

Hybridization Based Detection of Fecal Bacteria

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Biosketch

Dr. Kelly Goodwin is a Principal Investigator with the National Oceanographic and Atmospheric Administration (NOAA) at the Atlantic Oceanographic and Meteorological Laboratories (AOML) in Miami, Florida. Dr. Goodwin received a B.S. degree in Neurobiological Sciences from the University of Florida. She received M.S. ('90) and Ph.D. ('96) degrees in Environmental Engineering Science from the California Institute of Technology in Pasadena. She received a minor

in Oceanography from Caltech during a program in residence at the Scripps Institute of Oceanography ('93). From 1995-1998, she served as a National Research Council Postdoctoral Associate at the U.S. Geological Survey in Menlo Park, CA working on the microbial biogeochemistry of halocarbons. In 1999, she returned to Florida as a researcher with NOAA's joint institute with the University of Miami, the Cooperative Institute of Marine and Atmospheric Studies (CIMAS). She entered federal employment with NOAA in 2003

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and became adjunct faculty to the University of Miami's Rosenstiel School of Marine and Atmospheric Science. Her research interests include development and application of biotechnology to improve coastal water quality monitoring.

Abstract

Traditional water quality assays have drawbacks in terms of accuracy and rapidity of detection of organisms. To better protect human health and economic interests, improved assays must be developed. We are testing the feasibility of the Luminex 100, a novel flow cytometer based DNA hybridization system, to detect fecal bacterial contaminants in recreational waters. This method consists of combinations of fluorescent beads covalently bound

to capture probes. Target DNA is amplified and labeled with biotin. Upon hybridization, beads bearing target amplicons are classified by their spectral addresses. Detection of the amplicon is based on streptavidin coupled phycoerythrin fluorescence. We designed probes targeting the bacterial species and groups: *Escherichia coli*, *Enterococci faecalis*, *Bacteroides distasonis*, the *Bacteroides fragilis* group and the total coliform group. The assay is specific for the targeted organisms and can be completed in less than an hour following target DNA amplification. The Luminex technology provides a simple, accurate and rapid means of detection of targeted organisms. This high-throughput system allows detection of multiple organisms from a single sample through multiplexing of bead sets with different spectral addresses.

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