



Application Note AN-T-243

# Sulfite determination in beet sugar

## Automatic titration of sulfites in beet sugar

Sugar production is on the rise from sources like beets. Recent reports show an increase in beet sugar production due to improved crop varieties, advanced harvesting technologies, and expanded acreage in certain regions – particularly in the United States where beet sugar production is currently at a record high [1].

While primarily composed of sucrose, beet sugar can also contain naturally occurring sulfite compounds. These compounds, typically present in trace amounts, originate from various sources within the beet itself. Understanding the levels and distribution of these

naturally occurring sulfites is important for assessing potential health implications and ensuring compliance with food safety regulations.

The known methodology for sulfite determination is iodometric titration on a large quantity of sample, with starch solution utilized as a visual indicator. To be carried out correctly, this procedure requires experienced analysts.

This Application Note proposes a method for the automatic titration of low sulfite levels in beet crystal sugar by redox titration with iodine using a Pt Titrode as the potentiometric sensor.

## SAMPLE AND SAMPLE PREPARATION

No sample preparation is required.

A 0.005 mol/L thiosulfate solution is titrated against standard 0.005 mol/L potassium dichromate to determine the so-called thiosulfate strength.

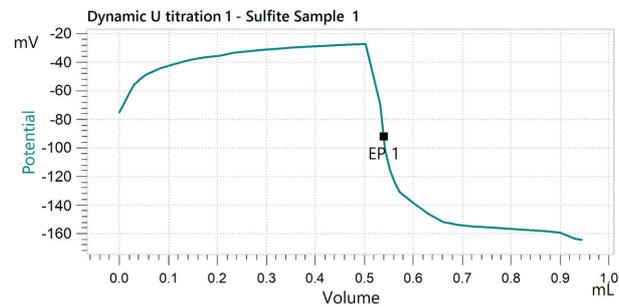
Next, a 0.004 mol/L iodine solution is titrated against the 0.005 mol/L thiosulfate solution to determine the so-called iodine strength.

Finally, 50.0 g of beet sugar is added to a 250 mL beaker. To this, 150 mL of deionized (DI) water and 5 mL of 1 mol/L HCl are added, and the iodine titrant is added until the first endpoint is detected by the Pt Titrode (Figure 1).

**Table 1.** Results of the determination of sulfite in beet sugar crystals with an OMNIS Titrator and Pt Titrode from Metrohm.

No. (n = 5)	Mean value in mg/L	s(abs) in mg/L	s(rel) in %
1	2.7	0.07	2.6

## RESULTS



**Figure 1.** Exemplary titration curve of sulfite in beet sugar crystals using the OMNIS Titrator and Pt Titrode.

## CONCLUSION

It was possible to fully automate the determination of sulfites in beet crystal sugar by potentiometric titration.

The titration rate must be set to slow and the

maximum increment limited to 30  $\mu$ L to avoid overtitration.

With OMNIS, sugar beet chemical analysis has never been easier to perform.

## REFERENCE

1. U.S. Department of Agriculture. *Sugar and Sweeteners - Background*. USDA Economic Research Service.  
<https://www.ers.usda.gov/topics/crops/sugar-and-sweeteners/background> (accessed 2025-08-20).

## CONTACT

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## CONFIGURATION



### OMNIS Professional Titrator

OMNIS Titrator, OMNIS 2, (1) 3S OMNIS Liquid Adapter, 2, "Professional"

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- 
- :51020 50 mL
- 3S OMNIS Liquid Adapter:
- :
- : "Basic"
- (1): "Advanced"
- (1), 5 : "Professional"

### OMNIS 2mL

2 mL, OMNIS Dosing





### dPt Titrode

pH OMNIS ,

pH ,:

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dTrodes OMNIS Titratoren

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