

Applied method (e.g. AOAC, DIN, EN, ISO, EPA, ASTM, §64, company sop, etc.)

DIN ISO 14891, IDF 185, 2002, Determination of nitrogen – routine method using combustion principle according to Dumas. This particular sample has been a Ringtest sample received from FAPAS in 2020.

Instruments

- | | |
|---|--|
| 1 | Analytical Balance (readability 0,1 mg or better) |
| 2 | Knife for preparation of small 1x1mm blocks of chocolate if needed |
| 3 | DUMATHERM N Pro, standard configuration |

Gases and Consumables

- | | | |
|---|--|---------|
| 1 | Helium and Oxygen, bottle gas, min. quality grade 5.0 | |
| 2 | Nitrogen or compressed air as bottle gas, min. quality grade 2.6 | |
| 3 | DumaReact, Combustion Reactor, packed with catalyst | 14-0245 |
| 4 | DumaTube, Quartz glass for reactor | 14-0203 |
| 5 | DumaFoil, Tin Foil for packing the samples | 14-0017 |
| 6 | DumaEDTA, Standard for Calibration, purity > 99 % | 14-0032 |

Method Settings

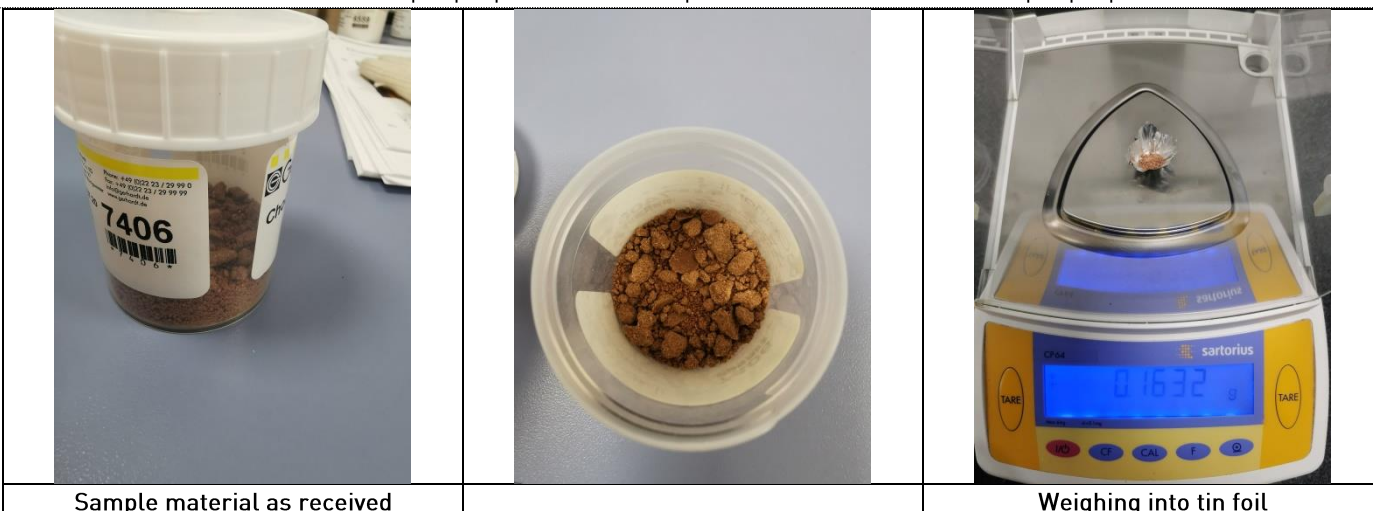
Sample Weight	150 – 200 mg
Packing of the sample	Tin foil
Combustion Method	C 1,0 (200 ml O ₂ / min, 1.0 ml O ₂ / mg sample)
Protein Factor	6,25
Combustion Temperature [°C]	1030
Reduction temperature [°C]	750
Recommended Calibration Range	1 – 10 mg N absolute (measured with 10-100 mg EDTA)

Homogenization / Preparation

The chocolate powder is directly taken as is for the weighing procedure. Mechanical grinding is not possible.

The material should be kept at room temperature (≤ 20 °C) during the weighing procedure.

Further homogenization can only be achieved with some chocolates types with using a water bath at approx. 50°C or lower. Official norms for food sample preparation will help further with a suitable sample preparation.



Sample material as received

Weighing into tin foil

Example Results



Dumatherm Nitrogen / Protein Analyser

Serial Number :	1005	Submitter :	FAPAS Schoko
Software Version:	DUMATHERM MANAGER V8.09	Operator :	Dr. Werner Küppers

Date	Time	Sample name	Weight [mg]	Protein factor	Nitrogen Peak Area [mV*s]	N Weight [mg]	Nitrogen [%]	Protein [%]
10.08.2020	11:25:18	7406	162,600	6,25	6,988E+03	1,717	1,056	6,60
10.08.2020	11:30:33	7406	166,551	6,25	7,148E+03	1,757	1,055	6,59
10.08.2020	11:35:44	7406	171,084	6,25	7,327E+03	1,801	1,053	6,58
10.08.2020	11:40:51	7406	161,114	6,25	6,892E+03	1,693	1,051	6,57
10.08.2020	11:46:05	7406	171,199	6,25	7,365E+03	1,810	1,057	6,61
10.08.2020	11:51:24	7406	164,425	6,25	7,057E+03	1,734	1,055	6,59

Calibration number and standard name :	for N	PBS V 1 (L-L-L)	EDTA	Average	1,054	6,59
Method :		C1,0		Standard Deviation	0,002	0,01
Sample Table :		Ringtests		RSD [%]	0,216	0,22

Temperatures:		Flow Rates:		Carrier Gas: He		Times:	
Combustion Reactor	1029 °C	He(FC1):	195,0 ml/min	Sample Delay		9 s	
Reduction Reactor	749 °C	He(FC2):	199,0 ml/min	Sample Stop		13 s	
Degassing Oven	299 °C	Oxygen	200,0 ml/min	Run Time		Auto	

DIN ISO 14891 (IDF 185), 2002, Determination of nitrogen content, routine method using the combustion method acc. to Dumas principle, a standard deviation of $s_r \leq 0,050$ for % N in milk powder is required. Chocolate is not mentioned in particular. The received results are within this range. No further sample homogenization or an increase of weight is necessary. The following Z-score plot shows all Ringtest Dumas results with the Gerhardt Dumatherm N Pro result marked in the orange square: The assigned value was determined to 1,04 %N (variation of +/- 0,08 for % N).

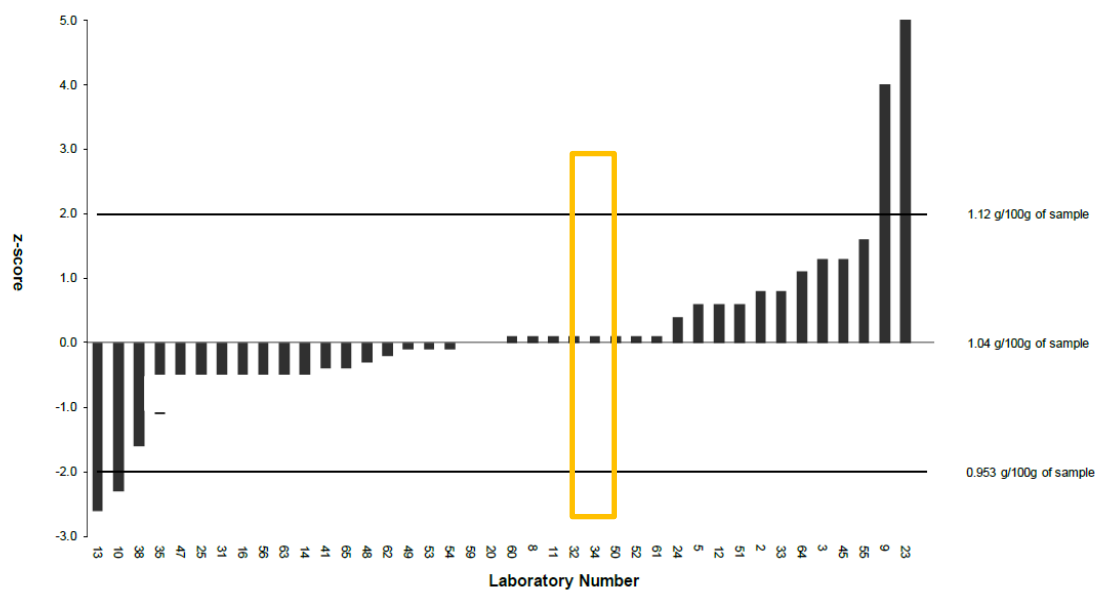


Figure 3: z-Scores for Nitrogen

Remarks

The received value with Dumatherm N Pro was fitting perfectly into the statistics of the Ringtest.



CERTIFICATE OF PARTICIPATION

This certificate confirms that:
C. Gerhardt GmbH & Co. KG

took part in:
Food Chemistry Proficiency Test **25186**
Start Date: 21/07/2020
Moisture , Total Fat , Nitrogen , Butyric Acid (C4:0) , Lactose , Sucrose in
Chocolate

and were allocated laboratory number **24**.

The performance of the laboratory is shown in the relevant report, which is available
from the secure pages at fapas.com

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