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Development and Application of Compound-Specific Chlorine Stable Isotope Analysis of 1,2-Dichloroethane

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1,2-Dichloroethane (1,2-DCA) has been produced in larger quantities that any other chlorinated hydrocarbons., then is frequently detected in groundwater and has been classified as a priority pollutant by the USEPA. The dual isotope approach (^{13}C and ^{37}Cl) have shown a great potential for evaluating sources and processes that affect chlorinated ethenes in groundwater. In order to extent to application of the dual isotope approach in the case of 1,2 DCA, a new methodology was developed for determining compound-specific chlorine stable isotopes (δ^{37}Cl) of 1,2-dichloroethane (1,2-DCA). The analytical methodology is carried out on a Continuous Flow - Isotope Ratio Mass Spectrometry (CF-IRMS). The technique depends on the measurement of fragments m/z 62 and m/z 64 of 1,2-DCA. The accuracy of the analytical technique was validated by conducting an off line analysis technique. The analytical quantification limit of the methodology is better than 30 μg/L and the reproducibility is better than 0.15‰The extraction and separation of 1,2-DCA was conducted by a Solid Phase Micro Extraction (SPME) and Gas Chromatography (GC). The analytical methodology was tested in field samples collected at a site where 1,2 DCA is one of the main contaminants.