

3-2011

# Determination of caffeine as a marker for septic tank contamination of Wilgreen Lake

Rosemary Onjiko  
*Eastern Kentucky University*

Susan Godbey  
*Eastern Kentucky University*

Walter S. Borowski  
*Eastern Kentucky University*

Darrin Smith  
*Eastern Kentucky University*

Lori Wilson  
*Eastern Kentucky University*

Follow this and additional works at: [https://encompass.eku.edu/fs\\_research](https://encompass.eku.edu/fs_research)

 Part of the [Analytical Chemistry Commons](#), [Biogeochemistry Commons](#), [Environmental Health and Protection Commons](#), [Environmental Indicators and Impact Assessment Commons](#), and the [Environmental Monitoring Commons](#)

---

## Recommended Citation

Onjiko, R., S. Godbey, W., Borowski, D. Smith, and L. Wilson, 2011. Determination of caffeine as a marker for septic tank contamination of Wilgreen Lake. Kentucky Water Resources Research Institute Symposium, 21 March 2011, p. 99.

This Conference Presentation is brought to you for free and open access by Encompass. It has been accepted for inclusion in EKU Faculty and Staff Scholarship by an authorized administrator of Encompass. For more information, please contact [Linda.Sizemore@eku.edu](mailto:Linda.Sizemore@eku.edu).

## **DETERMINATION OF CAFFEINE AS A MARKER FOR SEPTIC TANK CONTAMINATION OF WILGREEN LAKE**

Rosemary Onjiko and Susan Godbey  
Department of Chemistry  
Eastern Kentucky University  
521 Lancaster Avenue  
Richmond, KY 40475  
(859) 622-2042  
susan.godbey@eku.edu

Walter S. Borowski  
Department of Geography & Geology  
Eastern Kentucky University

Wilgreen Lake in Richmond, Kentucky, has been listed by both the state and the Environmental Protection Agency as an “impaired” lake due to excess nutrients, which may be in part contributed by domestic septic systems. Caffeine can be used as an anthropogenic marker to estimate the contribution of septic tank effluent to the lake. We have modified existing analytical methods to produce a viable method for the determination of caffeine in environmental water samples and applied the method to water samples collected from Wilgreen Lake. The modified method allows determination of caffeine in a concentration range of 75 to 10,000 ng/L in the water samples. Waters Oasis® HLB solid phase extraction cartridges are used to clean up and concentrate the water samples, which are then analyzed by liquid chromatography-tandem mass spectrometry. A Waters XTerra MS C18 column (3.5 µm film thickness, 2.1 x 100 mm column dimensions) is utilized in the separation. Carbon-13 labeled caffeine is added to all samples prior to extraction and serves as an internal standard. The parameters of the optimized method and results of the application of this method to water samples collected from Wilgreen Lake will be presented.

*Kentucky Water Resources Research Institute Annual Symposium, 21 March 2011, pp. 99.*