

POTASSIUM BROMATE IN BAKERY PRODUCTS

Key words:

Potassium Bromate; Dough conditioner; Ion chromatography; Post-column derivatisation; UV detection

Introduction:

Potassium bromate is recognised as one of the best dough conditioners in the bakery industry. Potassium bromate acts as a slow-oxidising agent throughout the fermentation, proofing, and baking processes affecting the structure and the rheology properties of the dough. As a result, many bakeries use potassium bromate as an additive to assist in the raising process and to produce a texture in the finished product that is appealing to the consumer.

Under controlled baking conditions, bromate is converted into inert bromide, which is harmless to the consumer. Scientific evidence surfaced in 1990, implicating bromate as a possible carcinogen. In response to the potential hazards, the United Nations Joint Food and Agricultural Organisation and the World Health Organisation decided to revoke potassium bromide from the list of acceptable flour treatment additives.

The organisations later consented to re-examine their position, dependent upon the industry's ability, to reduce bromate residuals to less than 5 parts per billion (ppb) in finished products.

Analysis:

Method:

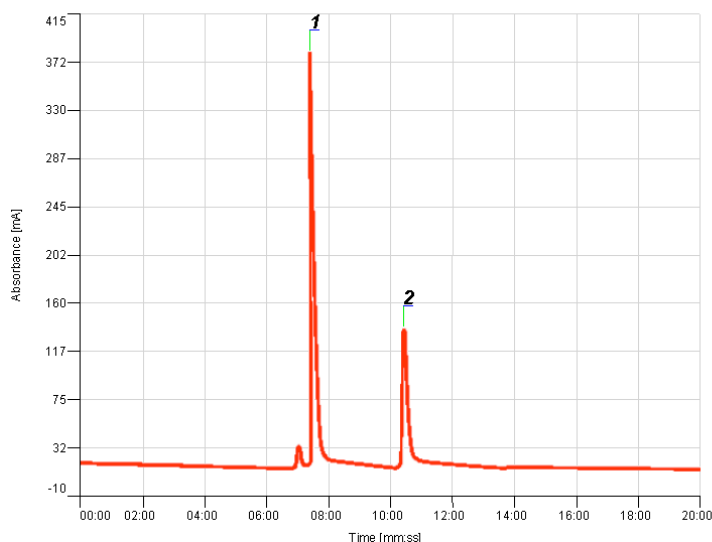
After extraction and clean up, the sample is analysed by ion chromatography on a polymeric anion exchange column. Bromate is quantified by post-column reaction with o-Dianisidine, which produces a UV-absorbing compound.

Instrumentation:

Adept HPLC Series System 2 with on-line solvent degasser, column oven, and post-column derivatisation system.

Chromatography:

Chromatogram – White Bread (1Potassium Bromate Tests)



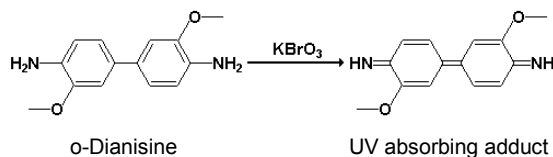
Chromatographic conditions:

Mobile phase: 3.6mM Sodium Carbonate
 Analytical column: Novosep A-2 Anion, 5µm 250x4mm
 Temperature: 40 °C
 Flow rate : 0.85 mL/min
 Injection volume: 20 µL
 Detection: UV @ 450 nm

Components:

- 1: Bromate
- 2: Nitrite

Derivatisation reaction:



Ordering Information:

Basic instrument:

Adept HPLC Series System 2 with:

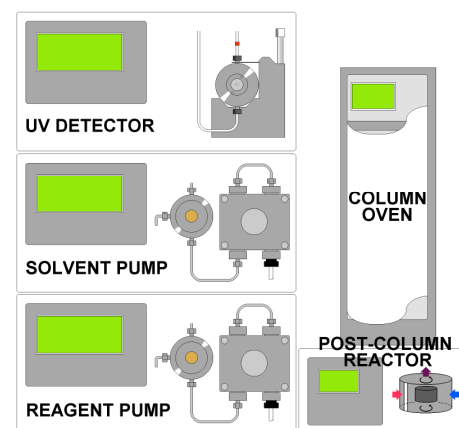
CE 4020 Solvent Degasser,
CE 4100 Analytical Pump,
CE 4660 Column Oven,
CE 4200 UV-Vis Dual Wavelength Detector,
CE 4901 Chromatography System Manager,

PowerStream Chromatography System
 Manager Software.

Post-column Reaction system consisting of:

CE 4100 HPLC Pump,
 In-line **Flow Check Valve**,
 150µL stainless steel **Mixer Cartridge**,
 500µL **Heated Reactor Module**,
Back-Pressure Regulator.

System diagram:



We supply analytical columns and guard column kits on request.

This note acts purely as a guide to the method. Cecil Instruments Ltd takes no responsibility for the outcome of any analysis. Feb 2006 Rev 1.1

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