

Food & Beverage Series

DEXTROSE MEASUREMENT IN POTATOES

Application Note 219LS

YSI Life Sciences

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INTRODUCTION

Dextrose (D-glucose) concentrations in complex matrices such as potatoes can be measured directly and quickly using the YSI 2900 Series 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.

I. MATERIALS & SETUP

A. YSI 2900 Series Biochemistry Analyzer - equipped with a 2365 Dextrose Membrane and 2357 Buffer.

B. Dextrose standards (2.50 g/L, 9.00 g/L).

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

D. Connect the 2900 Series instrument to a suitable power source.

E. Perform the instrument and membrane daily checks described in the Operations Manual.

F. Volumetric glassware (Class A recommended).

G. The following instrument setup is recommended: Sample Size: 25 µL

Probe A Parameters		Autocal Parameters	
Chemistry	Glucose	Temperature	1°C
Unit	g/L	Time	30 Min
Calibrator	2.50	Sample	5 Sam
End Point	30 Sec	Cal Shift	2%

II. METHOD

A. Weigh 100 to 200 grams of washed and peeled potatoes. For information on sample selection, see J. R. Sowokinos, *American Potato Journal*, 50, 333-334 (1978).

B. Juicerate the potatoes in an Acme Juicerator and collect the juice in a beaker. Wash the juicerator three times with 100 mL portions of buffer diluent. Wait two to three minutes between washings.

C. Quantitatively transfer the combined juice and buffer to a 500 mL volumetric flask. Rinse the beaker with several small (10 mL) aliquots of buffer and transfer to the flask. Dilute to the mark with buffer. Refrigerate for one hour prior to analysis.*

D. Calibrate the 2900 series instrument with a 2.50 g/L dextrose standard solution.

E. 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 Operations Manual for specifications.

F. Assay the sample prepared in C by aspiration into the 2900 Series. The linear range of the system is 0.05 to 9.00 g/L dextrose. If the value reported exceeds this, further dilution is required.*

G. Calibrate frequently as described in the Operations Manual.

* For potato samples with low dextrose content, consider increasing the ratio of potato sample to the volume of extracting buffer. For higher dextrose levels, more dilute samples are recommended.

The dextrose linearity of the 2900 series may be increased to 0.05 to 25.0 g/L. This can be done by decreasing the samples size to 10 µL and checking the linearity with a 25.0 g/L standard.

continued

III. CALCULATIONS

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

Example: A 200 g potato sample was prepared as described in III.B and C. When assayed, the value reported was 2.15 g/L dextrose.

% Dextrose: 2.15 g/L x 0.500 L/200 g	= 0.00538 g dextrose/g potatoes = 0.54% (w/w)

ODERING INFORMATION

YSI Part Numbers:

2900	Biochemistry Analyzer
2365	Glucose Membrane Kit
2776	Glucose Standard Solution (2.50 g/L)
1531	Glucose Standard Solution (9.00 g/L)
2777	Glucose Standard Solution (25.0 g/L)
2357	Buffer Kit
2363	Potassium Ferrocyanide Test Solution
2392	NaCl Solution (for membrane installation)

For further information, please contact:

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