

Nitrogen & protein determination in milk powder

KjelDigester K-449, KjelMaster K-375 with KjelSampler K-376:
Nitrogen and Protein Determination in Milk Powder (Certified Reference Material) According to the Kjeldahl Method by Colorimetric Titration

1. Introduction

A reliable and efficient method for the determination of total nitrogen and protein in milk powder, according to EN ISO 8968-1:2014, AOAC 930.29 and AOAC 991.20, is presented.

2. Experiment

Sample:

Whole milk powder, skimmed milk powder

Equipment:

KjelDigester K-449 (the parameters used are also valid for the K-446), Scrubber K-415 TripleScrub^{ECO}, KjelMaster K-375 with colorimetric sensor, KjelSampler K-376 (the parameters used are also valid for the K-377)

Procedure:

The samples are digested using the KjelDigester K-449. The distillation and boric acid titration are performed with the KjelMaster System K-375 / K-376 equipped with a colorimetric sensor. The combination of the KjelDigester K-449 and the KjelMaster system K-375 / K-376 increases the sample throughput.

Table 1. Distillation and titration parameters of the KjelMaster system K-375 / K-376.

Parameters	Settings
Reaction time	5 s
Distillation time	180 s
Titration type	Boric acid
Sensor type	Colorimetric



3. Results

The results of the determined protein content in whole milk powder and in skimmed milk powder are shown in Table 2.

Table 2. Results of protein content in whole milk powder and skimmed milk powder (n=5).

Sample	Labelled protein [g/100g]	Ø Determined protein [%]	RSD [%]	Recovery rate [%]
Whole milk powder	26.44	26.25	0.30	99.3
Skimmed milk powder	33	33.30	0.41	100.9

4. Conclusion

The determination of nitrogen and protein in milk powder using the KjelDigester K-449 and KjelMaster system K-375 / K-376 by colorimetric titration provides reliable and reproducible results and is fully automated. These results correspond well to the labelled values of the milk powders and with the results determined by potentiometric titration shown in the Application Note 104/2013 with low relative standard deviations (RSD). For further information please download the full application note from the website.

5. References

- Application Note No. 180/2015: Nitrogen & protein determination in milk powder
- EN ISO 8968-1:2014 Milk and milk products – Determination of nitrogen content - Part 1: Kjeldahl principle and crude protein calculation - Block-digestion method
- AOAC 991.20 Nitrogen (Total) in Milk – Kjeldahl Method - Block Digester / Steam Distillation Method
- AOAC 930.29 Protein in Dried Milk
- Application Note 104/2013, Nitrogen and Protein Determination in Milk Powder
- Technical Note 179/2015 Colorimetric titration procedure using Sher indicator
- KjelOptimizer App
- Operation Manual of KjelDigester K-446 / K-449
- Operation Manual of Scrubber K-415
- Operation Manual of KjelMaster system K-375 / K-376