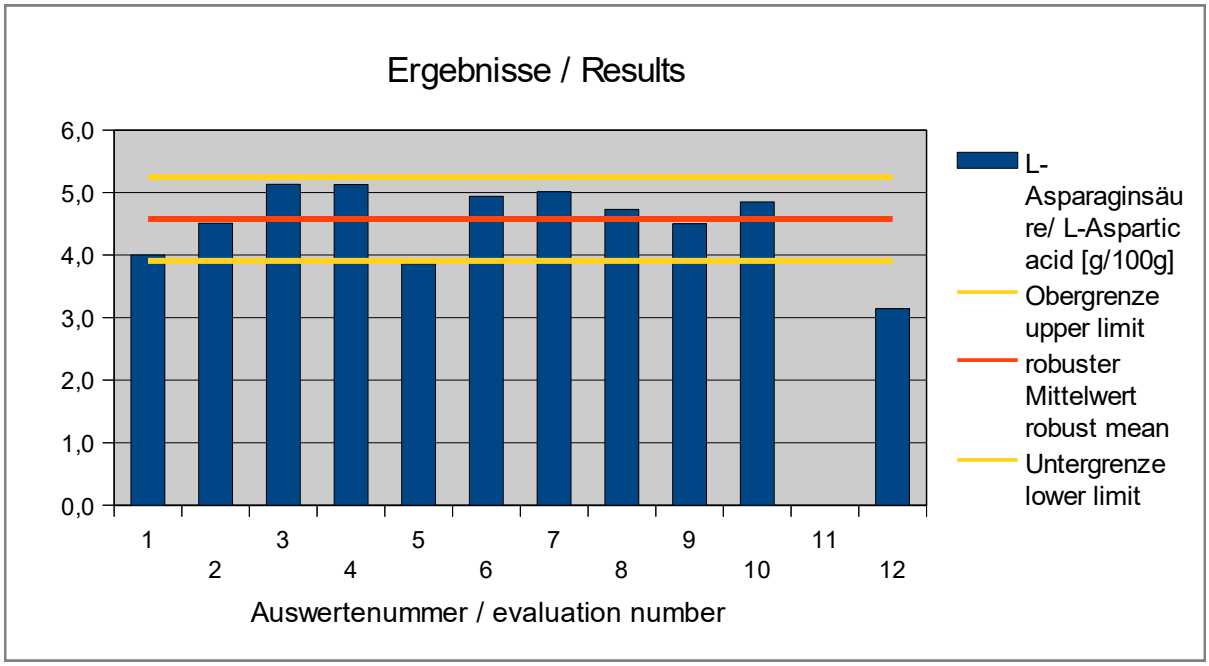


Abb. / Fig. 5: Ergebnisse L-Asparaginsäure / Results L-Aspartic acid

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Asparaginsäure / L-Aspartic acid [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	4,00	-0,578	-1,7	-4,0	
2	4,51	-0,068	-0,20	-0,47	
3	5,13	0,552	1,6	3,8	
4	5,13	0,549	1,6	3,8	
5	3,86	-0,718	-2,1	-4,9	
6	4,94	0,362	1,1	2,5	
7	5,01	0,432	1,3	3,0	
8	4,73	0,152	0,45	1,0	
9	4,50	-0,078	-0,23	-0,54	
10	4,85	0,272	0,81	1,9	
11					
12	3,14	-1,435	-4,3	-9,9	

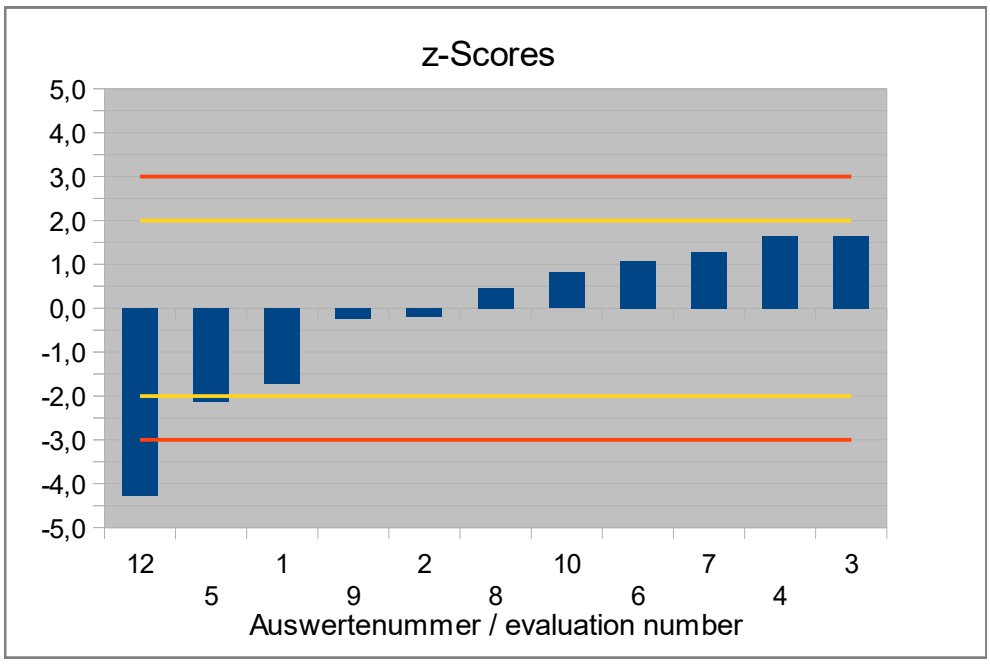


Abb. / Fig. 6: z-Scores L-Asparaginsäure/L-Aspartic acid

4.4 L-Cystine and L-Cysteine in g/100g (as L-Cystine)

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	8
Number of outliers	0
Mean	0,463
Median	0,464
Robust Mean (X)	**0,467**
Robust standard deviation (S*)	**0,105**
Number with 2 replicates	8
Repeatability SD (S_r)	0,0248
Repeatability (CV_r)	5,37%
Reproducibility SD (S_R)	0,101
Reproducibility (CV_R)	21,7%
Target range:	
Target standard deviation σ_{pt}	**0,0676**
Target standard deviation (for Information)	0,0210
lower limit of target range	**0,332**
upper limit of target range	**0,602**
Quotient S/σ_{pt}*	*1,6*
Standard uncertainty $U_{(Xpt)}$	*0,0465*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,69*
Results in the target range	*6*
Percent in the target range	*75%*

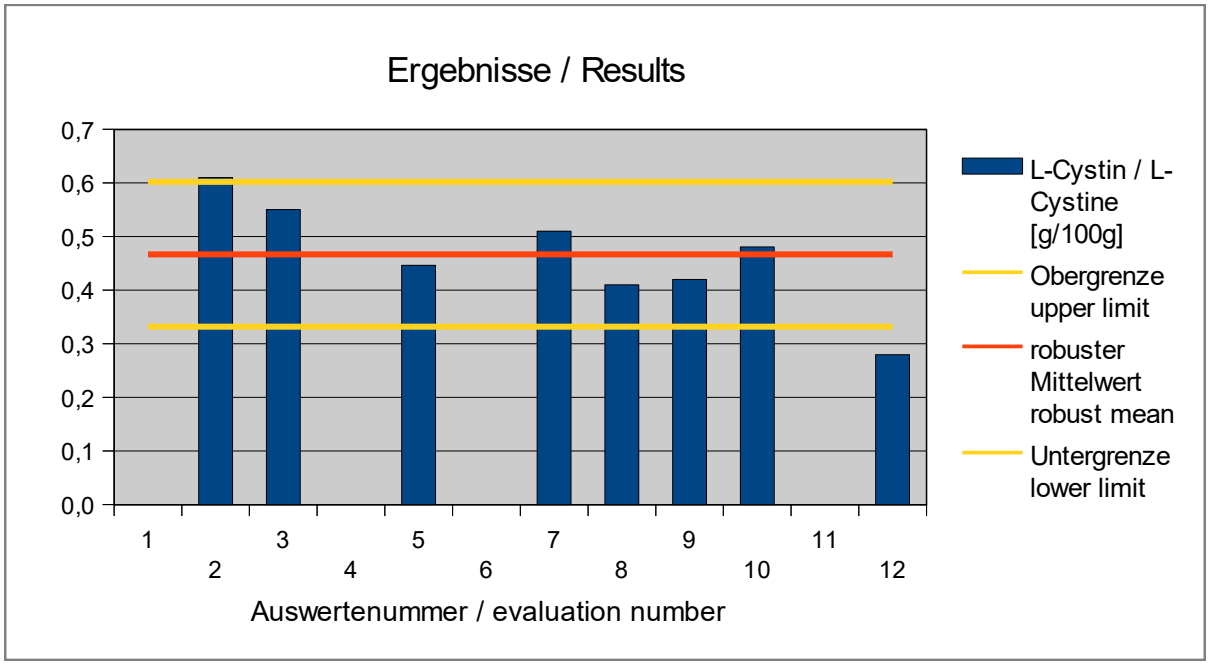


Abb. / Fig. 7: Ergebnisse L-Cystin / Results L-Cysteine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Cystin / L-Cystine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1					
2	0,61	0,143	2,1	6,8	
3	0,55	0,083	1,2	4,0	* result converted
4					
5	0,45	-0,021	-0,31	-1,0	* result converted
6					
7	0,51	0,043	0,63	2,0	
8	0,41	-0,057	-0,85	-2,7	
9	0,42	-0,047	-0,70	-2,2	
10	0,48	0,014	0,20	0,66	* result converted
11					
12	0,28	-0,188	-2,8	-8,9	

* calculation see p.20

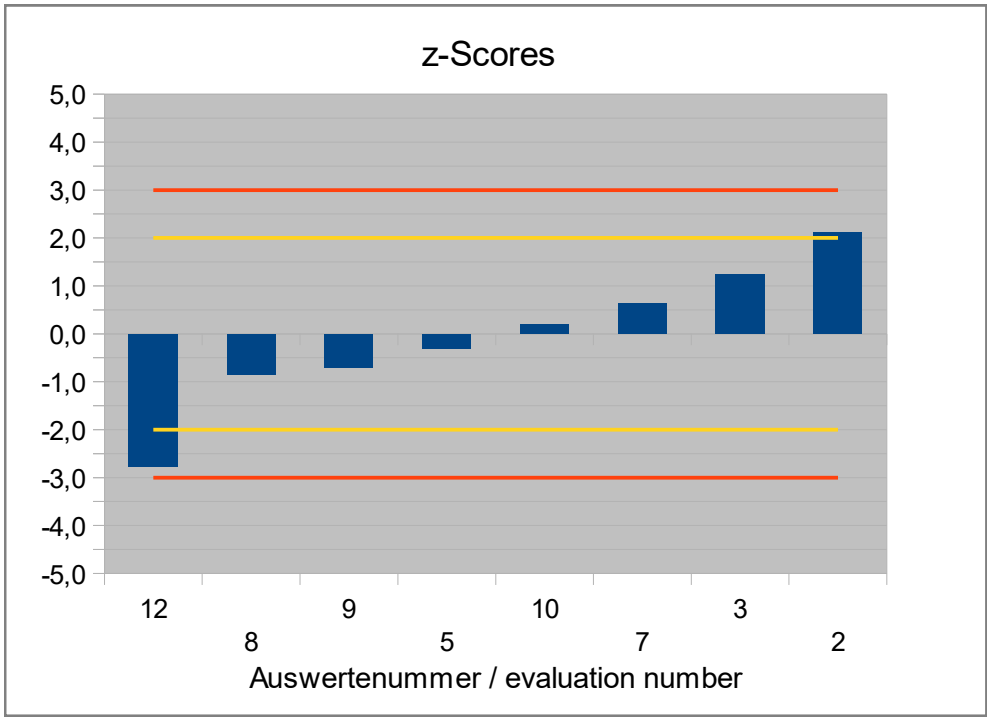


Abb. / Fig. 8: z-Scores L-Cystin / L-Cystine

4.5 L-Glutaminsäure/L-Glutamic acid in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	8,08
Median	8,08
Robust Mean (X)	**8,14**
Robust standard deviation (S*)	**0,880**
Number with 2 replicates	11
Repeatability SD (S_r)	0,456
Repeatability (CV_r)	5,65%
Reproducibility SD (S_R)	0,966
Reproducibility (CV_R)	12,0%
Target range:	
Target standard deviation σ_{pt}'	**0,519**
Target standard deviation (for Information)	0,237
lower limit of target range	**7,10**
upper limit of target range	**9,18**
Quotient S/σ_{pt}'*	*1,7*
Standard uncertainty $U_{(Xpt)}$	*0,332*
Quotient $U_{(Xpt)}/\sigma_{pt}'$	*0,64*
Results in the target range	*10*
Percent in the target range	*91%*

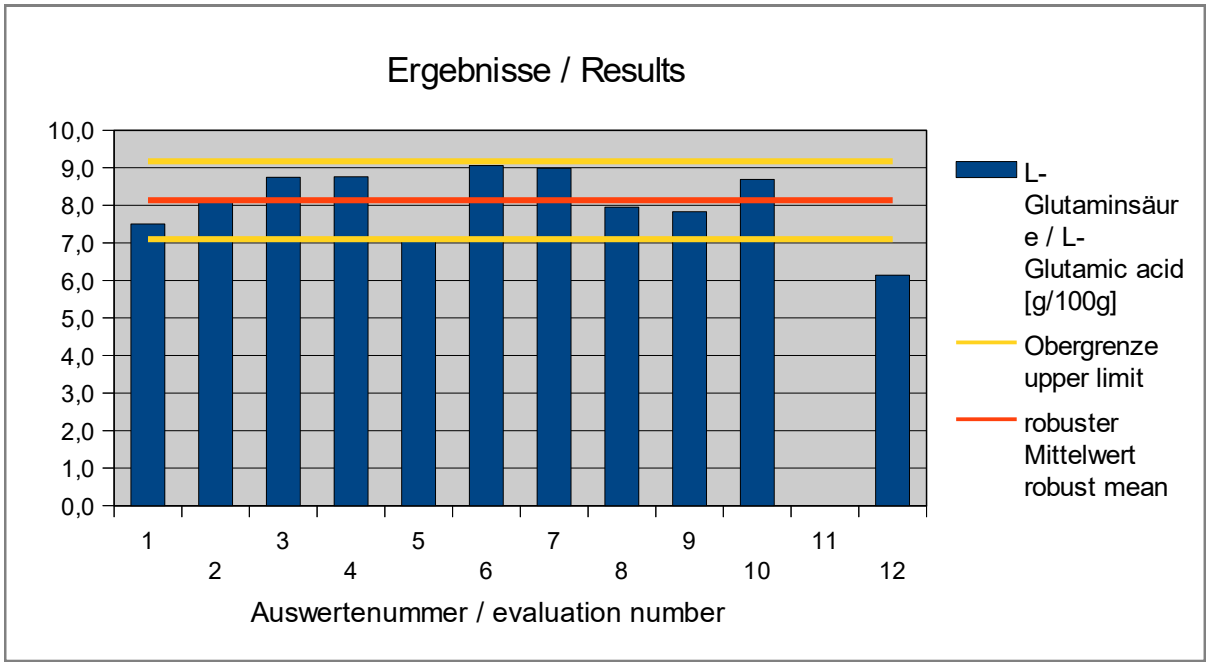


Abb. / Fig. 9: Ergebnisse L-Glutaminsäure / Results L-Glutamic acid

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Glutaminsäure / L-Glutamic acid [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z'-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	7,50	-0,638	-1,2	-2,7	
2	8,08	-0,058	-0,11	-0,24	
3	8,75	0,612	1,2	2,6	
4	8,76	0,622	1,2	2,6	
5	7,09	-1,048	-2,0	-4,4	
6	9,06	0,922	1,8	3,9	
7	8,99	0,852	1,6	3,6	
8	7,95	-0,188	-0,36	-0,79	
9	7,83	-0,308	-0,59	-1,3	
10	8,69	0,552	1,1	2,3	
11					
12	6,14	-1,998	-3,9	-8,4	

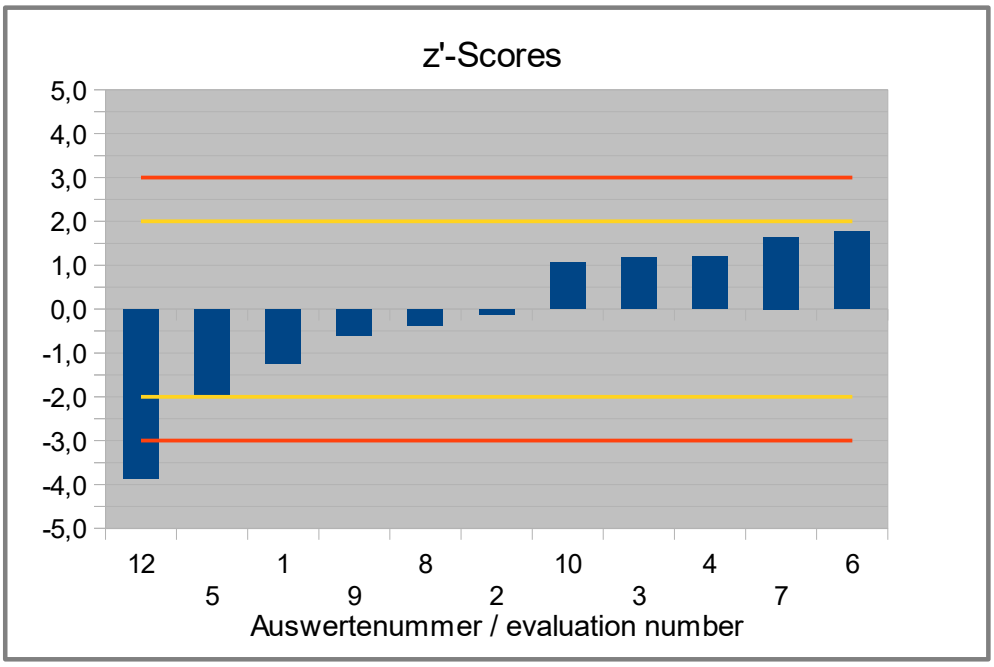


Abb. / Fig. 10: z'-Scores L-Glutaminsäure/L-Glutamic acid

4.6 Glycin/Glycine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	1,54
Median	1,60
Robust Mean (X)	**1,55**
Robust standard deviation (S*)	**0,186**
Number with 2 replicates	11
Repeatability SD (S_r)	0,0819
Repeatability (CV_r)	5,32%
Reproducibility SD (S_R)	0,194
Reproducibility (CV_R)	12,6%
Target range:	
Target standard deviation σ_{pt}	**0,103**
Target standard deviation (for Information)	0,0581
lower limit of target range	**1,35**
upper limit of target range	**1,76**
Quotient S/σ_{pt}*	*1,8*
Standard uncertainty $U_{(Xpt)}$	*0,0701*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,68*
Results in the target range	*9*
Percent in the target range	*82%*

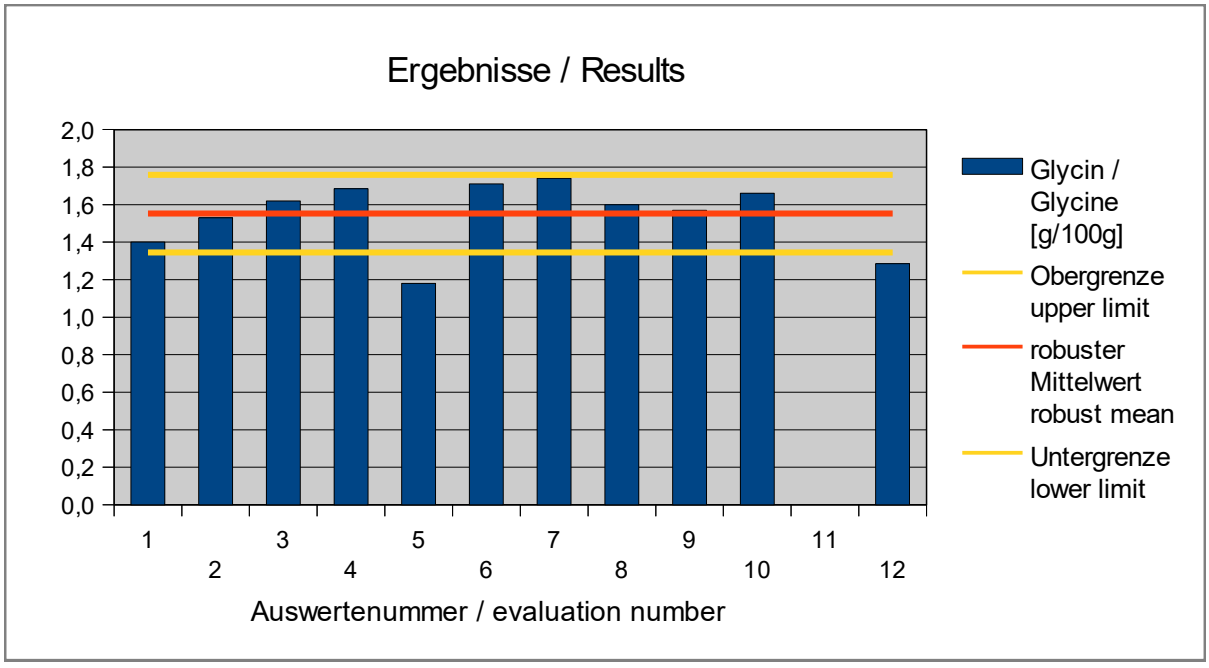


Abb. / Fig. 11: Ergebnisse Glycin/Glycine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	Glycin / Glycine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	1,40	-0,152	-1,5	-2,6	
2	1,53	-0,022	-0,21	-0,38	
3	1,62	0,068	0,66	1,2	
4	1,69	0,133	1,3	2,3	
5	1,18	-0,372	-3,6	-6,4	
6	1,71	0,158	1,5	2,7	
7	1,74	0,188	1,8	3,2	
8	1,60	0,048	0,46	0,82	
9	1,57	0,018	0,17	0,31	
10	1,66	0,108	1,0	1,9	
11					
12	1,29	-0,266	-2,6	-4,6	

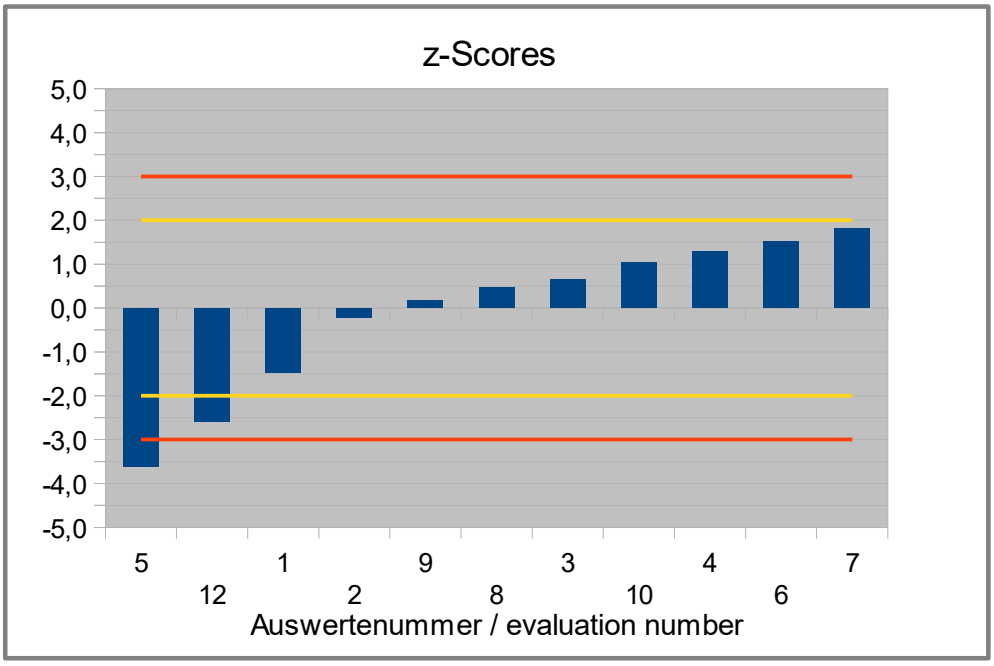


Abb. / Fig. 12: z-Scores Glycin/Glycine

4.7 L-Histidin/L-Histidine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	1,01
Median	1,04
Robust Mean (X)	**1,03**
Robust standard deviation (S*)	**0,164**
Number with 2 replicates	11
Repeatability SD (S_r)	0,0439
Repeatability (CV_r)	4,35%
Reproducibility SD (S_R)	0,186
Reproducibility (CV_R)	18,4%
Target range:	
Target standard deviation σ_{pt}	**0,110**
Target standard deviation (for Information)	0,0409
lower limit of target range	**0,806**
upper limit of target range	**1,25**
Quotient S/σ_{pt}*	*1,5*
Standard uncertainty $U_{(Xpt)}$	*0,0619*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,56*
Results in the target range	*9*
Percent in the target range	*82%*

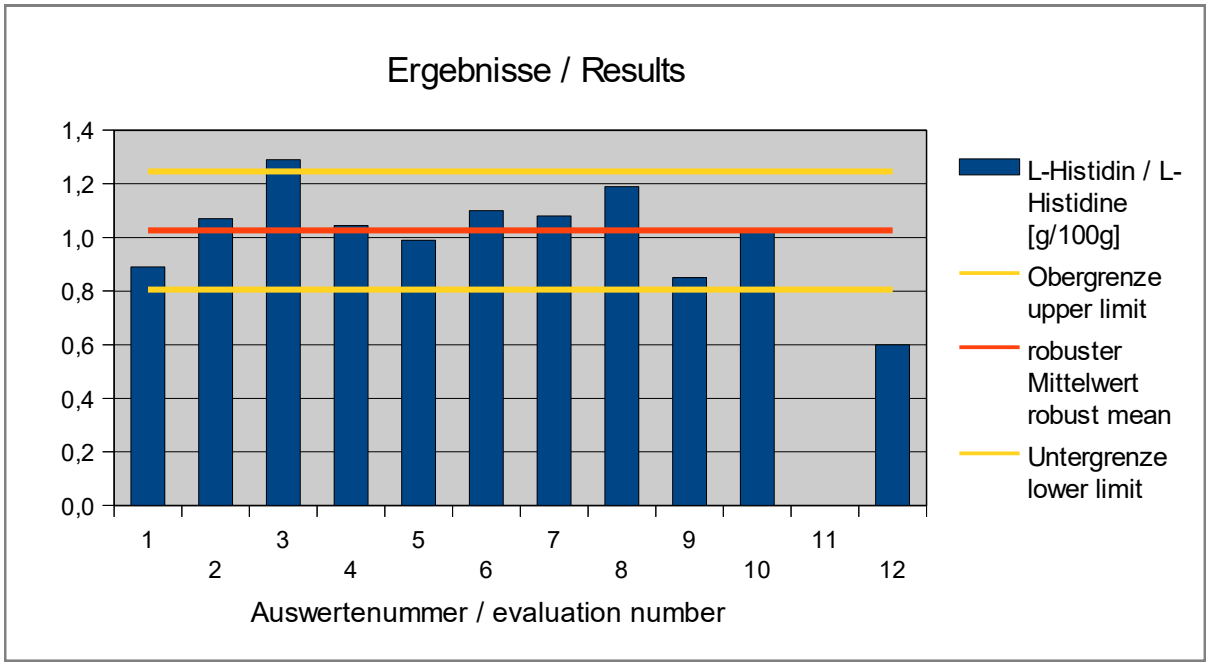


Abb. / Fig. 13: Ergebnisse L-Histidin / Results L-Histidine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Histidin / L-Histidine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	0,890	-0,136	-1,2	-3,3	
2	1,07	0,044	0,40	1,1	
3	1,29	0,264	2,4	6,5	
4	1,04	0,018	0,16	0,44	
5	0,990	-0,036	-0,33	-0,88	
6	1,10	0,074	0,67	1,8	
7	1,08	0,054	0,49	1,3	
8	1,19	0,164	1,5	4,0	
9	0,85	-0,176	-1,6	-4,3	
10	1,02	-0,006	-0,05	-0,15	
11					
12	0,599	-0,427	-3,9	-10,4	

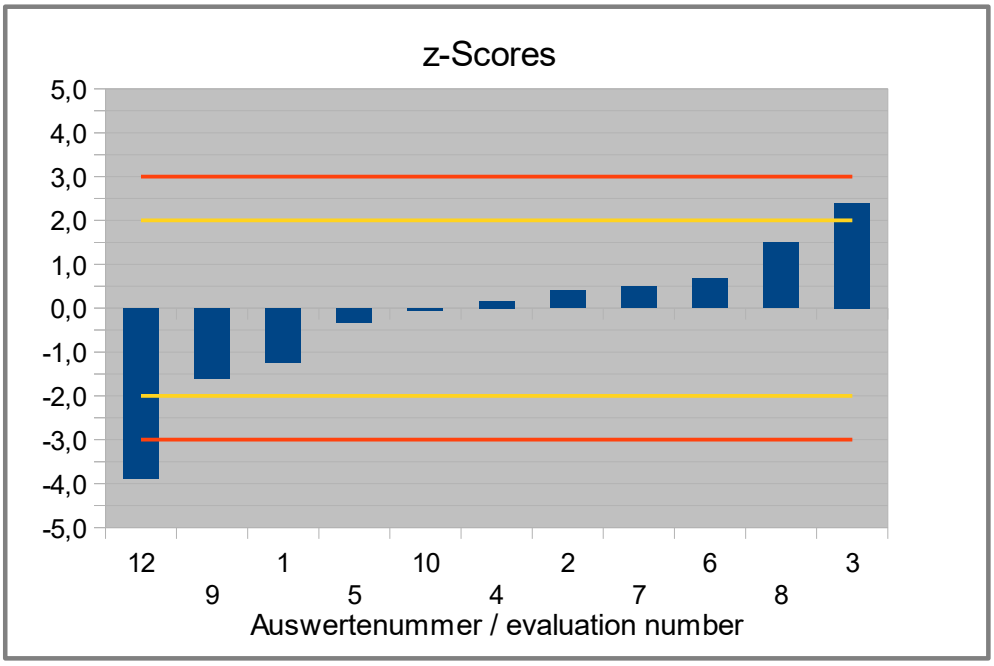


Abb. / Fig. 14: z-Scores L-Histidin/L-Histidine

4.8 L-Isoleucin/L-Isoleucine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	1,92
Median	2,11
Robust Mean (X)	**1,94**
Robust standard deviation (S*)	**0,310**
Number with 2 replicates	11
Repeatability SD (S_r)	0,0292
Repeatability (CV_r)	1,52%
Reproducibility SD (S_R)	0,319
Reproducibility (CV_R)	16,6%
Target range:	
Target standard deviation σ_{pt}	**0,152**
Target standard deviation (for Information)	0,0703
lower limit of target range	**1,64**
upper limit of target range	**2,25**
Quotient S/σ_{pt}'*	*2,0*
Standard uncertainty $U_{(Xpt)}$	*0,117*
Quotient $U_{(Xpt)}/\sigma_{pt}$'	*0,77*
Results in the target range	*9*
Percent in the target range	*82%*

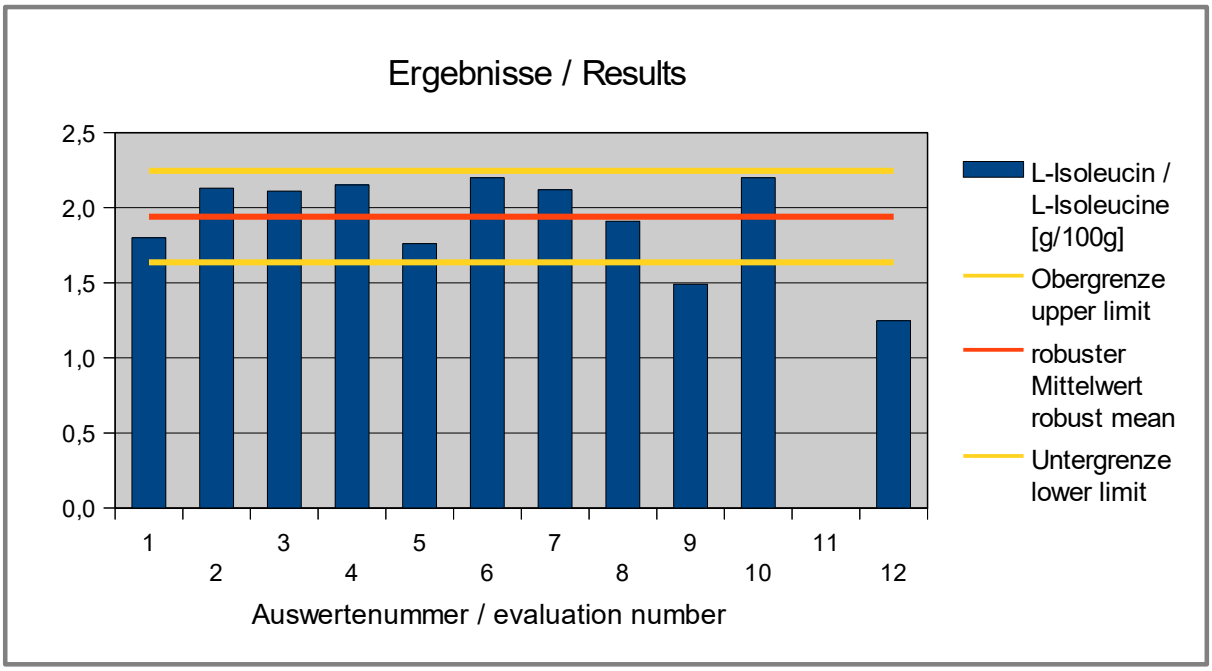


Abb. / Fig. 15: Ergebnisse L-Isoleucin / Results L-Isoleucine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Isoleucin / L-Isoleucine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z'-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	1,80	-0,141	-0,92	-2,0	
2	2,13	0,189	1,2	2,7	
3	2,11	0,169	1,1	2,4	
4	2,15	0,210	1,4	3,0	
5	1,76	-0,181	-1,2	-2,6	
6	2,20	0,259	1,7	3,7	
7	2,12	0,179	1,2	2,6	
8	1,91	-0,031	-0,20	-0,44	
9	1,49	-0,451	-3,0	-6,4	
10	2,20	0,259	1,7	3,7	
11					
12	1,25	-0,694	-4,6	-9,9	

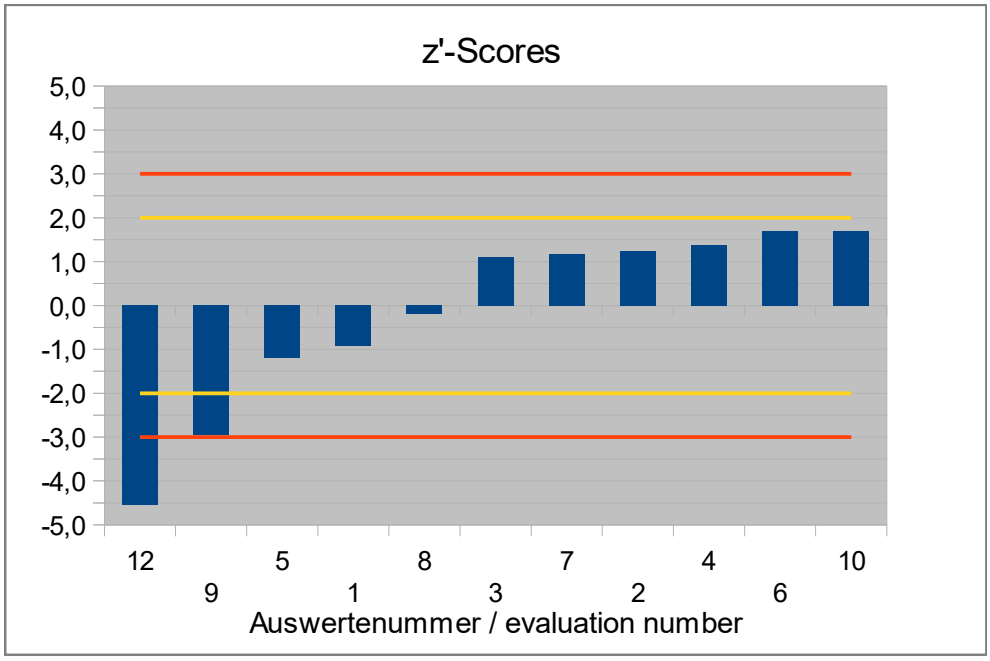


Abb. / Fig. 16: z'-Scores L-Isoleucin/L-Isoleucine

4.9 L-Leucin/L-Leucine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	3,37
Median	3,45
Robust Mean (X)	**3,37**
Robust standard deviation (S*)	**0,314**
Number with 2 replicates	11
Repeatability SD (S_r)	0,0777
Repeatability (CV_r)	2,31%
Reproducibility SD (S_R)	0,288
Reproducibility (CV_R)	8,55%
Target range:	
Target standard deviation σ_{pt}	**0,182**
Target standard deviation (for Information)	0,112
lower limit of target range	**3,01**
upper limit of target range	**3,74**
Quotient S/σ_{pt}*	*1,7*
Standard uncertainty $U_{(Xpt)}$	*0,118*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,65*
Results in the target range	*9*
Percent in the target range	*82%*

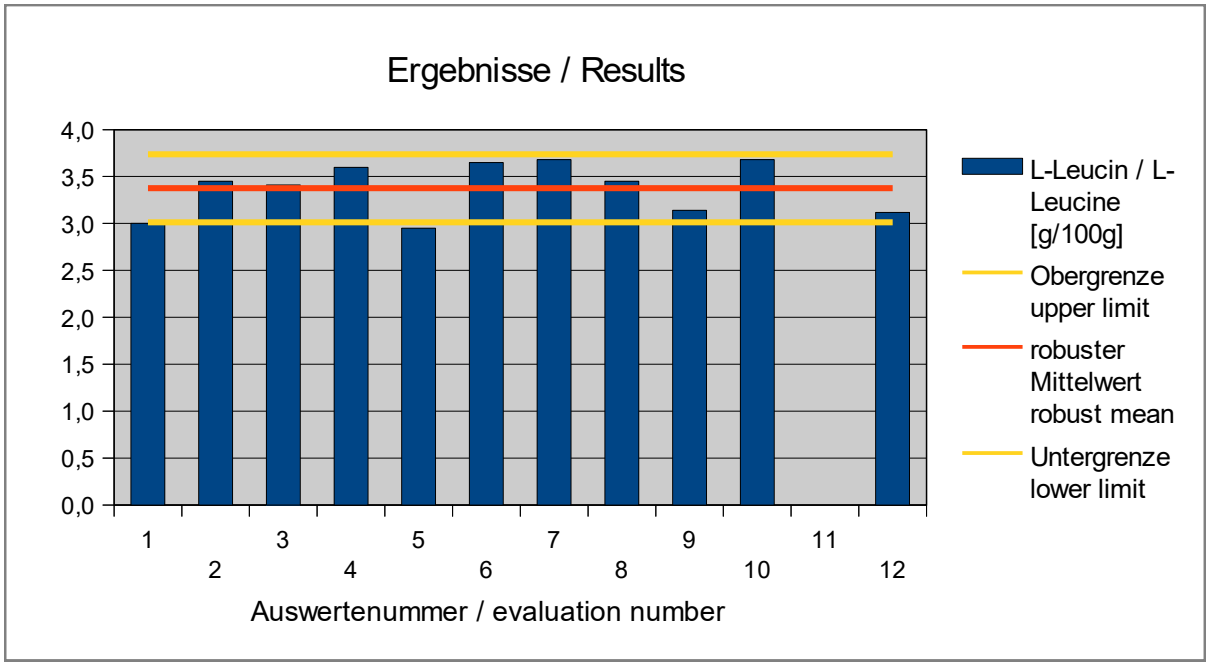


Abb. / Fig. 17: Ergebnisse L-Leucin / Results L-Leucine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Leucin / L-Leucine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	3,00	-0,375	-2,1	-3,3	
2	3,45	0,075	0,41	0,67	
3	3,41	0,035	0,19	0,31	
4	3,60	0,222	1,2	2,0	
5	2,95	-0,425	-2,3	-3,8	
6	3,65	0,275	1,5	2,4	
7	3,68	0,305	1,7	2,7	
8	3,45	0,075	0,41	0,67	
9	3,14	-0,235	-1,3	-2,1	
10	3,68	0,305	1,7	2,7	
11					
12	3,12	-0,258	-1,4	-2,3	

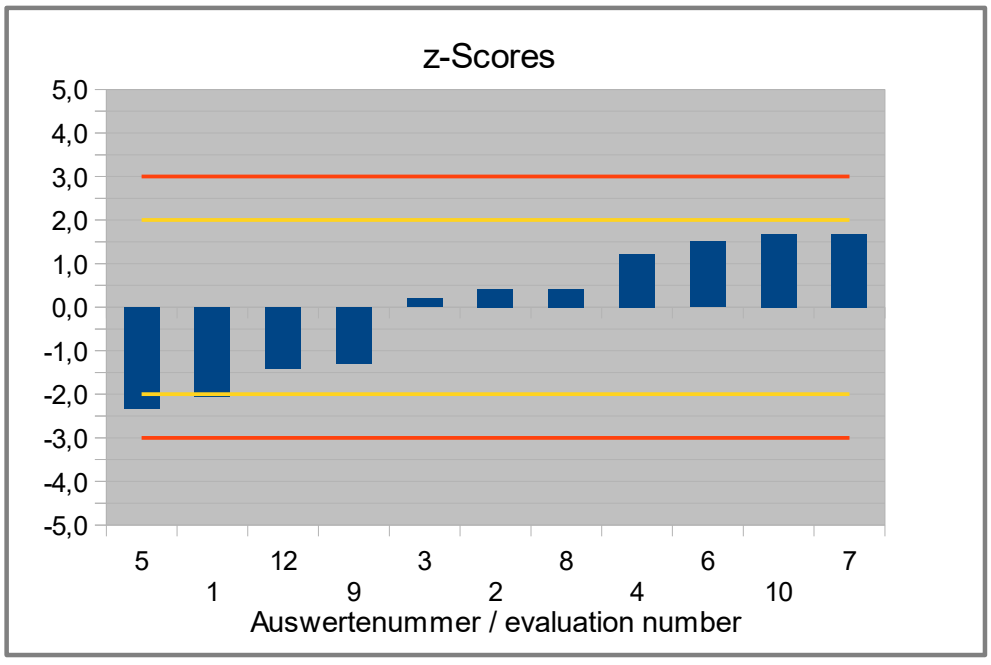


Abb. / Fig. 18: z-Scores L-Leucin/L-Leucine

4.10 L-Lysin/L-Lysine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	1
Mean	2,41
Median	2,46
Robust Mean (X)	**2,43**
Robust standard deviation (S*)	**0,293**
Number with 2 replicates	11
Repeatability SD (S_r)	0,0472
Repeatability (CV_r)	1,96%
Reproducibility SD (S_R)	0,309
Reproducibility (CV_R)	12,8%
Target range:	
Target standard deviation σ_{pt}	**0,215**
Target standard deviation (for Information)	0,0852
lower limit of target range	**2,00**
upper limit of target range	**2,87**
Quotient S/σ_{pt}*	*1,4*
Standard uncertainty $U_{(Xpt)}$	*0,111*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,51*
Results in the target range	*10*
Percent in the target range	*91%*

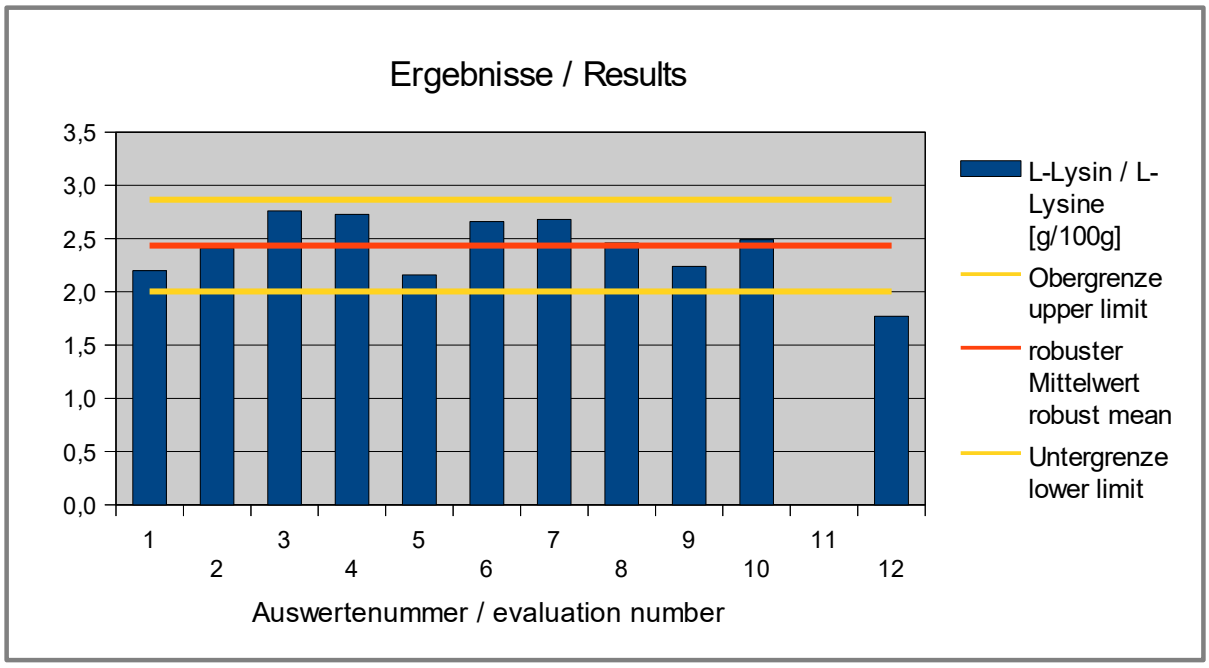


Abb. / Fig. 19: Ergebnisse L-Lysin / Results L-Lysine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Lysin / L-Lysine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	2,20	-0,235	-1,1	-2,8	
2	2,41	-0,025	-0,12	-0,29	
3	2,76	0,325	1,5	3,8	
4	2,73	0,294	1,4	3,5	
5	2,16	-0,275	-1,3	-3,2	
6	2,66	0,225	1,0	2,6	
7	2,68	0,245	1,1	2,9	
8	2,46	0,025	0,12	0,29	
9	2,24	-0,195	-0,90	-2,3	
10	2,49	0,055	0,26	0,65	
11	0,000472				Ergebnis ausgeschlossen / Result excluded
12	1,77	-0,664	-3,1	-7,8	

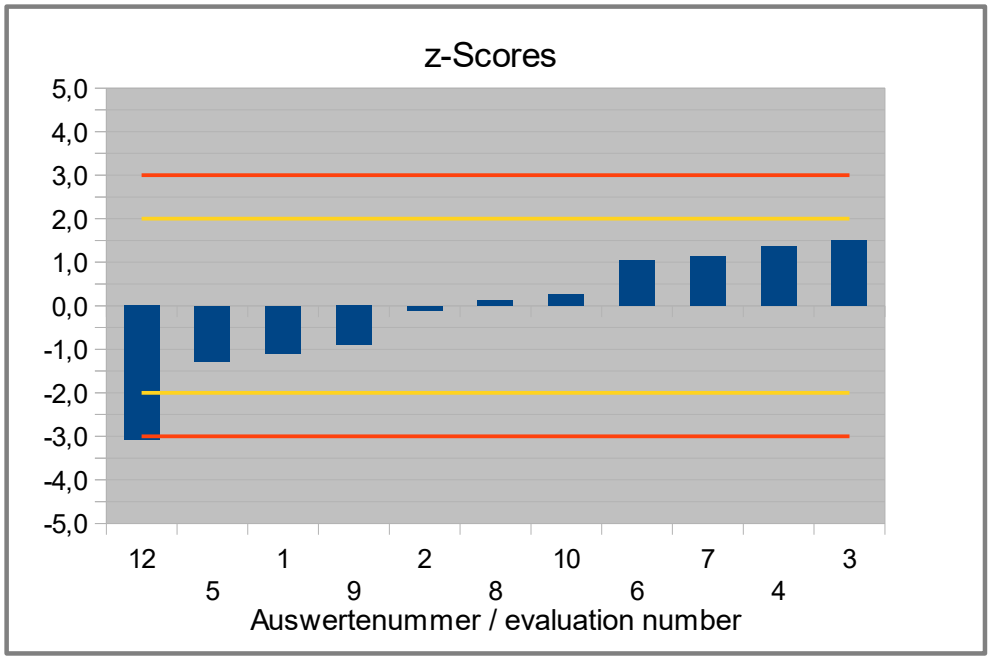


Abb. / Fig. 20: z-Scores L-Lysin/L-Lysine

4.11 L-Methionin/L-Methionine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	10
Number of outliers	1
Mean	0,590
Median	0,590
Robust Mean (X)	**0,588**
Robust standard deviation (S*)	**0,0840**
Number with 2 replicates	10
Repeatability SD (S_r)	0,0195
Repeatability (CV_r)	3,30%
Reproducibility SD (S_R)	0,0812
Reproducibility (CV_R)	13,8%
Target range:	
Target standard deviation σ_{pt}	**0,0393**
Target standard deviation (for Information)	0,0255
lower limit of target range	**0,509**
upper limit of target range	**0,666**
Quotient S/σ_{pt}*	*2,1*
Standard uncertainty $U_{(Xpt)}$	*0,0332*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,85*
Results in the target range	*7*
Percent in the target range	*70%*

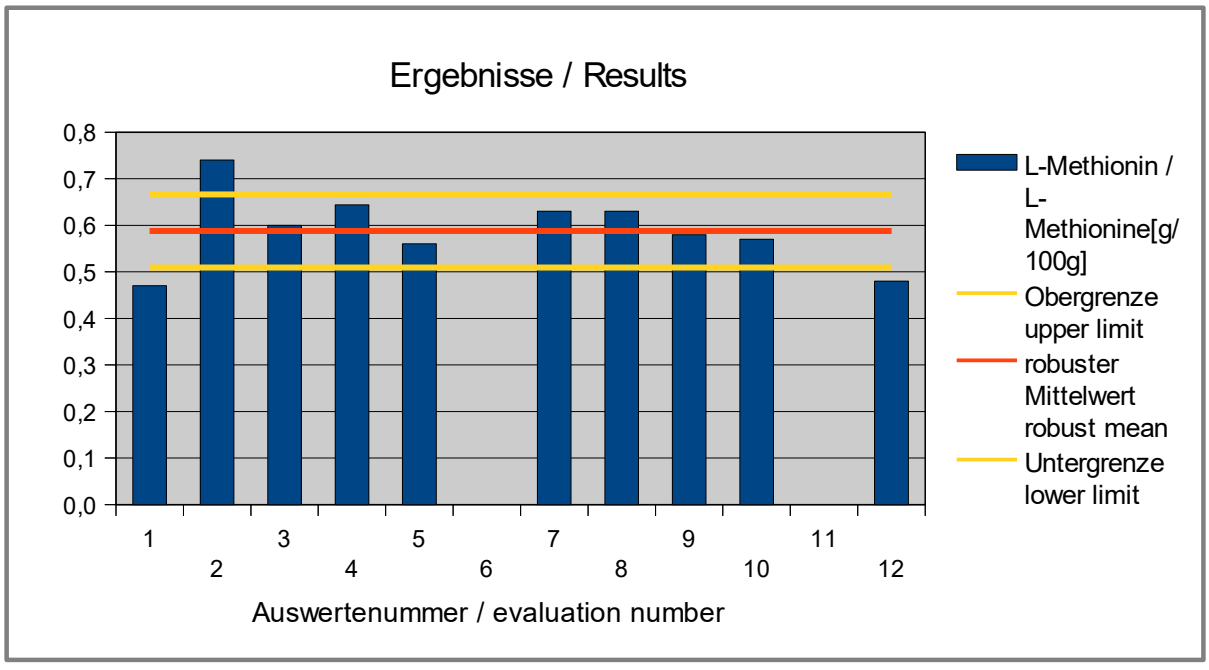


Abb. / Fig. 21: Ergebnisse L-Methionin / Results L-Methionine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Methionin / L-Methionine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	0,470	-0,118	-3,0	-4,6	
2	0,740	0,152	3,9	6,0	
3	0,600	0,012	0,31	0,48	
4	0,644	0,056	1,4	2,2	
5	0,560	-0,028	-0,71	-1,1	
6					
7	0,630	0,042	1,1	1,7	
8	0,630	0,042	1,1	1,7	
9	0,580	-0,008	-0,20	-0,31	
10	0,570	-0,018	-0,45	-0,70	
11	0,000063				Ausreißer ausgeschlossen / Outlier excluded
12	0,480	-0,108	-2,7	-4,2	

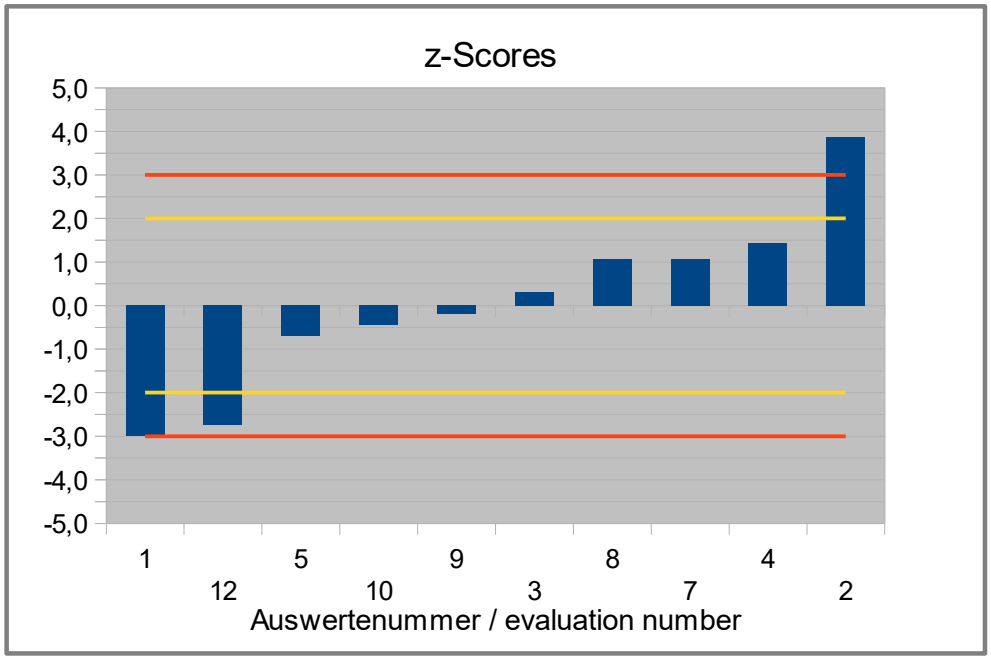


Abb. / Fig. 22: z-Scores L-Methionin/L-Methionine

4.12 L-Phenylalanin/L-Phenylalanine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	2,10
Median	2,24
Robust Mean (X)	**2,12**
Robust standard deviation (S*)	**0,211**
Number with 2 replicates	11
Repeatability SD (S_r)	0,0393
Repeatability (CV_r)	1,88%
Reproducibility SD (S_R)	0,239
Reproducibility (CV_R)	11,4%
Target range:	
Target standard deviation σ_{pt}'	**0,110**
lower limit of target range	**1,90**
upper limit of target range	**2,34**
Quotient S/σ_{pt}'*	*1,9*
Standard uncertainty $U_{(Xpt)}$	*0,0794*
Quotient $U_{(Xpt)}/\sigma_{pt}'$	*0,72*
Results in the target range	*9*
Percent in the target range	*82%*

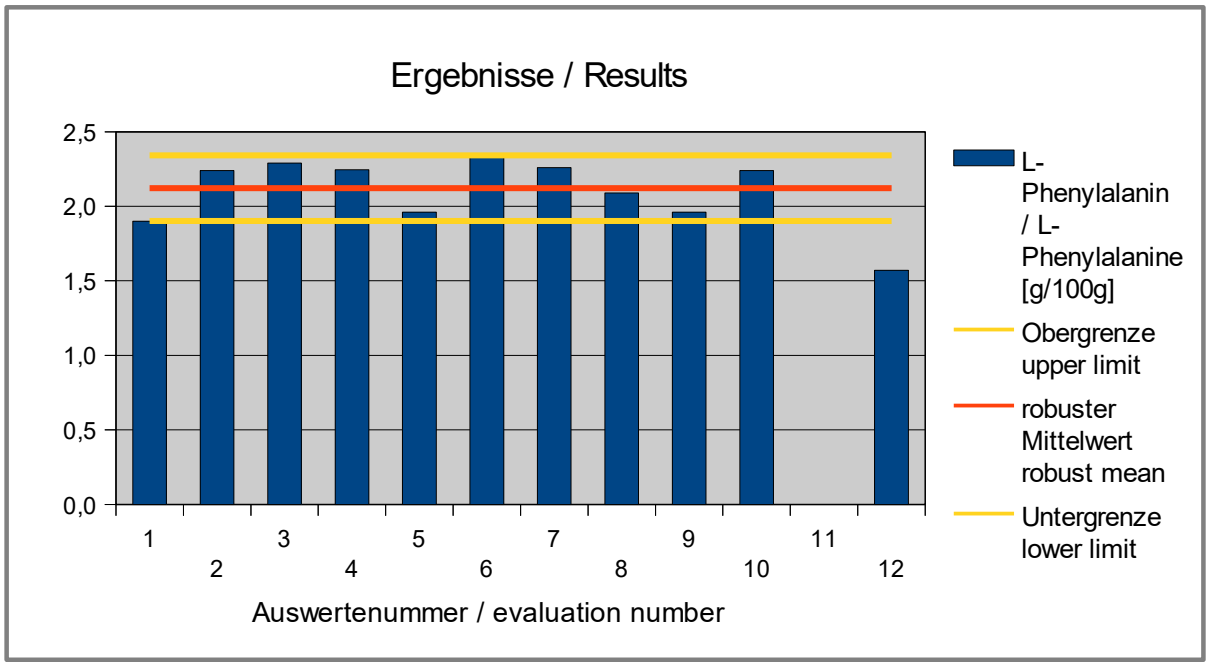


Abb. / Fig. 23: Ergebnisse L-Phenylalanin / Results L-Phenylalanine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Phenylalanin / L-Phenylalanine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z'-Score (σ_{pt})	Hinweis Remark
1	1,90	-0,222	-2,0	
2	2,24	0,118	1,1	
3	2,29	0,168	1,5	
4	2,25	0,123	1,1	
5	1,96	-0,162	-1,5	
6	2,35	0,228	2,1	
7	2,26	0,138	1,3	
8	2,09	-0,032	-0,29	
9	1,96	-0,162	-1,5	
10	2,24	0,118	1,1	
11				
12	1,57	-0,552	-5,0	

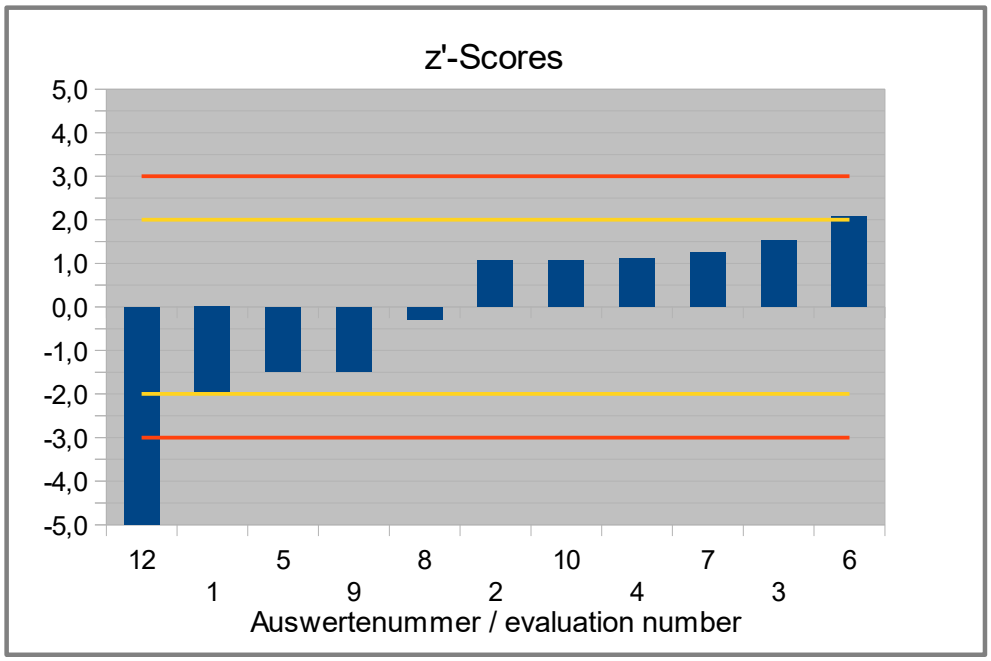


Abb. / Fig. 24: z'-Scores L-Phenylalanin/L-Phenylalanine

4.13 L-Prolin/L-Proline in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	10
Number of outliers	0
Mean	2,41
Median	2,54
Robust Mean (X)	**2,41**
Robust standard deviation (S*)	**0,294**
Number with 2 replicates	10
Repeatability SD (S_r)	0,106
Repeatability (CV_r)	4,39%
Reproducibility SD (S_R)	0,270
Reproducibility (CV_R)	11,2%
Target range:	
Target standard deviation σ_{pt}	**0,190**
Target standard deviation (for Information)	0,0845
lower limit of target range	**2,03**
upper limit of target range	**2,79**
Quotient S/σ_{pt}*	*1,6*
Standard uncertainty $U_{(Xpt)}$	*0,116*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,61*
Results in the target range	*9*
Percent in the target range	*90%*

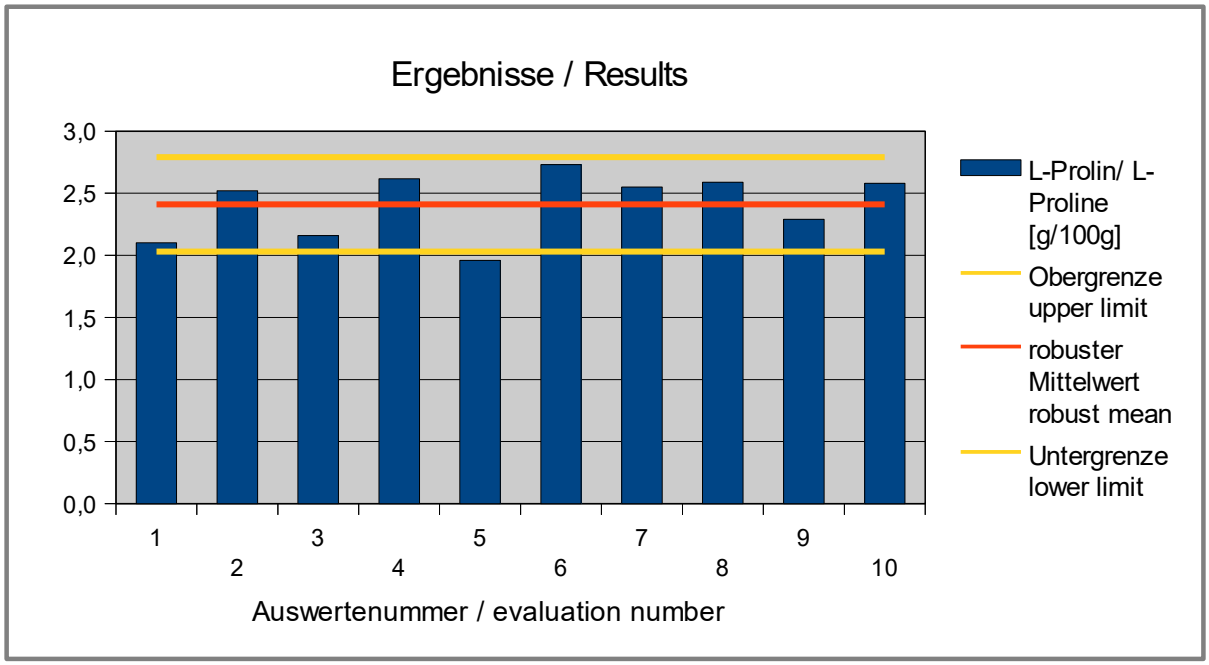


Abb. / Fig. 25: Ergebnisse L-Prolin / Results L-Proline

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Prolin/ L-Proline [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	2,10	-0,311	-1,6	-3,7	
2	2,52	0,109	0,58	1,3	
3	2,16	-0,251	-1,3	-3,0	
4	2,62	0,206	1,1	2,4	
5	1,96	-0,451	-2,4	-5,3	
6	2,73	0,319	1,7	3,8	
7	2,55	0,139	0,73	1,6	
8	2,59	0,179	0,95	2,1	
9	2,29	-0,121	-0,64	-1,4	
10	2,58	0,169	0,89	2,0	

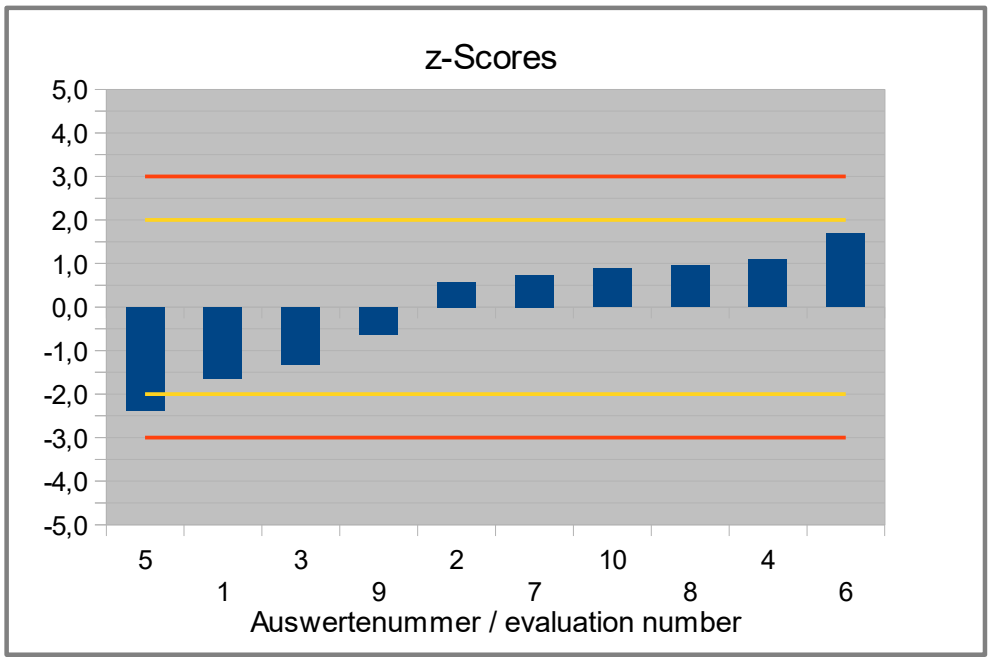


Abb. / Fig. 26: z-Scores L-Prolin/L-Proline

4.14 L-Serin/L-Serine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	2,12
Median	2,21
Robust Mean (X)	**2,18**
Robust standard deviation (S*)	**0,209**
Number with 2 replicates	11
Repeatability SD (S_r)	0,189
Repeatability (CV_r)	8,95%
Reproducibility SD (S_R)	0,364
Reproducibility (CV_R)	17,2%
Target range:	
Target standard deviation σ_{pt}'	**0,125**
Target standard deviation (for Information)	0,0774
lower limit of target range	**1,93**
upper limit of target range	**2,42**
Quotient S/σ_{pt}'*	*1,7*
Standard uncertainty $U_{(Xpt)}$	*0,0787*
Quotient $U_{(Xpt)}/\sigma_{pt}'$	*0,63*
Results in the target range	*8*
Percent in the target range	*73%*

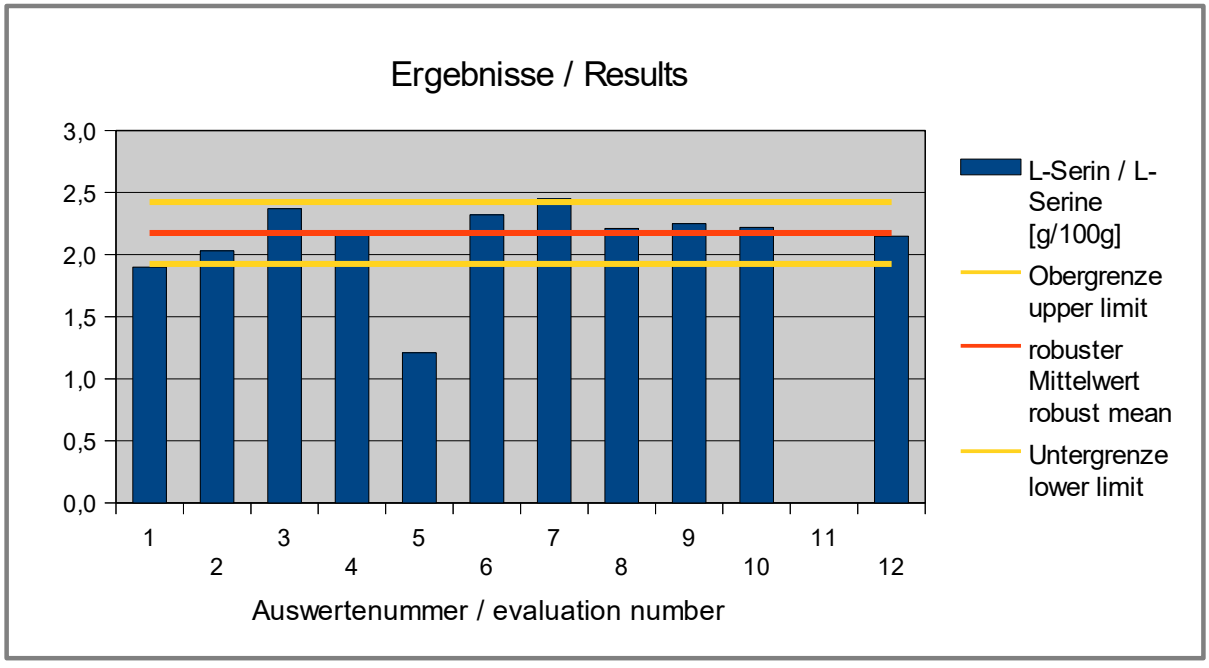


Abb. / Fig. 27: Ergebnisse L-Serin / Results L-Serine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Serin / L-Serine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z'-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	1,90	-0,275	-2,2	-3,6	
2	2,03	-0,145	-1,2	-1,9	
3	2,37	0,195	1,6	2,5	
4	2,17	-0,010	-0,08	-0,13	
5	1,21	-0,965	-7,7	-12,5	
6	2,32	0,145	1,2	1,9	
7	2,45	0,275	2,2	3,6	
8	2,21	0,035	0,28	0,45	
9	2,25	0,075	0,60	1,0	
10	2,22	0,045	0,36	0,58	
11					
12	2,15	-0,027	-0,21	-0,35	

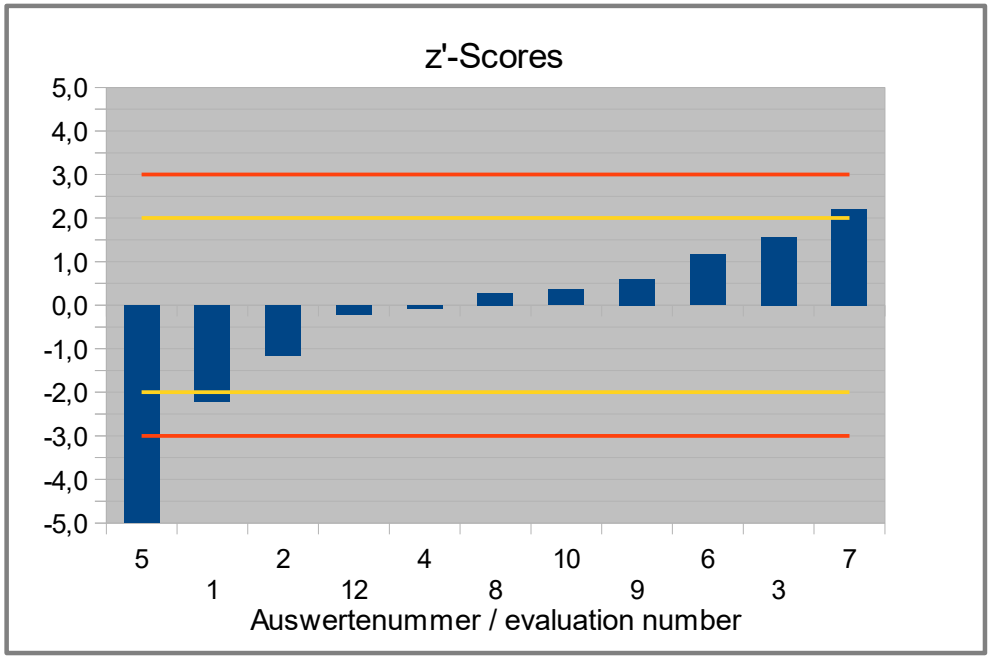


Abb. / Fig. 28: z'-Scores L-Serin/L-Serine

4.15 L-Threonin/L-Threonine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	0
Mean	1,57
Median	1,59
Robust Mean (X)	**1,57**
Robust standard deviation (S*)	**0,171**
Number with 2 replicates	10
Repeatability SD (S_r)	0,0418
Repeatability (CV_r)	2,63%
Reproducibility SD (S_R)	0,146
Reproducibility (CV_R)	9,21%
Target range:	
Target standard deviation σ_{pt}	**0,0884**
Target standard deviation (for Information)	0,0587
lower limit of target range	**1,39**
upper limit of target range	**1,75**
Quotient S/σ_{pt}*	*1,9*
Standard uncertainty $U_{(Xpt)}$	*0,0644*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,73*
Results in the target range	*8*
Percent in the target range	*73%*

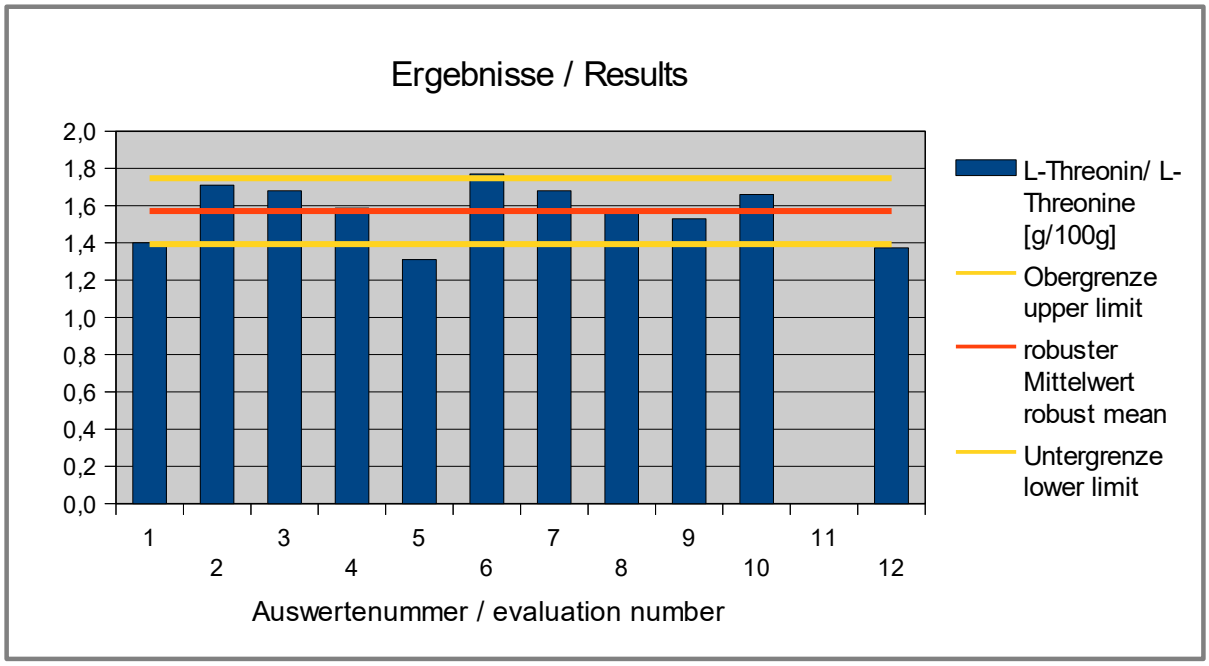


Abb. / Fig. 29: Ergebnisse L-Threonin / Results L-Threonine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Threonin/ L-Threonine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	1,40	-0,170	-1,9	-2,9	
2	1,71	0,140	1,6	2,4	
3	1,68	0,110	1,2	1,9	
4	1,59	0,017	0,19	0,28	
5	1,31	-0,260	-2,9	-4,4	
6	1,77	0,200	2,3	3,4	
7	1,68	0,110	1,2	1,9	
8	1,57	0,000	0,00	-0,01	
9	1,53	-0,040	-0,46	-0,69	
10	1,66	0,090	1,0	1,5	
11					
12	1,37	-0,197	-2,2	-3,4	

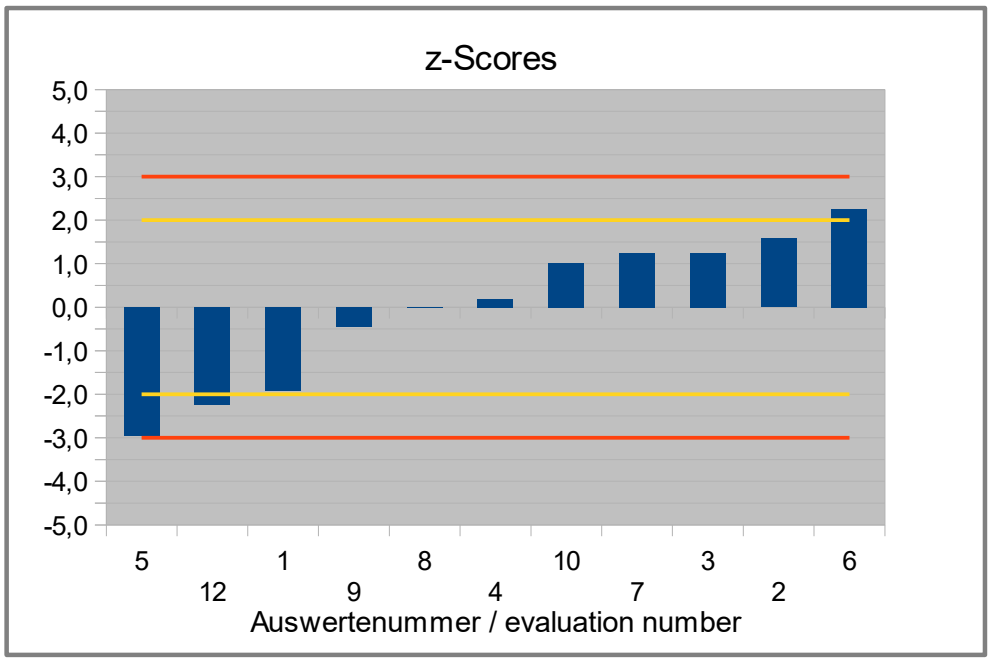


Abb. / Fig. 30: z-Scores L-Threonin/L-Threonine

4.16 L-Tryptophan in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	7
Number of outliers	0
Mean	0,416
Median	0,470
Robust Mean (X)	**0,416**
Robust standard deviation (S*)	**0,153**
Number with 2 replicates	7
Repeatability SD (S_r)	0,0107
Repeatability (CV_r)	2,59%
Reproducibility SD (S_R)	0,135
Reproducibility (CV_R)	32,6%
Target range:	
Target standard deviation σ_{pt}'	**0,0780**
Target standard deviation (for Information)	0,0190
lower limit of target range	**0,260**
upper limit of target range	**0,572**
Quotient S/σ_{pt}'*	*2,0*
Standard uncertainty $U_{(Xpt)}$	*0,0723*
Quotient $U_{(Xpt)}/\sigma_{pt}'$	*0,93*
Results in the target range	*6*
Percent in the target range	*86%*

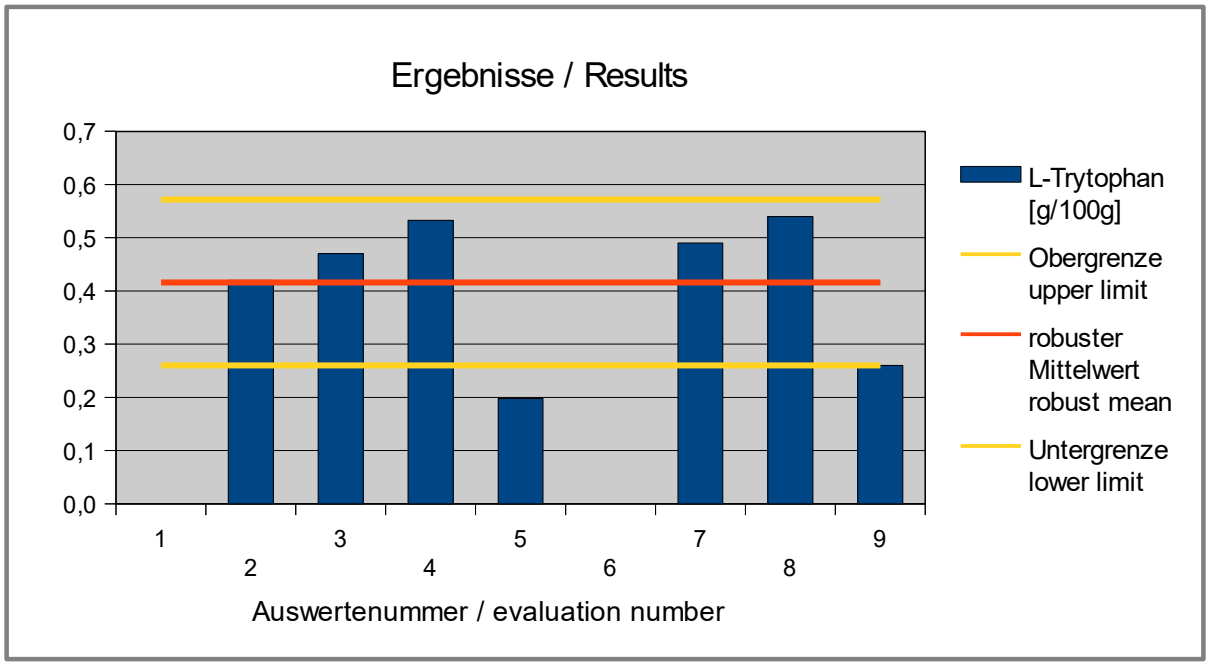


Abb. / Fig. 31: Ergebnisse L-Tryptophan / Results L-Tryptophan

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Trytophan [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z'-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1					
2	0,42	0,004	0,05	0,22	
3	0,47	0,054	0,69	2,9	
4	0,53	0,117	1,5	6,2	
5	0,20	-0,218	-2,8	-11,5	
6					
7	0,49	0,074	1,0	3,9	
8	0,54	0,124	1,6	6,5	
9	0,26	-0,156	-2,0	-8,2	

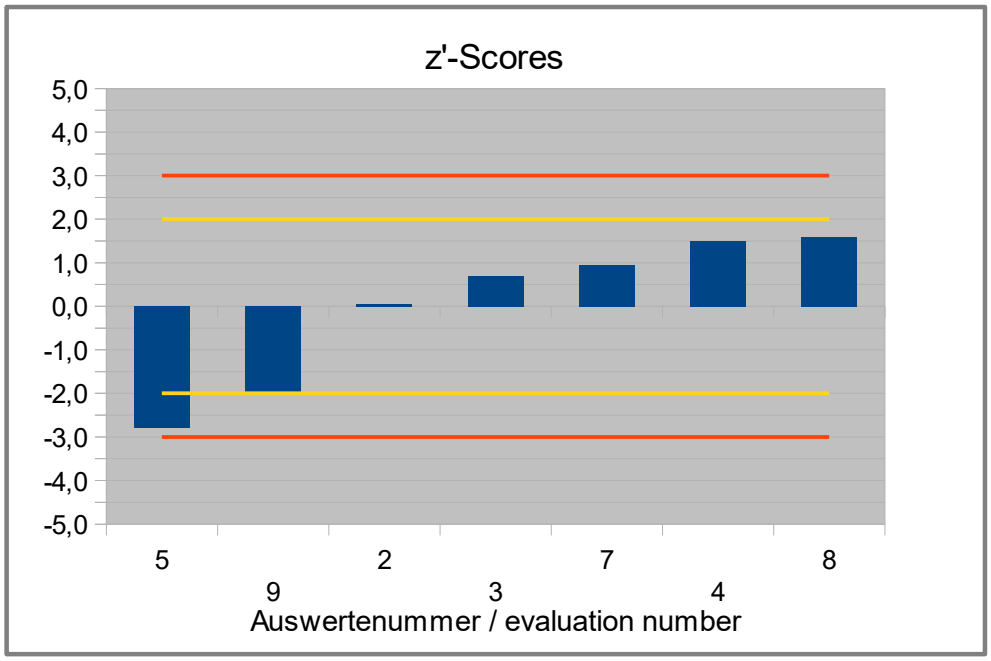
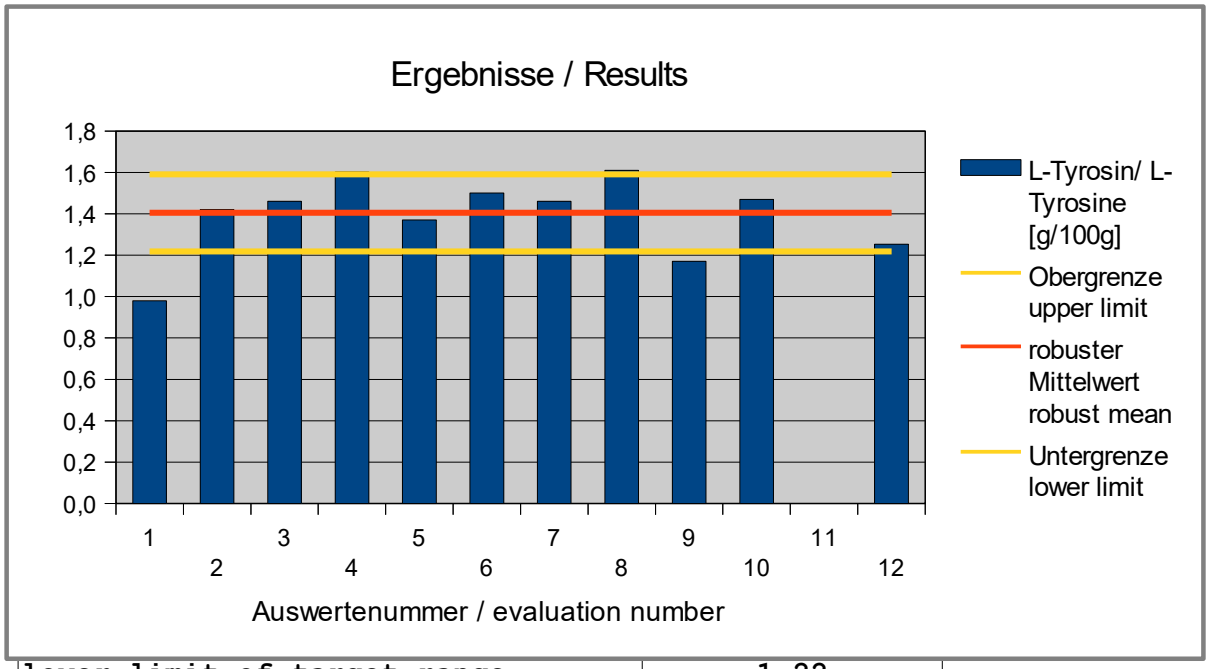


Abb. / Fig. 32: z'-Scores L-Tryptophan

4.17 L-Tyrosin/L-Tyrosine in g/100g

Vergleichsuntersuchung / Proficiency Test



lower limit of target range	**1,22**
upper limit of target range	**1,59**
Quotient S/σ_{pt}*	*1,9*
Standard uncertainty $U_{(Xpt)}$	*0,0682*
Quotient $U_{(Xpt)}/\sigma_{pt}$	*0,73*
Results in the target range	*7*
Percent in the target range	*64%*

Abb. / Fig. 33: Ergebnisse L-Tyrosin / Results L-Tyrosine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Tyrosin/ L-Tyrosine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	0,980	-0,424	-4,6	-8,0	
2	1,42	0,016	0,17	0,29	
3	1,46	0,056	0,60	1,0	
4	1,60	0,199	2,1	3,7	
5	1,37	-0,034	-0,37	-0,65	
6	1,50	0,096	1,0	1,8	
7	1,46	0,056	0,60	1,0	
8	1,61	0,206	2,2	3,9	
9	1,17	-0,234	-2,5	-4,4	
10	1,47	0,066	0,7	1,2	
11					
12	1,25	-0,152	-1,6	-2,8	

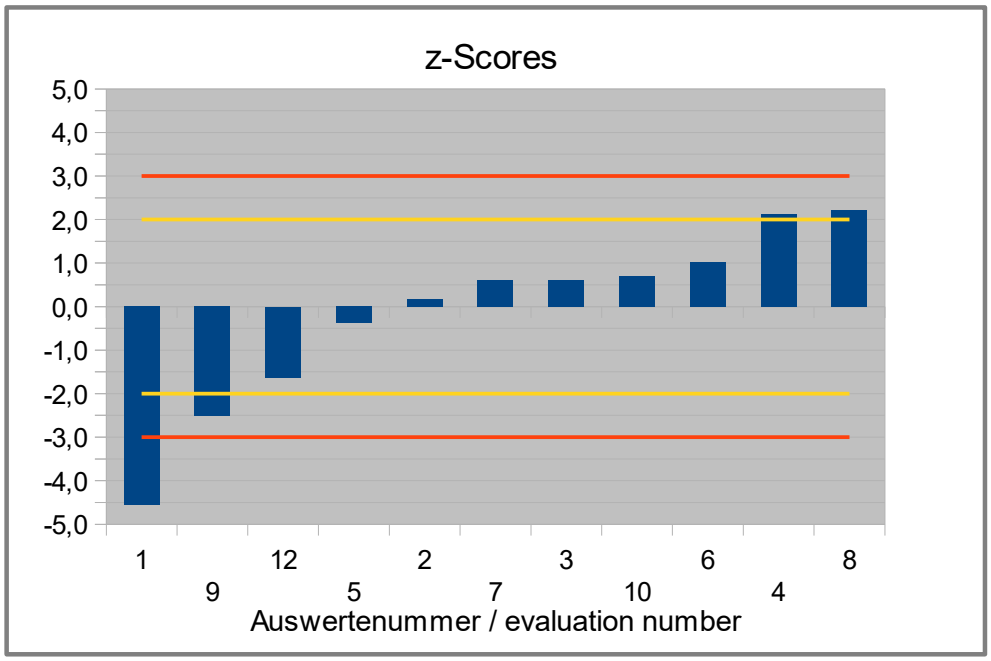


Abb. / Fig. 34: z-Scores L-Tyrosin/L-Tyrosine

4.18 L-Valin/L-Valine in g/100g

Vergleichsuntersuchung / Proficiency Test

Statistic Data	
Number of results	11
Number of outliers	1
Mean	2,26
Median	2,21
Robust Mean (X)	**2,14**
Robust standard deviation (S*)	**0,318**
Number with 2 replicates	10
Repeatability SD (S_r)	0,028
Repeatability (CV_r)	1,34%
Reproducibility SD (S_R)	0,263
Reproducibility (CV_R)	12,6%
Target range:	
Target standard deviation σ_{pt}'	**0,174**
Target standard deviation (for Information)	0,0764
lower limit of target range	**1,79**
upper limit of target range	**2,49**
Quotient S/σ_{pt}'*	*1,8*
Standard uncertainty $U_{(Xpt)}$	*0,120*
Quotient $U_{(Xpt)}/\sigma_{pt}'$	*0,69*
Results in the target range	*9*
Percent in the target range	*82%*

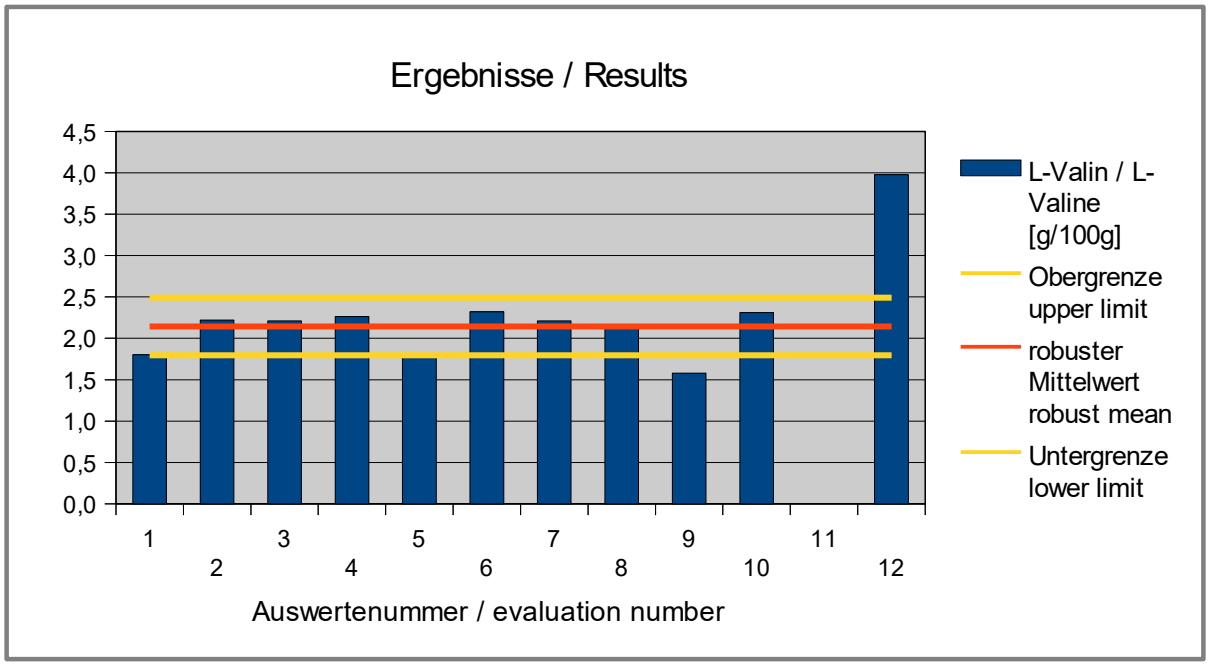


Abb. / Fig. 35: Ergebnisse L-Valin / Results L-Valine

Ergebnisse der Teilnehmer:
Results of Participants:

Auswerte-nummer Evaluation number	L-Valin / L-Valine [g/100g]	Abweichung [mg/kg] Deviation [mg/kg]	z'-Score (σ_{pt})	z-Score (Info)	Hinweis Remark
1	1,80	-0,343	-2,0	-4,5	
2	2,22	0,077	0,45	1,0	
3	2,21	0,067	0,39	0,88	
4	2,26	0,120	0,69	1,6	
5	1,79	-0,353	-2,0	-4,6	
6	2,32	0,177	1,0	2,3	
7	2,21	0,067	0,39	0,88	
8	2,16	0,017	0,10	0,23	
9	1,58	-0,563	-3,2	-7,4	
10	2,31	0,167	1,0	2,2	
11					
12	3,98	1,833	10,5	24,0	

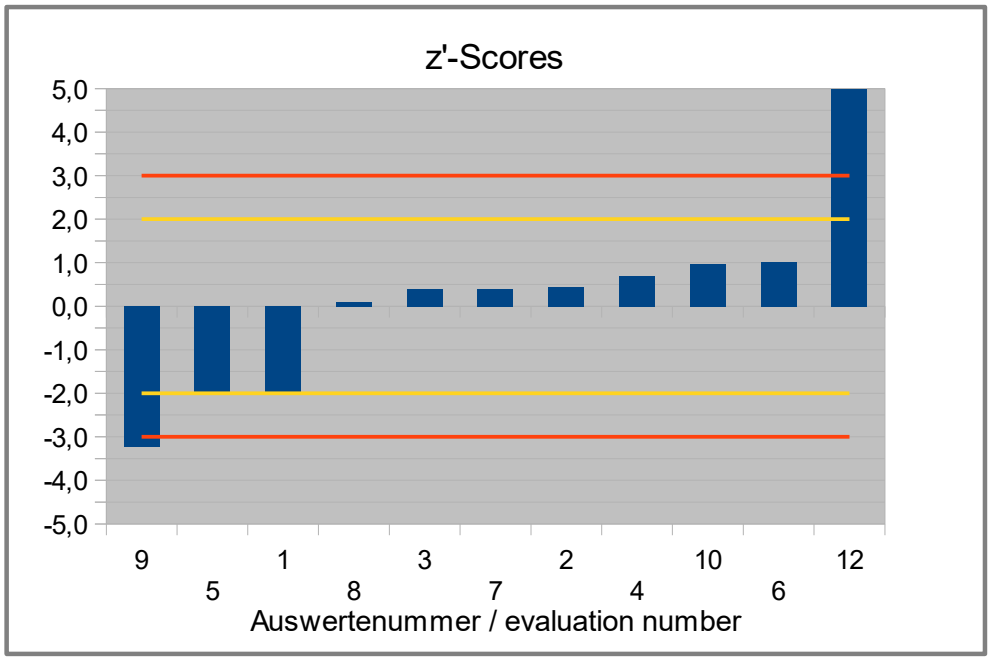


Abb. / Fig. 36: z'-Scores L-Valin/L-Valine

4.19 z-Scores of the participants: tabular overview

Auswertenummer	Ala	Arg	Asp	Cys	Glu	Gly	His	Iso	Leu	Lys	Met	Phe	Pro	Ser	Thr	Trp	Tyr	Val
1	-1,7	-2,0	-1,7		-1,2	-1,5	-1,2	-0,9	-2,1	-1,1	-3,0	-2,0	-1,6	-2,2	-1,9		-4,6	-2,0
2	0,2	-0,2	-0,2	2,1	-0,1	-0,2	0,4	1,2	0,4	-0,1	3,9	1,1	0,6	-1,2	1,6	0,1	0,2	0,4
3	0,8	1,1	1,6	1,2	1,2	0,7	2,4	1,1	0,2	1,5	0,3	1,5	-1,3	1,6	1,2	0,7	0,6	0,4
4	1,1	1,1	1,6		1,2	1,3	0,2	1,4	1,2	1,4	1,4	1,1	1,1	-0,1	0,2	1,5	2,1	0,7
5	-3,1	-1,4	-2,1	-0,3	-2,0	-3,6	-0,3	-1,2	-2,3	-1,3	-0,7	-1,5	-2,4	-7,7	-2,9	-2,8	-0,4	-2,0
6	1,6	1,2	1,1		1,8	1,5	0,7	1,7	1,5	1,0		2,1	1,7	1,2	2,3		1,0	1,0
7	1,7	1,3	1,3	0,6	1,6	1,8	0,5	1,2	1,7	1,1	1,1	1,3	0,7	2,2	1,2	1,0	0,6	0,4
8	-0,1	0,3	0,5	-0,8	-0,4	0,5	1,5	-0,2	0,4	0,1	1,1	-0,3	0,9	0,3	0,0	1,6	2,2	0,1
9	0,1	-0,4	-0,2	-0,7	-0,6	0,2	-1,6	-3,0	-1,3	-0,9	-0,2	-1,5	-0,6	0,6	-0,5	-2,0	-2,5	-3,2
10	1,0	1,4	0,8	0,2	1,1	1,0	-0,1	1,7	1,7	0,3	-0,5	1,1	0,9	0,4	1,0		0,7	1,0
11																		
12	-2,0	-4,8	-4,3	-2,8	-3,9	-2,6	-3,9	-4,6	-1,4	-3,1	-2,7	-5,0		-0,2	-2,2		-1,6	10,5

Bewertung des z-Scores / valuation of z-score (DIN ISO 13528:2009-01):
-2 ≤ z-score ≤ 2 erfolgreich / successful (in green)
-2 > z-score > 2 „Warnsignal“ / warning signal (in yellow)
*-3 > z-score > 3 „Ei*ngriffssignal“ / action signal (in red)

Abkürzungen/Abbreviations: Ala: L-Alanin/L-Alanine; Arg: L-Arginin/L-Arginine; Asp: L-Asparaginsäure/L-Aspartic acid; Cys: L-Cystin/L-Cystine; Glu: L-Glutaminsäure/L-Glutamic acid; Gly: Glycin/Glycine; His: L-Histidin/L-Histidine; Iso: L-Isoleucin/L-Isoleucine; Leu: L-Leucin/L-Leucine; Lys: L-Lysin/L-Lysine; Met: L-Methionin/L-Methionine; Phe: L-Phenylalanin/L-Phenylalanine; Pro: L-Prolin/L-Prolin; Ser: L-Serin/L-Serine; Thr: L-Threonin/L-Threonine; Trp: L-Tryptophan; Tyr: L-Tyrosin/L-Tyrosine; Val: L-Valin/L-Valine.

5. Documentation

Note: Information given in German were translated by DLA to the best of our knowledge (without guarantee of correctness).

5.1 Details by the participants

5.1.1 Primary Data

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Alanin/L-Alanine	1	g/100g	64	26	06.10.20	1,5	1,5	1,5	0,2	no	
	2	g/100g	15	75	28.09.20	1,7	1,67	1,73	0,11	no	
	3	g/100g	13	77	15.09.20	1,77	1,74	1,8	0,005	no	
	4	g/100g	3	87		1,797	1,809	1,786	0,05	yes	98
	5	g/100g	No. 31	No. 59	04.10.20	1,36	1,38	1,35		no	
	6	g/100g	6	23	29.09.20	1,85	1,85	1,85	0,04	no	
	7	g/100g	30	60	20.10.20	1,86	1,87	1,84		no	
	8	g/100g	43	47	22.10.	1,67	1,69	1,65	0,006	no	x
	9	g/100g	28	62	28.09.20	1,69	1,69	1,69	0,05	no	-
	10	g/100g			26.09.20	1,79	1,77	1,8			
	11	g/100g	44	45							
	12	g/100g	No. 35	No. 55	29.10.20	1,4701	1,4861	1,454	0.0005	yes	91,5

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Arginin/L-Arginine	1	g/100g			06.10.20	2,3	2,3	2,3	0,2	no	
	2	g/100g			28.09.20	2,63	2,61	2,65	0,3	no	
	3	g/100g			15.09.20	2,86	2,83	2,89	0,012	no	
	4	g/100g				2,856	2,867	2,846	0,05	yes	100
	5	g/100g			04.10.20	2,42	2,45	2,4		no	
	6	g/100g				2,89	2,86	2,91	0,06	no	
	7	g/100g				2,9	2,91	2,88			
	8	g/100g				2,72	2,73	2,71	0,013		
	9	g/100g			28.09.20	2,59	2,58	2,59	0,05	no	-
	10	g/100g				2,92	2,79	3,04			
	11	g/100g									
	12	g/100g			29.10.20	1,8066	1,7616	1,8516	0.0005	yes	99,3

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Asparaginsäure/ L-Aspartic acid	1	g/100g			06.10.20	4	3,9	4,1	0,2	no	
	2	g/100g			28.09.20	4,51	4,43	4,58	0,16	no	
	3	g/100g			15.09.20	5,13	5,12	5,13	0,005	no	
	4	g/100g				5,127	5,141	5,113	0,05	yes	96
	5	g/100g			04.10.20	3,86	3,9	3,82		no	
	6	g/100g				4,94	4,92	4,96	0,05	no	
	7	g/100g				5,01	5,07	4,95			
	8	g/100g				4,73	4,71	4,75	0,009		
	9	g/100g			28.09.20	4,5	4,49	4,51	0,05	no	-
	10	g/100g				4,85	4,79	4,91			
	11	g/100g									
	12	g/100g			29.10.20	3,1435	3,0987	3,1883	0.0005	yes	91,4

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Cystein / L-Cysteine	1	g/100g			06.10.20	not evaluable	n.a.	n.a.	0,2	no	
	2	g/100g									
	3	g/100g			16.09.20	0,56	0,56	0,55	0,004	no	
	4	g/100g									
	5	g/100g								no	
	6	g/100g									
	7	g/100g									
	8	g/100g			x	x	x	x	x	x	x
	9	g/100g			28.09.20	-	-	-	-	-	-
	10	g/100g				0,49	0,49	0,48			
	11	g/100g									
	12	g/100g			29.10.20						

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Cystin/L-Cystine	1	g/100g			06.10.20	not evaluable	n.a.	n.a.	0,2	no	
	2	g/100g			28.09.20	0,61	0,61	0,601	0,05	no	
	3	g/100g									
	4	g/100g									
	5	g/100g								no	
	6	g/100g									
	7	g/100g				0,51	0,49	0,52			
	8	g/100g				0,41	0,41	0,41	0,013		
	9	g/100g			28.09.20	0,42	0,4	0,44	0,05	no	-
	10	g/100g									
	11	g/100g									
	12	g/100g			29.10.20	0,2796	0,2388	0,3205	0.0005	yes	85,5

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Cystin + L-Cystein	1	g/100g									
	2	g/100g									
	3	g/100g									
	4	g/100g									
	5	g/100g			06.10.2020	0,45	0,44	0,46		no	
	6	g/100g									
	7	g/100g									
	8	g/100g									
	9	g/100g									
	10	g/100g									
	11	g/100g									
	12	g/100g									

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
Glycin/Glycine	1	g/100g			06.10.20	1,4	1,3	1,4	0,2	no	
	2	g/100g			28.09.20	1,53	1,5	1,56	0,11	no	
	3	g/100g			15.09.20	1,62	1,61	1,62	0,007	no	
	4	g/100g				1,685	1,666	1,705	0,05	yes	99
	5	g/100g			04.10.20	1,18	1,2	1,17		no	
	6	g/100g				1,71	1,71	1,71	0,04	no	
	7	g/100g				1,74	1,76	1,72			
	8	g/100g				1,6	1,62	1,58	0,006		
	9	g/100g			28.09.20	1,57	1,56	1,57	0,05	no	-
	10	g/100g				1,66	1,63	1,69			
	11	g/100g									
	12	g/100g			29.10.20	1,2859	1,4623	1,1095	0.0005	yes	100

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Glutaminsäure/L-Glutamic acid	1	g/100g			06.10.20	7,5	7,3	7,6	0,2	no	
	2	g/100g			28.09.20	8,08	8,04	8,12	0,21	no	
	3	g/100g			15.09.20	8,75	8,74	8,75	0,006	no	
	4	g/100g				8,76	8,934	8,586	0,05	yes	98
	5	g/100g			04.10.20	7,09	7,18	6,996		no	
	6	g/100g				9,06	9,04	9,07	0,14	no	
	7	g/100g				8,99	9,13	8,86			
	8	g/100g				7,95	7,97	7,92	0,01		
	9	g/100g			28.09.20	7,83	7,82	7,84	0,05	no	-
	10	g/100g				8,69	8,58	8,79			
	11	g/100g									
	12	g/100g			29.10.20	6,1395	7,1635	5,1154	0.0005	yes	82,1

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Histidin/L-Histidine	1	g/100g			06.10.20	0,89	0,88	0,9	0,2	no	
	2	g/100g			28.09.20	1,07	1,06	1,07	0,29	no	
	3	g/100g			15.09.20	1,29	1,28	1,3	0,034	no	
	4	g/100g				1,044	1,067	1,021	0,05	yes	99
	5	g/100g			04.10.20	0,99	0,998	0,98		no	
	6	g/100g				1,1	1,1	1,1	0,07	no	
	7	g/100g				1,08	1,09	1,06			
	8	g/100g				1,19	1,21	1,16	0,009		
	9	g/100g			28.09.20	0,85	0,85	0,84	0,05	no	-
	10	g/100g				1,02	0,98	1,06			
	11	g/100g									
	12	g/100g			29.10.20	0,599	0,5137	0,6842	0.0005	yes	90,9

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Isoleucin/Isoleucine	1	g/100g			06.10.20	1,8	1,8	1,8	0,2	no	
	2	g/100g			28.09.20	2,13	2,1	2,16	0,2	no	
	3	g/100g			15.09.20	2,11	2,09	2,13	0,003	no	
	4	g/100g				2,151	2,159	2,142	0,05	yes	100
	5	g/100g			04.10.20	1,76	1,79	1,73		no	
	6	g/100g				2,2	2,2	2,2	0,07	no	
	7	g/100g				2,12	2,13	2,1			
	8	g/100g				1,91	1,92	1,9	0,009		
	9	g/100g			28.09.20	1,49	1,49	1,48	0,05	no	-
	10	g/100g				2,2	2,18	2,22			
	11	g/100g									
	12	g/100g			29.10.20	1,2464	1,2056	1,2873	0.0005	yes	92

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Leucin/L-Leucine	1	g/100g			06.10.20	3	2,9	3	0,2	no	
	2	g/100g			28.09.20	3,45	3,4	3,5	0,22	no	
	3	g/100g			15.09.20	3,41	3,36	3,46	0,004	no	
	4	g/100g				3,597	3,526	3,669	0,05	yes	98
	5	g/100g			04.10.20	2,95	2,99	2,92		no	
	6	g/100g				3,65	3,64	3,65	0,09	no	
	7	g/100g				3,68	3,72	3,64			
	8	g/100g				3,45	3,5	3,4	0,01		
	9	g/100g			28.09.20	3,14	3,12	3,15	0,05	no	-
	10	g/100g				3,68	3,61	3,74			
	11	g/100g									
	12	g/100g			29.10.20	3,1167	3,0127	3,2206	0.0005	yes	70,7

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Lysin/L-Lysine	1	g/100g			06.10.20	2,2	2,1	2,2	0,2	no	
	2	g/100g			28.09.20	2,41	2,37	2,45	0,25	no	
	3	g/100g			15.09.20	2,76	2,75	2,77	0,002	no	
	4	g/100g				2,729	2,689	2,77	0,05	yes	101
	5	g/100g			04.10.20	2,16	2,18	2,13		no	
	6	g/100g				2,66	2,68	2,65	0,05	no	
	7	g/100g				2,68	2,71	2,65			
	8	g/100g				2,46	2,49	2,43	0,06		
	9	g/100g			28.09.20	2,24	2,23	2,24	0,05	no	-
	10	g/100g				2,49	2,44	2,53			
	11	g/100g				0,000472	0,000476	0,000469			
	12	g/100g			29.10.20	1,7711	1,7295	1,8128	0.0005	yes	100,6

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Methionin/L-Methionine	1	g/100g			06.10.20	0,47	0,46	0,47	0,2	no	
	2	g/100g			28.09.20	0,74	0,73	0,75	0,07	no	
	3	g/100g			16.09.20	0,6	0,6	0,6	0,003	no	
	4	g/100g				0,644	0,656	0,632	0,05	yes	96
	5	g/100g			04.10.20	0,56	0,57	0,56		no	
	6	g/100g									
	7	g/100g				0,63	0,64	0,62			
	8	g/100g				0,63	0,63	0,63	0,03		
	9	g/100g			28.09.20	0,58	0,57	0,58	0,05	no	-
	10	g/100g				0,57	0,59	0,55			
	11	g/100g				0,000063	0,000063	0,000063			
	12	g/100g			29.10.20	0,4801	0,4473	0,5129	0.0005	yes	98,04

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Phenylalanin/ L-Phenylalanine	1	g/100g			06.10.20	1,9	1,8	1,9	0,2	no	
	2	g/100g			28.09.20	2,24	2,22	2,25	0,26	no	
	3	g/100g			15.09.20	2,29	2,26	2,32	0,007	no	
	4	g/100g				2,245	2,252	2,238	0,05	yes	97
	5	g/100g			04.10.20	1,96	1,98	1,94		no	
	6	g/100g				2,35	2,37	2,33	0,07	no	
	7	g/100g				2,26	2,27	2,24			
	8	g/100g				2,09	2,13	2,05	0,01		
	9	g/100g			28.09.20	1,96	1,94	1,97	0,05	no	-
	10	g/100g				2,24	2,23	2,25			
	11	g/100g									
	12	g/100g			29.10.20	1,5702	1,5269	1,6134	0.0005	yes	92,3

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Prolin/L-Proline	1	g/100g			06.10.20	2,1	2,1	2,1	0,2	no	
	2	g/100g			28.09.20	2,52	2,73	2,3	0,15	no	
	3	g/100g			17.09.20	2,16	2,22	2,09	0,013	no	
	4	g/100g				2,617	2,638	2,596	0,05	yes	94
	5	g/100g			04.10.20	1,96	2,004	1,92		no	
	6	g/100g				2,73	2,7	2,74	0,11	no	
	7	g/100g				2,55	2,56	2,54			
	8	g/100g				2,59	2,59	2,58	0,01		
	9	g/100g			28.09.20	2,29	2,29	2,28	0,05	no	-
	10	g/100g				2,58	2,53	2,63			
	11	g/100g									
	12	g/100g			29.10.20						

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Serin/L-Serine	1	g/100g			06.10.20	1,9	1,8	1,9	0,2	no	
	2	g/100g			28.09.20	2,03	2,01	2,05	0,14	no	
	3	g/100g			15.09.20	2,37	2,33	2,4	0,005	no	
	4	g/100g				2,165	2,158	2,172	0,05	yes	93
	5	g/100g			04.10.20	1,21	1,24	1,19		no	
	6	g/100g				2,32	2,31	2,33	0,06	no	
	7	g/100g				2,45	2,47	2,43			
	8	g/100g				2,21	2,27	2,15	0,007		
	9	g/100g			28.09.20	2,25	2,24	2,25	0,05	no	-
	10	g/100g				2,22	2,12	2,32			
	11	g/100g									
	12	g/100g			29.10.20	2,1483	2,5693	1,7273	0.0005	yes	77

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Threonin/L-Thereonine	1	g/100g			06.10.20	1,4	1,4	1,4	0,2	no	
	2	g/100g			28.09.20	1,71	1,67	1,74	0,16	no	
	3	g/100g			15.09.20	1,68	1,66	1,69	0,011	no	
	4	g/100g				1,587	1,551	1,623	0,05	yes	97
	5	g/100g			04.10.20	1,31	1,32	1,3		no	
	6	g/100g				1,77	1,79	1,75	0,07	no	
	7	g/100g				1,68	1,7	1,66			
	8	g/100g				1,57	1,59	1,54	0,055		
	9	g/100g			28.09.20	1,53	1,54	1,51	0,05	no	-
	10	g/100g				1,66	1,59	1,72			
	11	g/100g									
	12	g/100g			29.10.20	1,3729	1,905	0,8408	0.0005	yes	73,1

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Tryptophan	1	g/100g			06.10.20	not determined					
	2	g/100g			21.09.20	0,42	0,42	0,41	0,09	no	
	3	g/100g			15.09.20	0,47	0,46	0,47	0,005	no	
	4	g/100g				0,533	0,543	0,524	0,05	yes	96
	5	g/100g			15.10.20	0,198	0,21	0,19		no	
	6	g/100g									
	7	g/100g			17.09.20	0,49	0,501	0,48			
	8	g/100g				0,54	0,53	0,54	0,008		
	9	g/100g			28.09.20	0,26	0,25	0,26	0,05	no	-
	10	g/100g									
	11	g/100g									
	12	g/100g			29.10.20						

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Tyrosin/L-Tyrosine	1	g/100g			06.10.20	0,98	0,97	0,98	0,2	no	
	2	g/100g			28.09.20	1,42	1,39	1,45	0,29	no	
	3	g/100g			15.09.20	1,46	1,46	1,45	0,008	no	
	4	g/100g				1,603	1,622	1,584	0,05	yes	97
	5	g/100g			04.10.20	1,37	1,35	1,39		no	
	6	g/100g				1,5	1,45	1,55	0,04	no	
	7	g/100g				1,46	1,47	1,44			
	8	g/100g				1,61	1,62	1,59	0,02		
	9	g/100g			28.09.20	1,17	1,16	1,17	0,05	no	-
	10	g/100g				1,47	1,39	1,54			
	11	g/100g									
	12	g/100g			29.10.20	1,2527	1,1928	1,3125	0.0005	yes	65,2

Parameter	Teilnehmer	Einheit	Proben-Nr. 1	Proben-Nr. 2	Datum d. Analyse	Ergebnis (Mittel)	Ergebnis 1	Ergebnis 2	Bestimmungsgrenze	Inkl. WF	Wiederfindungsrate [%]
Analyte	**Participant**	**Unit**	**Sample No. 1**	**Sample No. 2**	**Date of analysis**	**Result (Mean)**	**Result 1**	**Result 2**	**Limit of determination**	**Incl. RR**	**Recovery rate [%]**
L-Valin/L-Valine	1	g/100g			06.10.20	1,8	1,8	1,8	0,2	no	
	2	g/100g			28.09.20	2,22	2,17	2,26	0,19	no	
	3	g/100g			15.09.20	2,21	2,18	2,23	0,003	no	
	4	g/100g				2,263	2,254	2,271	0,05	yes	100
	5	g/100g			04.10.20	1,79	1,81	1,77		no	
	6	g/100g				2,32	2,32	2,32	0,03	no	
	7	g/100g				2,21	2,23	2,19			
	8	g/100g				2,16	2,17	2,14	0,008		
	9	g/100g			28.09.20	1,58	1,57	1,58	0,05	no	-
	10	g/100g				2,31	2,32	2,3			
	11	g/100g									
	12	g/100g			29.10.20	3,9752	5,067	2,8833	0.0005	yes	71,7

5.1.2 Analytical Methods

* For application of the same method notes to the method could be given for L-Alanine only.

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Alanin/L-Alanine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis	all: ion exchange chromatography with Ninhydrin post column derivatization; detection at 570nm, Pro at 440nm, Trp at 280nm	All amino acids: extern Sigma Aldrich Amino Acid Standard solution AAS18; calibartion range 1,25 to 20nmol		no	
	6	Determination of amino acids in food after hydrolysis via HPLC	Acid hydrolysis with 6 M HCl, 24 h at 110°C	Amino acids analyzer with post column derivatization	External standard, on-point-calibartion, reference material: milk protein		yes	
	7	Total amino acids (ccording to Regulation (Ec) Nr. 152/2009)	free amino acids (Pkt. 5.2 der Regulation (EC) Nr. 152/2009)		internal standard., one-point-calibration, fodder		yes	
	8	§64 LFGB L 49.07-2	Hydrolysis 6 N HCL	Derivatization Ninhydrin	DLA-59 2016	no	yes	x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10	ASU L 49.07-1 (May 1985) und L49.07-2 (November 1986)					yes/no	
	11							
	12	EZ: faast			DLA 50/2018		ja	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Arginin/L-Arginine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Asparaginsäure/ L-Aspartic acid	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Cystein/L-Cysteine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2							
	3	PA_A-202: 2016-01 (HPLC/FLD)	oxidation + acid hydrolysis + OPA-Dervatization				yes	
	4							
	5		acid hydrolysis				no	
	6							
	7							
	8	x	x	x	x	x	x	x
	9	-			-	-	-	
	10							Cysteic acid: 0,695 g/100g and 0,682 g/100g
	11							
	12							

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Cystin/L-Cystine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3							
	4							
	5		acid hydrolysis				no	
	6							
	7							
	8							
	9	HPLC/FLD - internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Cystin + L-Cystein	1							
	2							
	3							
	4							
	5	oxidation to cysteic acid, subsequently acid hydrolysis		external calibration with own stock solution from hydrochlorid cysteinic acid monohydrate (Merck); calibration range 0,4 bis 2,8 nmol		no		
	6							
	7							
	8							
	9							
	10							
	11							
	12							

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
Glycin/Glycine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Glutaminsäure/L-Glutamic acid	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Histidin/L-Histidine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					nein	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Isoleucin/Isoleucine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Leucin/L-Leucine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Lysin/L-Lysine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Methionin/L-Methionine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6							
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Phenylalanin/L-Phenylalanine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Prolin/L-Proline	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12							

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Serin/L-Serine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Threonin/L-Thereonine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				n	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Tryptophan	1							
	2	Determination by amino acid analyzer after acid hydrolysis					yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		enzymatic hydrolysis		external calibration with own stock solution from solid material (Serva Feinbiochemica); calibration range 0,2 bis 3,0 nmol		no	
	6							
	7	HPLC (according to Nr 4.11.2 VDLUFA Method book III, 2. Erg. 1988)			Three point calibration, feed		yes	
	8	VDLUFA III 4.11.2	hydrolysis LiOH	HPLC				x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12							

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Tyrosin/L-Tyrosine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

Parameter	Teil-nehmer	Methodenbeschreibung	Probenvorbereitung	Messmethode	Kalibrierung/Referenzmaterial	Wiederfindung mit gleicher Matrix	Methode akkreditiert	Sonstige Hinweise
Analyte	**Participant**	**Method description**	**Sample preparation**	**Measuring method**	**calibration/ reference material**	**Recovery with same matrix**	**Method accredited**	**Further remarks**
L-Valin/L-Valine	1	PALC19:2014-03 (HPLC/FLD after derivatization)			AA-18 Sigma		yes	
	2	Determination by amino acid analyzer after acid hydrolysis			internal standard		yes	
	3	PA_A-202: 2016-01 (HPLC/FLD)	acid hydrolysis + OPA-Derivatization				yes	
	4					no	yes	
	5		acid hydrolysis				no	
	6						yes	
	7							
	8							x
	9	HPLC/FLD – internal method PNTQ1339			external calib. curve and internal RM	no	yes	
	10							
	11							
	12	EZ: faast			DLA 50/2018		yes	

5.2 Homogeneity

5.2.1 Mixture homogeneity before bottling

Microtracer Homogeneity Test
DLA ptSU09

Weight whole sample	1,01	kg
Microtracer	FSS-rot lake	
Particle size	75 – 300	µm
Weight per particle	2,0	µg
Addition of tracer	24,7	mg/kg

Result of analysis

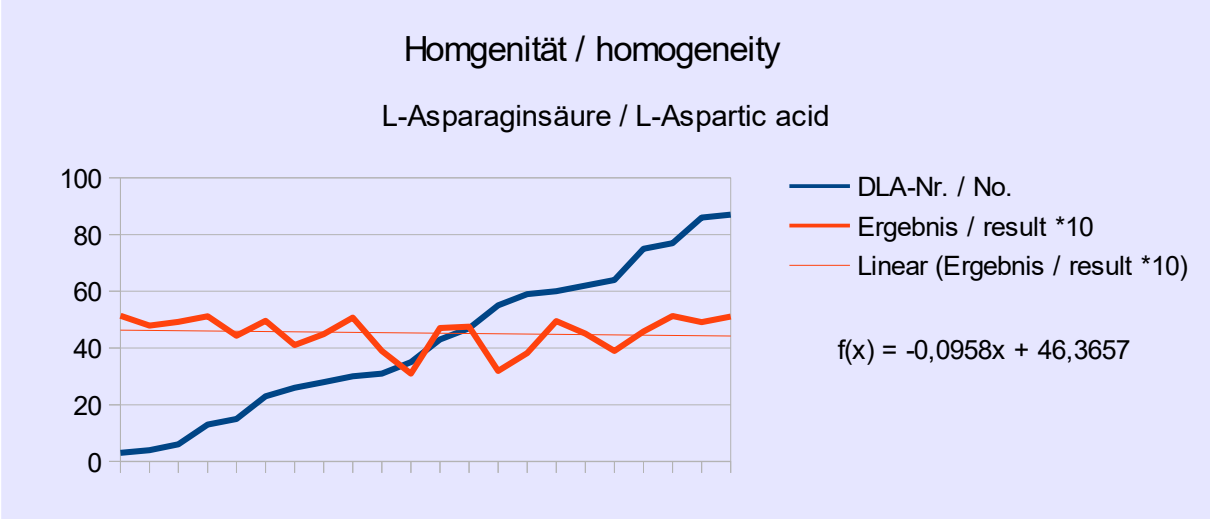
Sample	Weight [g]	Particle number	Particles [mg/kg]
1	5,04	75	29,8
2	4,98	75	30,1
3	5,01	79	31,5
4	5,02	61	24,3
5	5,03	74	29,4
6	4,98	66	26,5
7	5,05	67	26,5
8	4,97	76	30,6

Poisson distribution		
Number of samples	8	
Degree of freedom	7	
Mean	71,6	Particles
Standard deviation	6,28	Particles
χ^2 (CHI-Quadrat)	3,86	
Probability	**80**	%
Recovery rate	116	%

Normal distribution		
Number of samples	8	
Mean	28,6	mg/kg
Standard deviation	2,51	mg/kg
rel. Standard deviaton	8,77	%
Horwitz standard deviation	9,66	%
HorRat-value	**0,91**	
Recovery rate	116	%

5.2.2 Comparison of sample numbers / test results and trend line

By comparison of the increasing sample numbers and the measurement results of participants, the homogeneity of the chronological bottled PT items can be shown by the trend line for information:



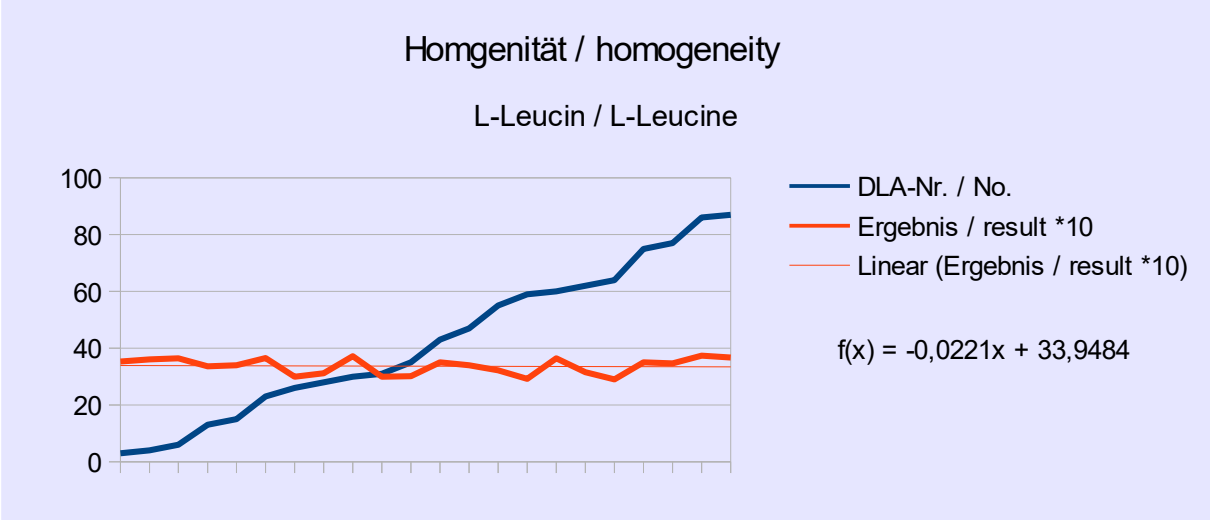


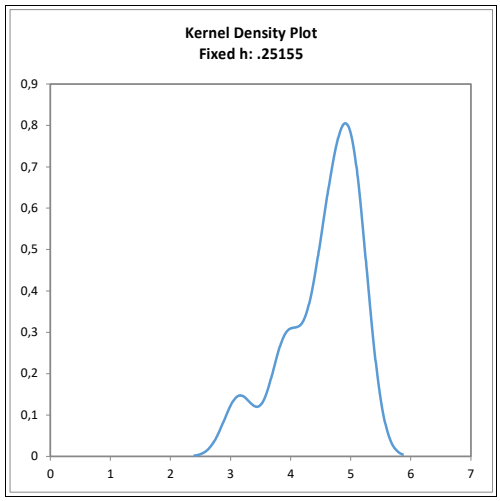
Abb./Fig. 37: Trendfunktion Probennummern vs. Ergebnisse: L-Asparaginsäure und L-Leucin (1*10 dargestellt)
trend line function sample number vs. results: L-aspartic acid and L-leucin (1*10 shown)

5.3 Kernel Density Plots of Results

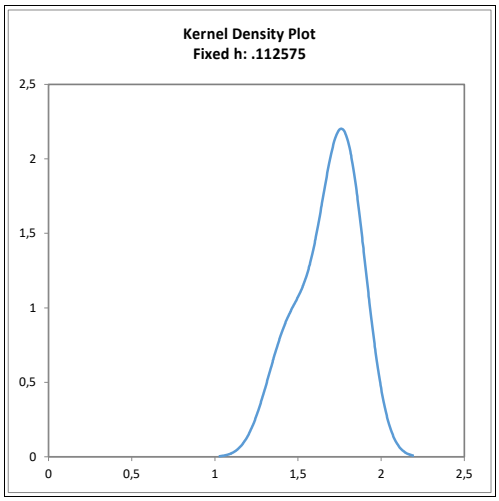
Abbildungen:
Kerndichte-Schätzungen
der Teilnehmerergebnisse
(mit h = 0,75 x σ_{pt} von Xpt)

Figures:
Kernel density plots
of participants' results
(with h = 0,75 x σ_{pt} of Xpt)

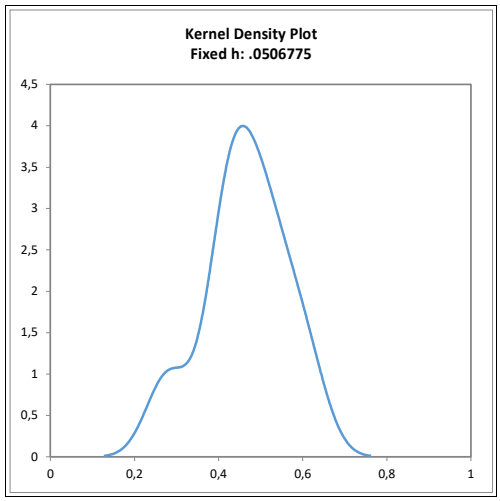
L-Asparaginsäure/L-Aspartic acid



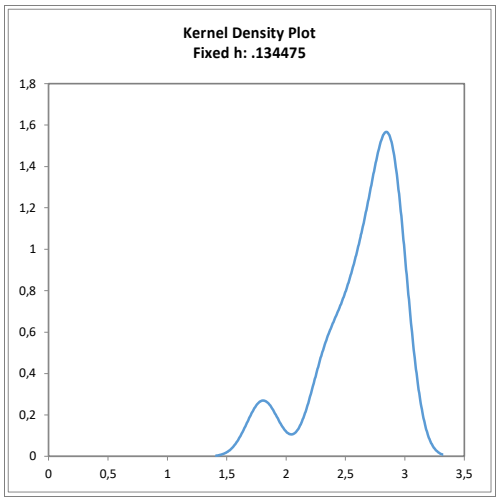
L-Alanin/L-Alanine



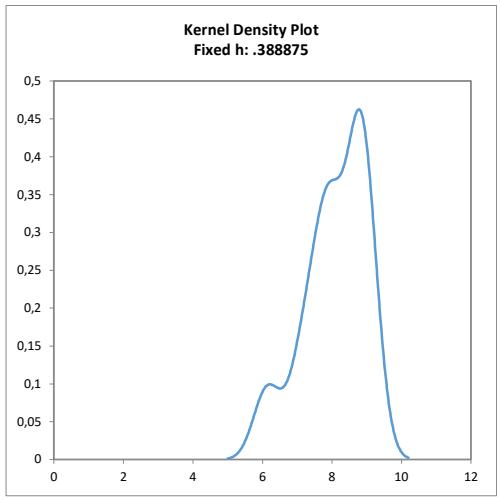
L-Cystin/L-Cystine



L-Arginin/L-Arginine



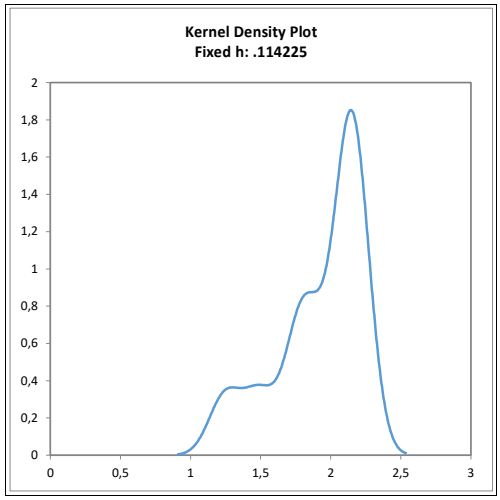
L-Glutaminsäure/L-Glutamic acid



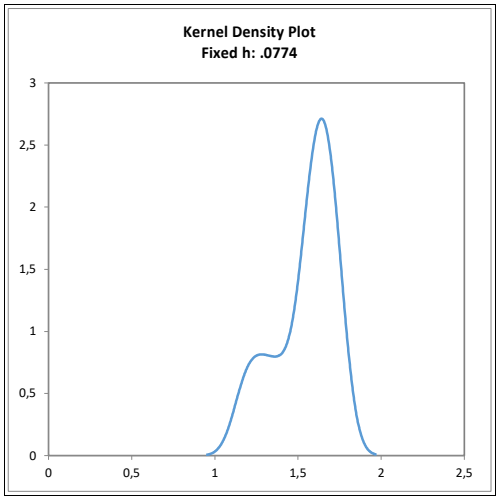
Abbildungen:
Kerndichte-Schätzungen
der Teilnehmerergebnisse
(mit h = 0,75 x σ_{pt} von Xpt)

Figures:
Kernel density plots
of participants' results
(with h = 0,75 x σ_{pt} of Xpt)

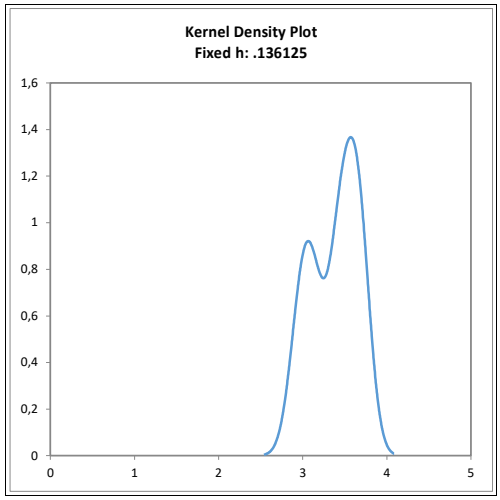
L-Isoleucin/L-Isoleucine



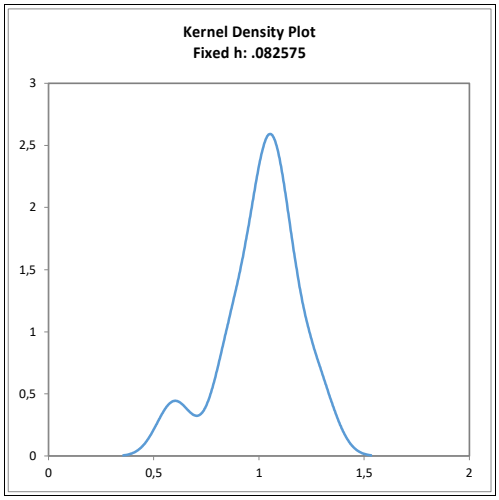
Glycin/Gycine



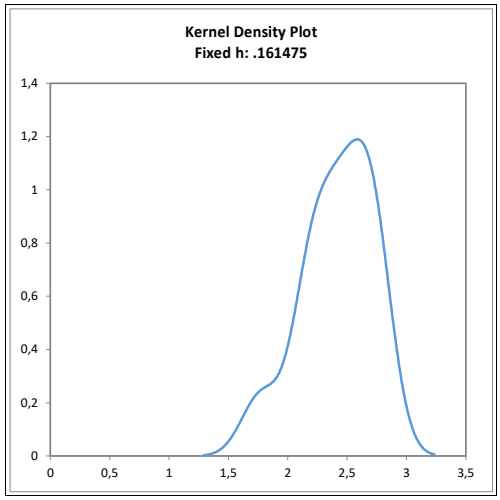
L-Leucin/L-Leucine



L-Histidin/L-Histidine



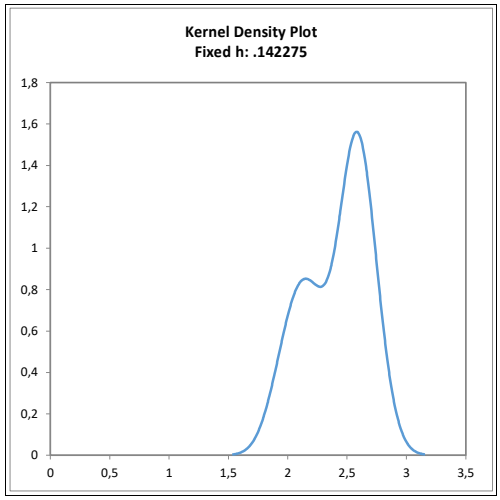
L-Lysin/L-Lysine



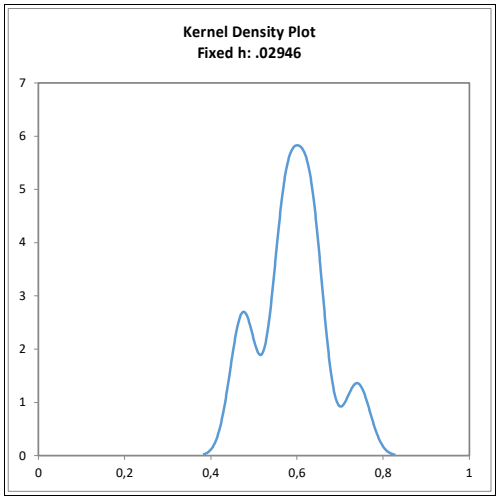
Abbildungen:
Kerndichte-Schätzungen
der Teilnehmerergebnisse
(mit h = 0,75 x σ_{pt} von X_{pt})

Figures:
Kernel density plots
of participants' results
(with h = 0,75 x σ_{pt} of X_{pt})

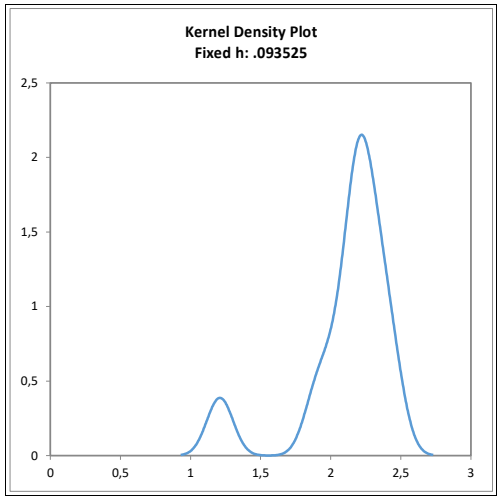
L-Prolin/L-Proline



L-Methionin/L-Methionine



L-Serin/L-Serine



L-Phenylalanin/L-Phenylalanine

< 8 Ergebnisse

< 8 Results

L-Threonin/L-Threonine

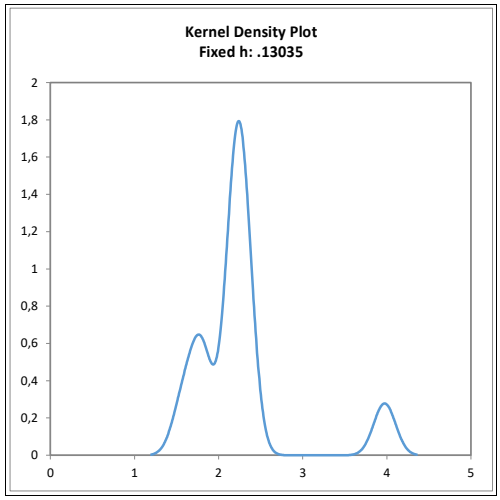
< 8 Ergebnisse

< 8 Results

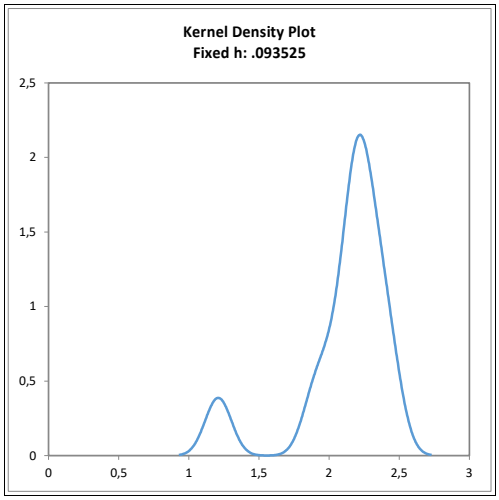
Abbildungen:
Kerndichte-Schätzungen
der Teilnehmerergebnisse
(mit h = 0,75 x σ_{pt} von Xpt)

Figures:
Kernel density plots
of participants' results
(with h = 0,75 x σ_{pt} of Xpt)

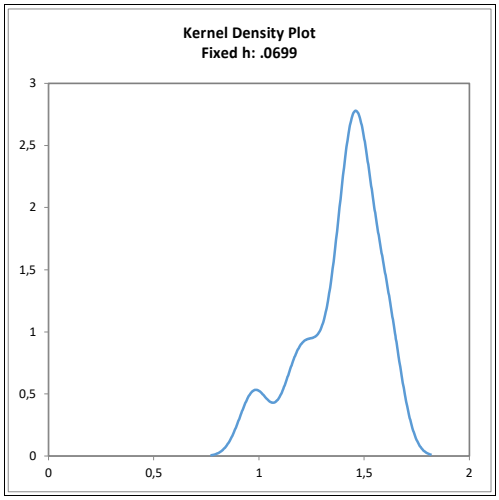
L-Valin/L-Valine



L-Tryptophan



L-Tyrosin/L-Tyrosine



5.5 Information on the Proficiency Test (PT)

Before the PT the participants received the following information in the sample cover letter:

PT number	***DLA SU09 (2020)***
PT name	***Total Amino Acid Composition in Food***
*Sample matrix**	***Samples I + II:*** *dietetic food (drink powder as a meal replacement) with a protein content <20% from soy and milk protein with vitamins, minerals and food additives.*
Number of samples and sample amount	*2 identical samples I + II, 10 g each.*
Storage	*Samples I + II: room temperature (dry and dark)*
Intentional use	*Laboratory use only (quality control samples)*
Parameter	*quantitative:* ***diverse amino acids after protein hydrolysis*** *(see result submission file)*
Methods of analysis	*Analytical methods are optional*
Notes to analysis	*The analysis of PT samples should be performed like a routine laboratory analysis.* *In general we recommend to homogenize a representative sample amount before analysis according to good laboratory practice, especially in case of low sample weights.*
Result sheet	*The results for sample I and II as well as the final results calculated as mean of the double determination (samples I and II) should be filled in the result submission file. The recovery rates, if carried out, has to be included in the calculation.*
Units	*g/100g*
Number of significant digits	*at least 2*
Further information	*For information please specify:* – *Date of analysis* – *DLA-sample-numbers (for sample I and II)* – *Limit of detection* – *Assignment incl. Recovery* – *Recovery with the same matrix* – *Method is accredited*
Result submission	*The result submission file should be sent by e-mail to:* ***pt@dla-lvu.de***
Last Deadline	***the latest October 30th 2020***
Evaluation report	*The evaluation report is expected to be completed 6 weeks after deadline of result submission and sent as PDF file by e-mail.*
Coordinator and contact person of PT	*Matthias Besler-Scharf PhD*

** Control of mixture homogeneity and qualitative testings are carried out by DLA. Any testing of the content, homogeneity and stability of PT parameters is subcontracted by DLA.*

6. Index of participant laboratories in alphabetical order

Teilnehmer / Participant	Ort / Town	Land / Country
		Deutschland/Germany
		Deutschland/Germany
		Deutschland/Germany
		Deutschland/Germany
		Deutschland/Germany
		Deutschland/Germany
		Deutschland/Germany
		Deutschland/Germany
		Deutschland/Germany
		Deutschland/Germany
		SPANIEN/SPAIN
		Deutschland/Germany

[Die Adressdaten der Teilnehmer wurden für die allgemeine Veröffentlichung des Auswerte-Berichts nicht angegeben.]

[The address data of the participants were deleted for publication of the evaluation report.]

7. Index of references

1. DIN EN ISO/IEC 17025:2005; Allgemeine Anforderungen an die Kompetenz von Prüf- und Kalibrierlaboratorien / General requirements for the competence of testing and calibration laboratories
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