

Total SO₂ content determination in shrimp-paste by modified Monier-Williams method

MultiDist and BasicDist:

Determination of total sulfur dioxide content in shrimp-paste by modified Monier-Williams method.

1. Introduction

Total SO₂ is defined as “the total of all the various forms of sulfur dioxide present in the sample, either in the free state or combined with their constituents” [1]. Its determination in solid samples poses a challenge because SO₂ is with held in adducts and is released slowly during boiling. Recognized results are obtained by means of the generally accepted Optimized Monier-Williams method according to AOAC 990.28 [2] which suggests the use of nitrogen-assisted boiling of the acidified sample to release the Total SO₂. The method presented in this study provides equally quantitative results with much less time required per sample and is based on steam distillation followed by pH titration.

2. Experiment

Sample:

Shrimp paste

Equipment:

MultiDist with EcoTitrator and F-314 Recirculation chiller (11K36532211)

BUCHI Sample tubes 300 mL (043982)

Procedure:

SO₂ determination involves in-situ acidification of the sample by dosing an acid mixture, followed by distillation with two steam power steps and simultaneous collection of the distillate in 3 % H₂O₂ solution. After the distillation a pH titration is carried out against standard NaOH as a titrant using Eco Titrator.



Table 1. Parameters and Settings for MultiDist.

| Parameters | Settings |
|-------------------|----------------------|
| Reaction time | 5 s |
| Distillation Time | 600 s |
| Titration type | Boric acid titration |
| Sensor type | pH electrode |

3. Results

The Results of the determination of SO₂ in Shrimp paste is shown in Table 2.

Table 2. Results of the determination of SO₂ in Shrimp paste (n= 5).

| Sample | Ø SO ₂ concentration measured [ppm] | RSD [%] |
|--------------|--|---------|
| Shrimp paste | 44.034 | 3.189 |

4. Conclusion

The recoveries for reference standard HMS on average were 99.67 % in the range for 1 mg SO₂/sample tube (absolute amount). The sample weight is adjusted accordingly (20 g in this case), in this concentration range. The average obtained concentration of 44 ppm (SD = 1.4 ppm) matches well with the declared concentration 41 ppm (SD = 9.7 ppm). For further information please download the full application note from the website.

5. References

Application Note No. 791/2022: Total SO₂ content determination in shrimp-paste by modified Monier-Williams method

[1] Compendium of International Methods of Analysis – OIV, Sulfur dioxide, Method OIV-MAAS323-04A

[2] AOAC Official Method 990.28, Sulfites in Foods, Optimized Monier-Williams Method Operation Manual of Distillation Unit MultiDist