APPLICATION NOTE

F&F-K-001-2022/A1

Sulphites Determination in Dried Apricots

according to the Monier-Williams method

Reference: **AOAC 990.28** Sulphites in Foods - Optimized Monier-Williams Method

Tested with **VELP Scientifica UDK distillation units** (F30200145)

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SO_2 DETERMINATION IN DRIED APRICOTS MONIER-WILLIAMS METHOD

Introduction

Sulphites, in various forms, have been added to foods as preservatives agents and for other purposes for centuries. Their use became an issue of concern when some sensitive individuals exhibited adverse reactions to sulphite residues in foods. This fact lowers the concentration which was considered safe for human consumption and increases the number of control analyses to be performed. Therefore, analytical methods were developed to monitor these compounds at the regulatory limit of 10 ppm.
Based on a 60-year database, the Monier-Williams procedure still remains the reference method (Fazio *et al.*, 1989).

Sulphur Dioxide Determination in Dried Apricots

One of the most commonly used methods for this analysis is the sulphur dioxide distillation from complex matrixes followed by iodine titration. This steam distillation considerably shortens the time required, without affecting the results.
This method shows comparable results to the ones obtained by using the Monier-Williams technique.

Chemicals

- Starch solution 1 %
- Iodine solution 0.02 N
- Hydrochloric acid (HCl) 7 %

Sample

Standard FAPAS	Dried apricots (water/fruit slurry)
Ref. Number	T2095QC
Quantity	100 g
Analyte	Sulphur dioxide
Assigned value	1483 mg/kg
Satisfactory range	1325-1641 mg/kg

Sample Preparation

Homogenize the sample avoiding unnecessary exposure to air.
Weigh up to 10 g (± 1 mg) of sample into a standard 250 ml test tube.

Distillation and Titration

Prepare the receiving solution in a 250 ml Erlenmeyer flask, adding 75 ml of distilled water 10 drops of starch solution and 6 drops of iodine solution 0.02 N. The receiving solution color is light blue.

Distill the sample according to the following parameters (set in a customizable method):

- H_2O (dilution water): 50 ml
- HCl (7 %): 30 ml *
- Distillation time: 6 minutes
- Steam power: 50 %
- Set no automatic distillation residues discharge at the end of the distillation.

Prepare some blanks with all the chemicals, without the sample.
Titrate the distillate with iodine solution 0.02 N in order to get the solution back to light blue.
It was found that using always the same amount of iodine reagent (6 drops) in the starting solution, titration is facilitated and accuracy is increased.

* Added with acid pump kit UDK 1X9 230V (Code A00000422)

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Typical Results on Dried Apricots

Record the ml of titration solution for the calculation using the formula:

$$\text{mg/kg } SO_2 = \frac{(\text{ml sample} - \text{ml blank}) * M_{SO2} * N * 1000}{m_{sample} * 2}$$

ml sample: titrant volume used for sample
ml blank: average of titrant volume used for blanks
M_{SO2}: SO_2 molecular weight (64.06 g/mol)
N: normality titrant solution (0.02 N)
m_{sample}: sample quantity (g)

Sample quantity (g)	mg SO_2	mg/kg SO_2
10.752	14.5	1346.5
10.465	14.0	1340.6
10.737	14.5	1348.4
10.419	14.0	1340.3
10.238	13.6	1332.8
Average ± SD%		**1341.7 ± 6.1**
RSD% *		**0.5**
Expected SO_2 content: 1325-1641 mg/kg		

***** RSD% = (Standard Deviation * 100) / Average

The complete procedure was verified by dosing 10 ml of sodium bisulphite standard solution containing 23.57 mg SO_2.

Conclusion

The obtained results are reliable and reproducible in accordance with the expected values. with a low relative standard deviation (RSD < 1%). that means high repeatability of the results.

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- Worldwide **official method** adherence
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VELP solutions

Tested with	Other VELP solutions			
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