



Detection of nitrite and nitrate in molasses

Introduction:

In the growth process of sugar crops, excessive application of nitrogen fertilizer may lead to the accumulation of nitrate content in sugar raw materials (sugar beets), and in the subsequent processing, nitrate is reduced to nitrite by bacteria. Some sugar factories have started testing nitrate and nitrite in their packaging and factory sugar products to control product quality. This article uses an ion chromatograph to detect the content of nitrate and nitrite in raw materials of sugar products.

Detection items (Table 1):

Anion	NO ₂ ⁻	NO ₃ ⁻
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Keywords: Molasses, Ion chromatography, Nitrite, Nitrate.

Instruments and equipment

- **Ion chromatograph:** CIC-D260
- **Ultra pure water machine:** ECO-S15

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Requirements

Reagents

Unless otherwise specified, all reagents used are superior grade. Commercially available certified standard solutions for nitrite and nitrate (1000 mg/L);

Deionized Water

When preparing standard samples manually or diluting real samples, please use ASTM filtration and deionization requirements that meet the specifications listed in the table 2.

Table 2: Deionized water specification.

Specification	
Ions Resistivity	≥18.25MΩ·cm
Organics-TOC	<10ppb
Iron/Transition Metals	<1ppb
Pyrogens	<0.03Eu/mL
Particulates (>0.2μm)	<1unit/mL
Colloids-Silica	<10ppb
Bacteria	<1cfu/mL

Chromatography conditions

Table 3: Analysis conditions

Instrument	CIC-D260
Eluent	0-30 min 6 mM KOH 30-45 min 50 mM KOH
Flow rate	0.7 mL/min
Injection volume	100 μL
Analytical Column	SH-AP-1
Column oven temperature	35°C
Conductivity cell temperature	35°C
Suppressor current	120 mA

Sample preparation

Molasses sample: Accurately weigh 2 g (accurate to 0.0001 g) of the sample and place it in a 50 mL sterilized centrifuge tube. Dissolve it in water and sonicate, make up to the mark, centrifuge at 10000 r/min for 10 minutes. The supernatant passing through a C18 solid-phase extraction column, passed through 0.22 μm nylon filter membrane, inject sample analysis.

Standard chromatogram

Standard chromatogram, As shown in below:

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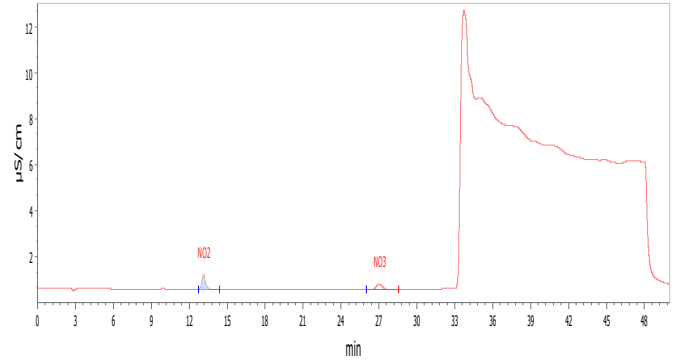


Figure 1. Chromatogram of standard sample.

Sample chromatogram

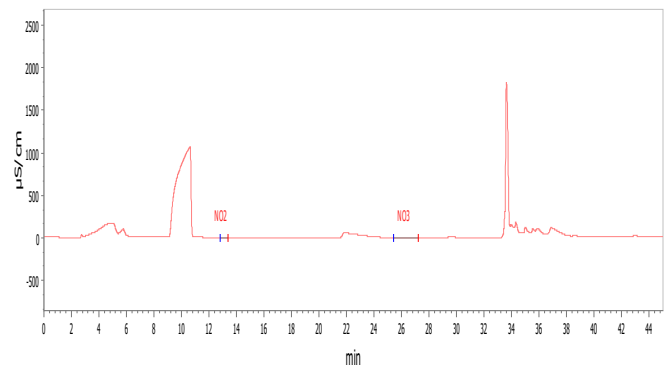


Figure 2. Chromatogram of sample

Results and calculations

Table 7: Sample test result (mg/L)

Anion	NO ₂ ⁻	NO ₃ ⁻
	0.65	0.378

Remarks: ① The measured value has been deducted from the blank value; ② There may be differences in testing results between different methods and laboratories;

Feasibility analysis and conclusion

The above experiments prove that the detection method has good resolution and is suitable for the determination of the content of the components to be measured in the sample.