World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:11, No:07, 2017

Electromagnetically-Vibrated Solid-Phase Microextraction for Organic Compounds

Authors : Soo Hyung Park, Seong Beom Kim, Wontae Lee, Jin Chul Joo, Jungmin Lee, Jongsoo Choi

Abstract : A newly-developed electromagnetically vibrated solid-phase microextraction (SPME) device for extracting nonpolar organic compounds from aqueous matrices was evaluated in terms of sorption equilibrium time, precision, and detection level relative to three other more conventional extraction techniques involving SPME, viz., static, magnetic stirring, and fiber insertion/retraction. Electromagnetic vibration at 300~420 cycles/s was found to be the most efficient extraction technique in terms of reducing sorption equilibrium time and enhancing both precision and linearity. The increased efficiency for electromagnetic vibration was attributed to a greater reduction in the thickness of the stagnant-water layer that facilitated more rapid mass transport from the aqueous matrix to the SPME fiber. Electromagnetic vibration less than 500 cycles/s also did not detrimentally impact the sustainability of the extracting performance of the SPME fiber. Therefore, electromagnetically vibrated SPME may be a more powerful tool for rapid sampling and solvent-free sample preparation relative to other more conventional extraction techniques used with SPME.

Keywords : electromagnetic vibration, organic compounds, precision, solid-phase microextraction (SPME), sorption equilibrium time

Conference Title : ICGGGE 2017 : International Conference on Geoenvironmental, Geomechanical and Geotechnical Engineering

Conference Location : Zurich, Switzerland

Conference Dates : July 27-28, 2017