

Supplementary Information

Detection of *Escherichia coli* in potable water using personal glucose meters

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1. Materials and methods
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1. Materials and Methods

E.coli Castellani and Chalmers (American Type Culture Collection (ATCC) 11229) was obtained from Stream Technologies, Inc., (Edmonton, Canada). Lauryl Tryptose Broth (LTB) nutrient broth medium and Luria-Bertani (LB) Agar was obtained from Fisher Scientific, Canada. Lactose was obtained from Sigma-Aldrich, USA. D-glucose, Tryptone and Phosphate buffer solution (PBS) (pH-7.2) were obtained from Biochemistry stores, University of Alberta, Canada. Eppendorf pipettes (0-10 µl, 20-200 µl, 100-1000 µl) and the respective pipette tips were obtained from Fisher Scientific, Canada. Microcentrifuge tubes of 1.5 ml, sterile, snap-fit, plastic were acquired from Fisher Scientific, Canada. Prism™ ambient microcentrifuge was purchased from Cole Palmer, Montreal, Canada. Most of the solutions were prepared using Deionized (DI) water (Milli-Q® ultrapure water, ©EMD Millipore Corporation, MA, USA). Materials were sterilized whenever needed in an autoclave (Tuttnauer 3850M Autoclave, Heidolph North America, Elk Grove Village, IL, USA).

We have pursued two different approaches for the detection of *E.coli* using PGM:

1. By measuring the production of glucose by supplying lactose as the substrate.
2. By measuring the consumption of glucose by supplying known amounts of glucose.

1.1. Detection of *E.coli* using PGM by measuring production of glucose

E.coli (ATCC#11229) samples were cultured in LTB at 37°C for 18 hr. Serial dilutions of these cultures were prepared following standard protocols to result in final bacteria concentrations in the range of 2 - 2x10⁸ CFU/100 µl. Unless otherwise stated, serial dilutions of the cultures were prepared following the same protocols for all the experiments. The cultures were then plated on LB Agar plates following standard protocols and incubated for 18 hr at 37°C. The CFU count for different dilutions were calculated using standard plate counting method.

Sample volumes of 100 µl of each of the dilutions mentioned above, were taken in separate microcentrifuge tubes and 100 µl of 0.5 M lactose solution was then added to each of the tubes. The tubes were then incubated at 37°C. Glucose measurements were taken every 30 min for each of the tubes using PGM for a period of 24 hr. 0.85 % NaCl solution without *E.coli* was used as the negative control solution in all experiments.

1.2. Detection of *E.coli* using PGM by measuring consumption of glucose

1.2.1 Measurement of glucose consumption in LTB

Sample volumes of 210 µl were prepared in microcentrifuge tubes by adding 100 µl of *E.coli* sample, 100 µl of LTB and 10 µl of glucose solution (2% w/v). A series of similar samples were prepared with different concentrations of *E.coli* ranging from 2-2x10⁸ CFU. Initial PGM readings were obtained for each of these samples by dipping the glucose test strips in the solution immediately after the addition of glucose. All the samples were then incubated at 37°C to provide optimal conditions to induce the growth of *E.coli* thereby facilitating the consumption of glucose. PGM readings were taken every 1 hr for each of the samples until the glucose levels dropped to 0 in the sample with the lowest concentration of *E.coli* (2 CFU).

1.2.2 Measurement of glucose consumption in *E.coli* water samples

In order to mimic real world contaminated water samples, *E.coli* sample volumes of 100 µl with different concentrations in the range of 2-2x10⁸ CFU/100 µl were centrifuged in a microcentrifuge at 10,000 rpm for 10 min. The resulting pellets were re-suspended in 100 µl of 0.85% NaCl solution. To each these samples, 10 µl of glucose solution was then added. Initial PGM readings were obtained for each of these samples by dipping the glucose test strips in the solution immediately after the addition of glucose. All the samples were then incubated at 37°C. PGM readings were taken every 1 hr for each of the samples for 24 hr.

1.2.3 Measurement of glucose consumption in *E.coli* water samples with Tryptone as the additive

Tryptone solutions (4% w/v) were prepared in PBS buffer (pH 7.2). *E.coli* contaminated water samples were prepared following the same procedure mentioned in section 1.2.2. To each of these samples, 100 μ l of Tryptone solution and 10 μ l of glucose solution were then added. Initial PGM readings were obtained for each of these samples by dipping the glucose test strips in the solution immediately after the addition of glucose. All the samples were then incubated at 37°C. PGM readings were taken every 1 hr for each of the samples until the glucose levels dropped to 0 in the sample with the lowest concentration of *E.coli* (2 CFU).