

Protein determination in animal feed

KjelDigester K-449, KjelMaster K-375 with Optrode and KjelSampler K-376:

Proteindetermination in animal feed according to ISO 5983-2 and AOAC 2001.11 by digestion with Kjeldahl tablets and hydrogen peroxide followed by colorimetric titration using Optrode

1. Introduction

A reliable and efficient method for the determination of total nitrogen and protein in animal feed according to ISO 5983-2 [1] and AOAC 2001.11 [2] is presented.

2. Experiment

Sample:

L-Tryptophan (assay $\geq 99\%$), Merck (1.08374.0010)
Horse feed "Derby Country" (photo on title page). According to an external testing lab (Weissling GmbH, DE-48341 Altenberge, Germany) the protein content is $11.90 \pm 0.10\%$ (w/w).

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 Optrode
KjelSampler K-376 (the parameters used are also valid for the K-377)

Procedure:

The samples are first homogenized and afterwards the homogenized sample is digested. After the digestion, the sample is distilled and titrated.



Table 1. Parameters and settings for K-375 / K-376

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

3. Results

The Results of the determination of nitrogen in a reference substance and protein in a sample are shown in Table 2.

Table 2. Results of the determination of nitrogen in a reference substance (n=2) and protein in a sample (n= 3).

Sample	Labelled content	Ø Nitrogen content [%]	RSD [%]	Recovery rate [%]	Ø Protein content [%]	RSD [%]
Tryptophan	13.58 % Nitrogen	12.46	0.07	99.1	-	-
Derby Country	11.9 % Protein	-	-	-	12.09	0.66

4. Conclusion

The determination of nitrogen and protein in animal feed using the KjelDigester K-449 and KjelMaster System K-375 / K-376 by automated colorimetric titration according to ISO 5983-2 and AOAC 2001.11 provided reliable and reproducible results which corresponded perfectly to the results by an external testing lab. Due to the high-efficient instruments and optimized method, the determination time per sample was about 5 minutes only while the consumption of chemicals was reduced to a minimum. For further information please download the full application note from the website.

5. References

Application Note No. 339/2018

[1] ISO 5983-2 Animal feeding stuffs –Determination of nitrogen content and calculation of crude protein content, Part 2: Block digestion and steam distillation method

[2] AOAC 2001.11: Protein (Crude) in Animal Feed, 2018: Protein determination in animal feed Forage (Plant Tissue), Grain, and Oilseeds Technical Note No.335/2018 Colorimetric titration with Optrode sensor

Kjeldahl Optimizer App for the optimization of the method parameters.

Operation Manual of KjelDigester K-446 / K-449

Operation Manual of Scrubber K-415

Operation Manual of KjelMaster system K-375 / K-376