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BIOTRANSFORMATION OF CAFFEINE, COTININE, AND NICOTINE IN STREAM SEDIMENTS

Paul Bradley*, L.B. Barber, D.W. Kolpin, P.B. McMahon, F.H. Chapelle

ABSTRACT: Microbially catalyzed cleavage of the imadazole ring of caffeine was observed in stream sediments collected upstream and downstream of municipal waste-water treatment plants (WWTP) in three geographically separate stream systems. Microbial demethylation of the N-methyl component of cotinine and its metabolic precursor, nicotine, also was observed in these sediments. These findings indicate that stream sediment microorganisms are able to substantially alter the chemical structure and thus the analytical signatures of these candidate waste indicator compounds. The potential for in situ biotransformation must be considered if these compounds are employed as markers to identify the sources and track the fate of waste-water compounds in surface-water systems.

***** Research Ecologist, U.S. Geological Survey, 720 Gracern Rd., Suite 129, Columbia, SC 29210, USA, Phone: 803-750-6125, Fax: 803-750-6181, Email: pbradley@usgs.gov