Elizabeth Salvo, J Biosens Bioelectron 2017, 8:2(Suppl)
DOI: 10.4172/2155-6210-C1-034

7th Euro Biosensors and Bioelectronics Conference

July 10-11, 2017 Berlin, Germany

Towards practical bacterial biosensor assays for on-site applications

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Air drying in the natural polymers pullulan and acacia gum has been reported previously as an effective bacterial preservation strategy. The use of this method for the preservation of sensing bacteria is presented here. Colorimetric *Escherichia coli* bioreporters for tetracycline and arsenate analytes has retained responsivity following air-drying in pullulan sugar. Additionally, the method was used to immobilize sensing cells onto paper substrates, and a screen of various materials was conducted to determine the optimal composition of a drying matrix for responsivity. The viscosity enhancer pullulan, acacia gum, polyvinylpyrrolidine and gelatin were paired with osmoprotectants in some standard bacterial culture mediums. The air-drying process is simpler, less expensive, requires less sophisticated instrumentation, and leads to much higher bacterial survival rates compared to the gold standard method for bacterial preservation, lyophilization. Simplicity of the method paired with applicability to simple platforms such as paper test strips makes this research an important step toward the usage of sensing microbes for the detection of a variety of biologically relevant analytes in the field.

Biography

Elizabeth Salvo is a second-year Master of Science candidate in the Chemical Biology graduate program at the Biointerfaces Institute (McMaster University) in Hamilton, Ontario, Canada. She previously obtained a Bachelor of Science degree in Chemical Biology with a minor in Biology from McMaster University. Currently working under Dr. John Brennan, her research predominantly focuses on paper-based biosensors, as well as applications of microbial biosensor technologies for pollutant detection. Her current work is concerned with the preservation of microbial biosensors through drying in natural polymers such as pullulan, in order to increase the utility of these sensors for field applications. She is currently a recipient of two departmental awards from McMaster University.

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