

**SOCIETY OF ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY.
ANNUAL MEETING– November 2014**

<http://www.setac.org>

Interlaboratory Comparability of Microarray Data

Vidal-Dorsch Doris E.^{1*}, Bay Steven M.¹, Moore Shelly¹, Layton Blythe¹, Mehinto Alvine C.¹, Vulpe Chris D.², Brown-Augustine Marianna², Loguinov Alex², Poynton Helen³, Garcia-Reyero Natàlia⁴, Perkins Edward J.⁵, Escalon Lynn⁵, Denslow Nancy D.⁶, Colli-Dula R. Cristina⁶, Dorian Tri⁷, Shukradas Shweta^{7, 8}, Bruno Joy⁹, Brown Lorraine⁹, Van Agglen Graham⁹, Jackman Paula¹⁰ and Bauer Meg¹⁰.

¹*Southern California Coastal Water Research Project, Costa Mesa, CA. USA*

²*University of California, Berkeley, Berkeley, CA. USA*

³*University of Massachusetts Boston, Boston, MA. USA*

⁴*Mississippi State University, Starkville, MS. USA*

⁵*US Army Engineer Research and Development Center, Vicksburg, MS. USA*

⁶*University of Florida, Gainesville, FL. USA*

⁷*Agilent Technologies, Santa Clara, CA. USA*

⁸*Strand Scientific Intelligence Inc., San Francisco, CA. USA*

⁹*Environment Canada, Calgary, AB, Canada*

¹⁰*Environment Canada, Moncton, NB. Canada*

Abstract

Toxicity tests with marine amphipods, such as *Eohaustorius estuarius*, are widely used for sediment quality assessment and in regulatory programs. Detection of sediment contamination impacts has the potential to prompt remedial action, which would require a determination of the contaminants causing the impact. Limited information is provided by traditional toxicity test and analytical chemistry.

Molecular TIEs have been investigated as a tool to determine the cause of toxicity; however, little work has been done to demonstrate the reproducibility of results, which is a critical element in its adoption as an assessment tool. This study investigated microarray technology reproducibility and different analysis that impact differential gene expression. A 15K *E. estuarius* custom gene microarray was used to evaluate reproducibility of microarray analyses across six laboratories. Amphipods were exposed (10-d) to cyfluthrin-spiked or control sediments. Results showed that probe intensity signals were comparable among laboratories. Aliquots of the same RNA extracts analyzed by the different laboratories showed a high correlation, indicating good interlaboratory agreement. Gene expression data concordance ranged from 0.4 to 0.7. Microarray gene expression data was to a degree reproducible across and within laboratories; however, several factors affected data comparability (e.g., instruments and protocols used, personnel expertise). Despite variability caused these factors, a subset of genes was consistently differentially expressed across all laboratories. A higher degree of data agreement was observed in differentially expressed genes with a fold change > 2. The reproducibility of results, given that certain factors are controlled, indicates that molecular TIE's are a viable test tool for determining contaminant impacts on aquatic organisms.