

TOTAL SULFITES IN FOOD AND DRINKS **UIC, Inc. Adaptation of the Modified Monier-Williams Method**



Figure 1: Model CM340 Total Sulfite Analyzer

PRINCIPLES OF OPERATION

As in the modified Monier-Williams method, samples are treated with acid and heated to release SO_2 . A nitrogen carrier gas sweeps the SO_2 through a reflux condenser and into the Sulfur Coulometer cell. The Sulfur Coulometer automatically titrates the SO_2 , saves, and digitally displays the amount.

PROCEDURE

1. Assemble and prepare the components for operation as described in the instruction manuals.
2. Determine the blank and run a standard to confirm proper operation of the system.
3. Charge the sample tube with a known weight of sample and attach the tube to the apparatus. Sample size should be selected to contain 1-3 mg of SO_2 .
Note: Solid and viscous liquid samples may either be weighed out directly into the sample tubes or weighed out into porcelain, platinum, alumina or similar sample containers and then placed in the tube. Water and liquid samples handled with a syringe can be directly injected through the septum at the top of the apparatus.
4. Move the sample tube into position over the heater, pump acid into the reaction tube, and press Begin Analysis on the coulometer.

Note: When injecting samples, a 100 ml sample flask with stirring magnet can be used. This eliminates the need to open the system between sample runs.

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5. When all of the SO₂ has been evolved and titrated, the CM5017S automatically detects the endpoint, ends the analysis, saves results on a USB Flash Drive and/or prints the result to the printer*.

(*) – Endpoint determination and result calculations are performed automatically based on user selectable settings entered into the *CM5017Sulfur Coulometer*.

RESULTS

When samples contain over 1 mg SO₂, the coulometer measurement repeatability is +/- 0.15%. Reproducibility is typically +/-0.5% at 1000 ppm. When sample availability or volume limits the amount of SO₂ evolved to small amounts, the precision is generally better than 1 µg SO₂. Sample stability can limit both the accuracy and precision of the test.

Analysis times are typically 7 to 15 minutes. Some samples react very slowly, thus extending the analysis time.

A major advantage of the S Coulometer is the analysis completion can be observed. Low results due to incomplete reactions and wasted time can thus be avoided. Other advantages include “calibration free”, effortless operation of the system and option modification for using different acids, carrier gases or scrubbers for different applications.

Table 1-Comparison of Total Sulfites in Dried Fruit (% SO₂)

Sample	Monier – Williams		Coulometric		p-rosaniline	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Apricots	0.369%	2.700%	0.385%	0.006%	0.373%	0.013%
White Raisins	0.397%	0.007%	0.370%	0.008%	0.366%	0.014%
Apples (dehydrated)	0.433%	0.008%	0.432%	0.007%	0.458%	0.014%
Potatoes	0.0128%	0.0002%	0.0127%	0.0003%	-	-

Table 2-Total Sulfites in Beer (mg SO₂/L)

Sample	Coulometric		p-rosaniline	
	Mean	S.D.	Mean	S.D.
Beer A	1.09	0.08	1.46	0.03
Beer B	4.95	0.04	5.86	0.09
Beer C	1.92	0.03	3.76	0.11
Beer D	2.76	0.05	3.72	0.42

Table 3-Total Sulfites in Wine (mg SO₂/L)

Sample	Coulometric		Monier – Williams	
	Mean	S.D.	Mean	S.D.
Red Wine	82	2	89	4
White Wine	132	2	138	6
Red Wine Vinegar	78	2	79	6

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