

Determination of Protein Content in Instant Noodles Using a Cooling Water- Free Fully Automatic Kjeldahl Nitrogen Analyzer

Version Number: GDN-20250626-01-KNA

Reference standard

- [1] GB 5009.5-2016 National Food Safety Standard - Determination of Protein in Foods [S].

Testing with GDANA N810 Cooling Water-free Fully Automatic Kjeldahl Nitrogen Analyzer



Copyright© 2025 Grand Analytical Instrument Co., Ltd.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission.

Tel: 020-87684846

Email: info@gdana.com

Web: <http://www.gdana.com>

5th Floor, Building 7, LianDong U Valley Guangzhou Nansha International Enterprise Park, Zhixin 1st Road,
Dagang Town, Nansha District, Guangzhou, China, 511455

Application Note

I> Introduction

Instant noodles, also known as fast noodles, cup noodles, quick food noodles or ready-to-eat noodles, are generally called bowl noodles in the south of China and "GongZai noodles" in Hong Kong. It is a kind of flour-based food that can be cooked and eaten after being soaked in hot water in a short time. In this experiment, the Kjeldahl nitrogen determination method was adopted to analyze the samples. This method features strong universality (applicable to various organic nitrogen-containing samples), classic reliability, relatively low equipment cost, the ability to verify its accuracy through spiked recovery experiments, and controllable blank values. It is helpful for accurately determining the total nitrogen/crude protein content in the samples and provides a reliable basis for subsequent protein content calculations.

II> Instruments and Reagents

2.1 Instruments

N810 Cooling Water-Free Fully Automatic Kjeldahl Nitrogen Analyzer, NDS-20 Graphite Digestion Furnace (20-position), Analytical Balance (0.0001g precision), High-Speed Grinder, etc.

2.2 Reagents

Sulfuric Acid (Analytical Reagent Grade), 20g/L Boric Acid Solution, Bromocresol Green-Methyl Red Mixed Indicator, 400g/L Sodium Hydroxide Solution, Mixed Catalyst

Copyright© 2025 Grand Analytical Instrument Co., Ltd.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission.

Tel: 020-87684846

Email: info@gdana.com

Web: <http://www.gdana.com>

5th Floor, Building 7, LianDong U Valley Guangzhou Nansha International Enterprise Park, Zhixin 1st Road, Dagang Town, Nansha District, Guangzhou, China, 511455

Application Note

(3g K_2SO_4 , 0.2g $CuSO_4$) or Catalyst Tablets, 0.1mol/L Hydrochloric Acid Standard

Titration Solution.

2.3 Sample

Powdered instant noodles ground using a high-speed grinder.

III> Experimental Procedure

3.1 Sample Preparation

After grinding, homogenize the sample. Weigh 0.3g (accurate to 0.1mg). Wrap the sample using weighing paper and place it into a digestion tube. Add 2 mixed catalyst tablets (or 3.2g mixed catalyst powder), followed by adding 10mL concentrated sulfuric acid along the wall of the digestion tube.

Note: To ensure consistency between the sample and blank sample digestion contents, add a piece of weighing paper to the blank sample digestion tube for digestion together.

3.2 Digestion

Place the digestion tubes containing the samples and reagents onto the digestion furnace. Cover with the exhaust hood. Set the digestion furnace parameters as shown in Table 1:

Copyright© 2025 Grand Analytical Instrument Co., Ltd.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission.

Tel: 020-87684846

Email: info@gdana.com

Web: <http://www.gdana.com>

5th Floor, Building 7, LianDong U Valley Guangzhou Nansha International Enterprise Park, Zhixin 1st Road, Dagang Town, Nansha District, Guangzhou, China, 511455

Application Note

Table 1 Digestion Parameter Settings

Stage	Temperature	Digestion Time
1	230°C	40min
2	420°C	120min

3.3 Instrument Testing

After digestion is complete, allow the digestion tubes to cool to room temperature before removal. Check the sufficiency of reagents in the nitrogen analyzer. Perform an instrument blank test simultaneously. Once the instrument blank stabilizes, the digested samples can be tested on the instrument. The nitrogen analyzer parameter settings are shown in Table 2:

Table 2 Nitrogen Analyzer Parameter Settings

Boric Acid	Dilution Water	Alkali Solution	Distillation Time	Protein Factor	Titration Acid Concentration
30mL	30mL	50mL	5min	6.25	0.09987mol/L

Copyright© 2025 Grand Analytical Instrument Co., Ltd.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission.

Tel: 020-87684846

Email: info@gdana.com

Web: <http://www.gdana.com>

5th Floor, Building 7, LianDong U Valley Guangzhou Nansha International Enterprise Park, Zhixin 1st Road, Dagang Town, Nansha District, Guangzhou, China, 511455

Application Note

IV. Results Analysis and Discussion

4.1 Experimental Results

The selected raw sunflower seed samples underwent digestion, distillation, and titration. The experimental results are shown in Table 3:

Table 3 Protein Content Test Results

Sample Name	Sample Weight (g)	Blank Volume (mL)	Titration Volume (mL)	Protein Content (%)	Average (%)	RSD/%
Instant Noodles	0.5197	0.0372	5.6732	9.45	9.52	1.07
	0.5125		5.7065	9.64		
	0.5183		5.6732	9.48		

4.2 Conclusion

The mean protein content of the instant noodle samples tested using the N810 Cooling Water-Free Fully Automatic Kjeldahl Nitrogen Analyzer was 9.52%, with an RSD value of 1.07%. The experimental results demonstrate excellent parallelism.

Copyright© 2025 Grand Analytical Instrument Co., Ltd.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission.

Tel: 020-87684846 Email: info@gdana.com Web: <http://www.gdana.com>
5th Floor, Building 7, LianDong U Valley Guangzhou Nansha International Enterprise Park, Zhixin 1st Road,
Dagang Town, Nansha District, Guangzhou, China, 511455

Application Note

Precautions

When grinding samples, avoid running the grinder for extended periods to prevent overheating.

Copyright© 2025 Grand Analytical Instrument Co., Ltd.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission.

Tel: 020-87684846

Email: info@gdana.com

Web: <http://www.gdana.com>

5th Floor, Building 7, LianDong U Valley Guangzhou Nansha International Enterprise Park, Zhixin 1st Road,
Dagang Town, Nansha District, Guangzhou, China, 511455