

Application Short Note DUMATHERM

Nitrogen/Protein in Soy Flour

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

AOAC 992.23: grains and oilseeds; DIN ISO 16634-1: Food products – Determination of the total nitrogen content by combustion according to the Dumas principle and calculation of the crude protein content.

Instruments

1	Analytical Balance (readability 0,1 mg or better)
2	Homogenizer, e.g. Speed Rotor Mill, Pulverisette 14 (Fritsch), 0,75 mm sieve size
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	250 +/- 10 mg
Packing of the sample	Tin foil 14-0017
Combustion Method	B 1,8 (O ₂ dosing 300 ml O ₂ / min, 1.8 ml O ₂ / mg sample)
Protein Factor	6,25
Combustion temperature [°C]	1030
Reduction temperature [°C]	750
Recommended Calibration Range	1 – 25 mg N abs. (EDTA, 20 equidistant points, 10-250 mg)

Homogenization / Preparation

The sample was measured as received. In case the level of homogenization is not resulting in acceptable repeatability's according to the above mentioned norm ($sd \leq 0,29$), the sample was additionally grinded to 0,75 mm sieve size with a speed rotor mill.



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Results with the same sample, now ground to 0,75 mm sieve size:



Dumatherm Nitrogen / Protein Analyser

Serial Number : 10023
Software Version: DUMATHERM MANAGER V8.11

Submitter : 0,75mm grinded
Operator : Dr. Werner Küppers

Date	Time	Sample name	Weight [mg]	Moisture [%]	Protein factor	Nitrogen Peak Area [mV*s]	N Weight [mg]	Nitrogen [%]	Protein [%]
02.10.2020	09:49:56	7450	256,800	0,00	6,25	7,983E+04	20,321	7,913	49,46
02.10.2020	09:55:27	7450	252,100	0,00	6,25	7,838E+04	19,954	7,915	49,47
02.10.2020	10:01:02	7450	256,200	0,00	6,25	7,972E+04	20,292	7,920	49,50
02.10.2020	10:06:42	7450	258,400	0,00	6,25	8,075E+04	20,552	7,953	49,71
02.10.2020	10:12:13	7450	250,400	0,00	6,25	7,781E+04	19,812	7,912	49,45
02.10.2020	10:17:50	7450	252,500	0,00	6,25	7,800E+04	19,861	7,866	49,16

Average	7,913	49,46
Standard Deviation	0,028	0,18
RSD [%]	0,355	0,35

Calibration number for N WKU 300320 Full Ran EDTA
and standard name :

Method : B1,8
Sample Table : bar magen 2

Temperatures

Combustion Reactor 1029 °C
Reduction Reactor 750 °C
Degassing Oven 300 °C

Flow Rates

Carrier Gas: He
He(FC1): 195,0 ml/min
He(FC2): 199,0 ml/min
Oxygen 299,0 ml/min

Times

Sample Delay 7 s
Sample Stop 11 s
Run Time Auto

The repeatability limits of AOAC 992.23 ($s_r \leq 0,29$ for % Protein) were met.

Remarks

It is important to take a representative sample weight of the well homogenized sample material.

Mix the sample before weighing thoroughly with a spatula to receive a representative sample portion for weighing.