Comparison and verification of bacterial water quality indicator measurement methods using ambient coastal water samples

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ABSTRACT

More than 30 laboratories routinely monitor water along southern California's beaches for bacterial indicators of fecal contamination. Data from these efforts frequently are combined and compared even though three different methods (membrane filtration (MF), multiple tube fermentation (MTF), and chromogenic substrate (CS) methods) are used. To assess data comparability and quantify variability within method and across laboratories, 26 laboratories participated in an intercalibration exercise. Each laboratory processed three replicates from eight ambient water samples employing the method or methods they routinely use for water quality monitoring. Verification analyses also were conducted on a subset of wells from the CS analysis to confirm or exclude the presence of the target organism. Enterococci results were generally comparable across methods. Confirmation revealed a 9% false positive rate and a 4% false negative rate in the CS verifications for enterococci, though these errors were small in the context of within- and among-laboratory variability. Fecal coliforms also were comparable across all methods, though CS underestimated the other methods by about 10%, probably because it measures only *E. coli*, rather than the larger fecal coliform group measured by MF and MTF. CS overestimated total coliforms relative to the other methods by several fold and was found to have a 40% false positive rate in verification. Across-laboratory variability was small relative to within- and among method variability, but only after data entry errors were corrected. Nearly 20% of the labs had data entry errors, which were much larger than any method-related errors.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2003_04AnnualReport/ar29-griffith_pg350-356.pdf