

Glucose and Lactate Concentration Determination using the YSI 2900 Biochemistry Analyzer

Approvals

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1. Purpose:

1.1. The operation of the YSI 2900 Biochemistry Analyzer to measure the glucose and lactate concentrations in samples. The YSI 2900 Analyzer utilizes enzyme sensor technology to measure concentrations of up to two analytes in solution. Using this technology, enzymes are immobilized in a 3-layer membrane on platinum probes in the instrument. When samples containing glucose or lactate are injected on to the membranes, they are oxidized to hydrogen peroxide (H₂O₂). Hydrogen peroxide (H₂O₂) is then oxidized at the platinum probe and produces a probe current. The probe current at each probe is proportional to the amount of hydrogen peroxide and therefore to the amount of glucose or lactate in the sample. This SOP describes the use of the YSI 2900 to measure glucose and lactose concentration in samples.

2. Scope:

2.1. This SOP applies to operation of the YSI 2900 Biochemistry Analyzer to measure the glucose and lactate concentrations in samples by students in the Biomanufacturing class (BIOT 221) in the STEM Department of Bucks County Community College

3. Responsibilities:

- 3.1. It is the responsibility of the course instructor/lab assistant to ensure that this SOP is performed as described and to update the procedure when necessary.
- 3.2. It is the responsibility of the students/technicians to follow the SOP as described and to inform the instructor about any deviations or problems that may occur while performing the procedure.

4. References:

4.1 YSI 2900 Operations Manual

5. Definitions: Not Applicable

6. Precautions:

6.1 Wear personal protection equipment (laboratory coat and gloves) when operating the instrument and handling samples.

7. Materials:

- 7.1 YSI Buffer Kit (YSI # 2357)
- 7.2 YSI Glucose Membrane Kit (YSI # 2365)
- 7.3 YSI Lactate Membrane Kit (YSI # 2329)
- 7.4 YSI Glucose-/Lactate Standard (YSI # 2747- glucose 1.80 g/L, L-lactate-0.45 g/L)

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8. Procedure:

8.1. Prime the instrument fluid system

- 8.1.1. From the configure screen , touch the “initialize” tab
- 8.1.2 Touch the “prime” button under bottle B1 to prime the buffer solution
- 8.1.3 Touch the “prime” button under Bottle C1 to prime the calibrator bottle

8.2 Check Probe Current

- 8.2.1 From the “initialize” tab of the Configure screen, touch either “flush” button to flush the sample chamber with buffer
- 8.2.2 Observe the probe current values. They must be below 6 nA and stable. When the enzyme probe baseline currents are below 6 nA and stable, the probe indicators change from red to green. Once both probe indicators are green, touch the “X” button at the top left of the screen to exit the main display

8.3. Calibration- The instrument must be calibrated before running samples

- 8.3.1 From the main display, touch “Run” From the Calibrate tab, Touch “start” to initiate calibration. The instrument will initiate calibration of active probes. Calibration status will be displayed on the screen.

8.4 Read Samples

- 8.4.1 From the Run screen, touch the Sample tab.
- 8.4.2 Touch the “Station 2” icon. The station 2 set-up window appears.
- 8.4.3 Touch the “manual” button to change sample name. When the keypad window appears, enter a new sample name by touching the buttons. Touch done and the new sample name will appear.
- 8.4.4 Hold sample tube at Station 2 and touch “start” to initiate sampling at Station 2. results will be displayed. Record results.

9. Attachments: N/A

10. History:

Revision	Reviewer	Date	Revision Number
Initial Release	Dr. Linda Rehfuss	09 April 2014	0