

Sample Hold Time Evaluation for Polycyclic Aromatic Hydrocarbons in Water Samples

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Abstract

The stipulated holding time for polycyclic aromatic hydrocarbons (PAHs) in water samples is 7-days (EPA-SW846). We were interested to determine the degradation of 25 PAHs in a variety of water samples over 21-days of storage. Furthermore, we wondered if preservation of samples was possible to enhance storage stability up to 21-days. Samples of raw river water (Rossdale Treatment Plant, Edmonton), lake water (Lake Wabamun), slough water (Northern Bear Golf Course) and Groundwater (from an acreage) were obtained in 1L amber Boston round bottles. Samples were analyzed in duplicate immediately to determine if PAHs were present. Samples were then fortified with 25 PAHs at approximately 1 ug/L. Some samples were preserved with ascorbic acid, copper sulfate and sulfuric acid; others were unpreserved. Both unpreserved and preserved spiked samples were analyzed on day 0 (D0) in duplicate. Additional spiked samples (both preserved and unpreserved) were stored at 4°C for 21-days and then reanalyzed in duplicate. River water revealed a 33% degradation from Day0. Preservation with ascorbic acid and sulfuric acid reduced the degradation to 16 and 11% respectively from D0. Lake water revealed a 46% degradation from D0. Preservation with sulfuric acid reduced the degradation to 14%. Groundwater revealed a degradation of 21% from D0. Preservation with sulfuric acid was most effective and reduced the degradation to 15% from D0. Slough water demonstrated the greatest degradation, namely 46% from D0. The best preservative for slough water was observed to be ascorbic acid and sulfuric acid. Using these preservatives degradation was reduced to 31% which is unacceptable. For water samples derived from rivers, lakes and groundwater we suggest that preservation with sulfuric acid can stabilize the samples up to 21-days. The PAH reduction is limited to 11 – 15% which is well within the 20% degradation accepted by EPA.

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