Dextrose Measurement in Molasses

I. Introduction

Dextrose (D-glucose) concentrations in complex matrices such as molasses can be measured directly and quickly using the YSI 2700 SELECT Biochemistry Analyzer. YSI's unique enzyme technology provides for specific dextrose measurement. Measurements are virtually unaffected by color, turbidity, density, pH, or the presence of reducing substances.

When a sample is injected into the sample chamber, the dextrose diffuses into the membrane containing glucose oxidase. The dextrose is immediately oxidized to hydrogen peroxide and D-glucono-δ-lactone. The hydrogen peroxide is detected amperometrically at the platinum electrode surface. The current flow at the electrode is directly proportional to the hydrogen peroxide concentration, and hence to dextrose concentration.

II. Materials and Setup

A. YSI 2700 SELECT Biochemistry Analyzer - equipped with a 2365 Dextrose Membrane and 2357 Buffer.

B. Dextrose standards (2.50 g/L, 9.00 g/L). Place the 2.50 g/L solution in Cal Station #1.

C. Buffer Diluent (40 g/L NaH_2PO_4, 10 g/L Na_2HPO_4 in reagent water).

D. Connect the 2700 SELECT to a suitable power source.

E. Perform the instrument and membrane check described in the Operations Manual (Section 3).

F. Volumetric glassware (Class A recommended).

G. The following instrument setup is recommended.

Sample size:	25 µL
Sample Station #	2
CalMethod	One Station

Black Probe Parameters

Chemistry	Dextrose
Unit	g/L
Calibrator	2.50 g/L
End Point	30 Sec
CalStation#	1

White Probe Parameters

Single Channel 2700	N/A
Dual Channel 2700	None

Autocal Parameters

Sample Error	ON
Temperature	1°C
Time	15 Min
Sample	5 Sam
Cal Shift	2%

III. Method

A. Weigh up to 15.000 g of molasses to be analyzed.

B. Transfer the sample to a 100 mL volumetric flask, using buffer diluent to rinse and dilute. Fill the flask to the mark with buffer and mix. Allow the solution to equilibrate for at least twenty minutes before analysis.

C. Calibrate the 2700 SELECT with a 2.50 g/L dextrose standard solution.

D. Check the linearity of the membrane at least once a day by injection of a dextrose linearity check solution (9.00 g/L). Refer to the Operators Manual (Section 3) for specifications.

E. Assay the sample prepared in B by aspiration into the 2700 SELECT. The linear range of the system is 0 to 9.00 g/L dextrose. If the value reported exceeds this, further dilution is required.*

F. Calibrate frequently as described in the Operations Manual (Section 6).

* The linearity of the 2700 SELECT may be increased to 0 to 25.0 g/L. This can be done by decreasing the sample size to 10 µL and checking the linearity with a 25.0 g/L standard.

IV. Calculations

To calculate % dextrose, multiply the reported value by the appropriate dilution factor.

Example: 10.012 g of molasses was diluted to 100 mL in a Class A volumetric flask. When assayed, the value reported was 13.21 g/L dextrose.

% Dextrose:

13.21 g/L x 0.100L/10.012g = 0.1319g dextrose/g molasses
= 13.2% (w/w)

V. Ordering Information

YSI No.	
2700	Biochemistry Analyzer
2365	Dextrose Membrane Kit
2776	Dextrose Standard Solution (1.80 g/L)
1531	Dextrose Standard Solution (9.00 g/L)
2777	Dextrose Standard Solution (25.0 g/L)
2357	Buffer Kit
2363	Potassium Ferrocyanide Test Solution
2392	NaCl Solution (for membrane installation)

YSI *incorporated*

1725 Brannum Lane
PO Box 279
Yellow Springs, Ohio 45387 USA
937-767-7241• 800-765-4974

A27301C

October 00