

Determination of Total Volatile Basic Nitrogen (TVB-N) in fish

Determination of Total Volatile Basic Nitrogen (TVB-N) in fish using MultiKjel

1. Introduction

An easy and reliable method for the determination of the Total Volatile Basic Nitrogen (TVB-N) in fish sample is introduced. This Application Note is compliant with the EC guideline (EC No. 853/2004) [1] and ISO 19615 [2]. TVB-N compounds include ammonia, dimethylamine and trimethylamine and are a product of amine degradation by microorganisms. The determination of TVB-N is of great importance to ensure freshness and therefore quality of a product.

2. Experimental

Equipment: MultiKjel or MultiDist with titrator, for example Metrohm Eco Titrator

Sample: Fish sample with a certified TVB-N content of 52.49 ± 5.35 mg/100 g.

Procedure: A protein-free extract of a certified, homogeneous fish sample is prepared with 0.6 N perchloric acid and an aliquot of the extract is taken. The distillation and boric acid titration are performed with the MultiKjel in combination with the Metrohm Eco Titrator., respectively, applying the parameters specified in Table 1.

Table 1: Parameters for distillation and titration with the MultiKjel and Eco Titrator, respectively.

Method parameters MultiKjel		Instrument Settings	
Reaction Detection	Off	MaxAccuracy mode	On
H ₂ O Volume	0 mL	Chiller/Tap water	Chiller F-314
NaOH Volume	4 mL	Chiller temperature	10°C
Reaction Time	5 s	AutoDist mode	On
Steam Steps	Fixed time		
Steam Power	90 %	Automated Titration on Eco Titrator	
Level Detection	Off	Eco Titrator Method	
Distillation Time	300 s	Titrant	HCl 0.01 M
Stirrer Speed Distillation	5	Sensor type	Potentiometric
Titration Type	Boric acid titration	Method	Nitrogen (N)
H ₃ BO ₃ Volume	60 mL (2%)	Endpoint	pH = 4.65
Stirrer Speed Titration	8		
Titration Start Time	300 s		
Sample Tube Aspiration	20 s		
Receiver Aspiration	20 s		



3. Results

The results of the TVB-N determination in fish products are presented in Tables 2.

Table 2: Results of the TVB-N determination.

Fish (CRM)	m _{Sample} [g]	V _{Sample} [mL]	Nitrogen [mg]	TVB-N [mg/100 g]
Sample 1	10.018	20.6800	2.786	50.06
Sample 2	10.194	20.9530	2.824	49.87
Average [%]	-	-	2.805	49.96
Rsd [%]	-	-	0.27	0.27



4. Conclusion

The determination of TVB-N in fish products using the Kjel Line systems (e.g. MultiKjel) with potentiometric titration provides reliable and reproducible results. These results correspond well to the certified reference values of 52.49 ± 5.35 mg/100 g with low relative standard deviations.

5. References

- [1] Official Journal of the European Communities, No 853/2004.
- [2] ISO 19615 Meat and fish products - Determination of volatile basic nitrogen.

For more information, please refer to Application Note 847/2024.