Marine and Freshwater Sediment, Pore Water, and Tissue Samples

Columbia Analytical Services, Inc. has been actively involved in the analysis of marine and freshwater sediment, water and tissue samples since 1986. Much of our analytical work is in support of dredging, remedial investigation, feasibility studies and risk assessment, which, in many cases, require extremely low-level detection limits. These types of samples present unique challenges to the laboratory due to analytical interferences caused by the matrices.

In addition to supporting marine and freshwater aquatic sample analyses throughout the United States, our laboratories also possess the necessary permits to accept samples from foreign countries.

Columbia Analytical has developed and implemented cleanup procedures and method modifications to specifically deal with these types of matrices. We have also developed the expertise necessary to perform complex ultra-trace analyses. These low-level analyses of sediment, tissue and water use advanced specialized instrumentation. This instrumentation includes Inductively Coupled Plasma Mass Spectroscopy (ICP/MS), purge and trap cold vapor atomic fluorescence spectrometry, High-Resolution Gas Chromatography/Mass Spectroscopy (HRGC/MS), and High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS).

Due to the complexity of analyzing these matrices for low-level constituents, specialized procedures beyond the scope of EPA SW 846, EPA-CLP and other routine methods are often required. Seawater presents no particular challenges when determining organic constituents. However, trace metals analysis in the presence of high dissolved solids requires relatively involved techniques to reach the levels of detection typically required to meet project objectives.

Columbia Analytical has been active in research and development of procedures for preparation and analyses of sediment, tissue and water samples. Our laboratory specializes in the analysis of tissue and sediment for low-level chemical constituents and has developed procedures for providing data of high technical quality that meets standard validation criteria.

Specialties

- PCB Congeners and Aroclors
- Low-Level PCB Congeners by 1668A
- Tributyltins/Organotins
- Ultra Low-Level Metals
- Dioxins/Furans
- PAHs and Alkylated Homologs
- Freeze-Drying Sample Preparation
- Solid Phase Extraction

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Analysis	Method/Technique
Inorganic Parameters	
Total Solids	EPA 160.3 Modified
Total Volatile Solids	EPA 160.4 Modified
Total Organic Carbon	ASTM D 4129-82 Modified
Total Sulfides	EPA 9030 Modified
Ammonia	EPA 350.3 Modified
Grain Size	Puget Sound Estuary Program
Total Metals (Sb, As, Cd, Cr, Cu,	EPA 3050, ICP-MS/ICP-AES
Pb, Hg, Ni, Se, Ag, Zn)	GFAAS/CVAAS
CLP TCL (Metals only)	EPA CLP
Acid Volatile Sulfide (AVS)	EPA Draft Method
Simultaneously Extracted Metals (SEM)	EPA Draft Method
Organic Parameters	
Polynuclear Aromatic Hydrocarbons (PAHs)	GC/MS or GC/MS SIM
Phthalate Esters	GC/MS or GC/MS SIM
Phenols and Other Organic Acids	GC/MS or GC/MS SIM
Semivolatile Organics (PAHs, Phthalates,	GC/MS or GC/MS SIM
and Phenols/Organic Acids)	
Chlorinated Phenolics/Guaiacols/Anisoles	EPA 1653 or NCASI 86.01
Resin and Fatty Acids	NCASI 85.01
Chlorinated Hydrocarbons	EPA 8260A or 8121
Organochlorine (OC) Pesticides	EPA 8081 (Low Level)
Polychlorinated Biphenyls (PCBs) Aroclors	EPA 8082 (Low Level)
OC Pesticides/PCBs	EPA 8081 (Low Level)
PCB Congeners (64)	EPA 8082
Volatile Organic Compounds	EPA 8260
CLP TCL (Volatiles/Semivolatiles/OC Pesticide/PCBs)	EPA CLP
Organotin Isomers (mono - tetrabutyl)	Derivitization; GC/FPD, ASTM E 1853-96, *SM* 8070
Chlorinated Dioxins and Furans	EPA 8290, EPA 1613
Porewater Analyses	
Sample Preparation	Refrigerated Anaerobic Centrifugation
Organotin Isomers (mono - tetrabutyl)	Derivitization; GC/FPD
Metals (customized list)	Reductive Precipitation
	ICP-MS/ICP-AES
	GFAAS/CVAAS

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Experience

Columbia Analytical has routinely performed chemical analyses in support of the Puget Sound Estuary Program (PSEP), Puget Sound Dredged Disposal Analyses (PSDDA), EPA Green Book, EPA Gold Book and the Puget Sound Water Quality Authority. These studies have included numerous analyses of sediment, tissue and water samples for a variety of trace metals, organics, and conventional chemical constituents.

Sediment Testing

Our project work involves the development and validation of specialized analytical techniques to meet the low level detection limits and difficult matrix requirements of sediment samples. All data generated under these projects must meet specific quality control and stringent data deliverable requirements as stipulated for complete data validation. Columbia Analytical has developed ultratrace organic and inorganic facilities which are physically separated from the other Columbia Analytical labs.

Tissue Testing

Columbia Analytical performs trace level organic and inorganic analyses of tissue samples for a variety of private and public sector clients. Typical matrices are marine and freshwater fish, as well as crustaceans, mollusks and other invertebrates. Project work involves developing and validating specialized analytical techniques to meet difficult matrix and low-level detection limit requirements. This includes the development of dissection and other sample preparation techniques as well as sample digestion procedures.

Water Testing

Columbia Analytical routinely performs the analysis of outfall effluents, storm water and other aqueous sources that impact waterways and sediment mixing zones. Additionally, Columbia Analytical provides rapid turnaround for water samples taken to monitor dredging activities.

Organotins

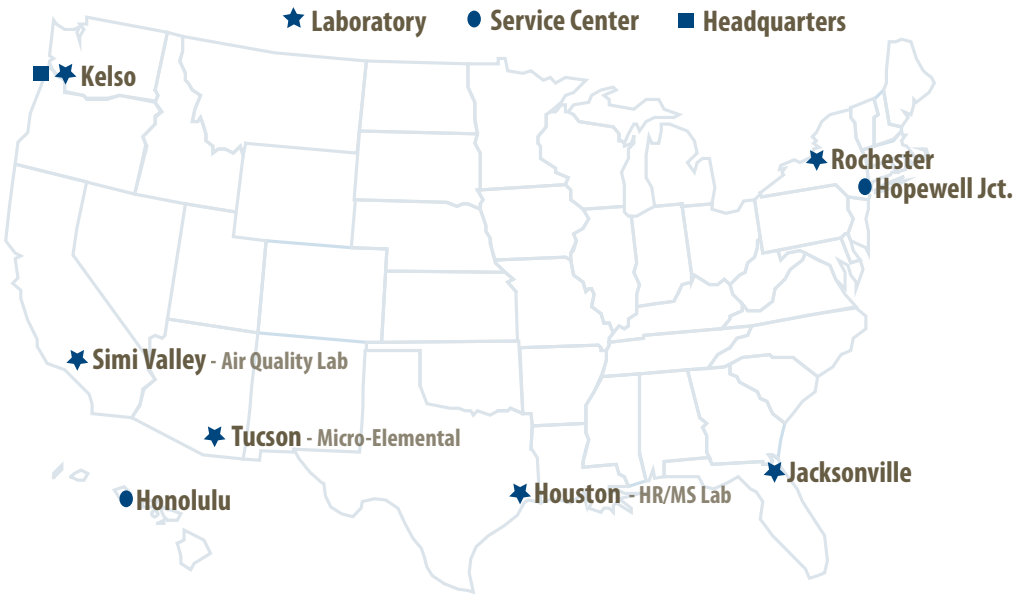
Columbia Analytical has considerable experience analyzing water, porewater, soil, sediment and tissue samples for low level organotins using solvent extraction, derivatization and a gas chromatography flame photometric detector (GC/FPD), consistent with C.A.Krone, et al. and M.O. Stallard, et al.

Ultra-Trace Metals

Columbia Analytical performs ultra-trace level metals analyses of pore water samples associated with harbor dredging projects. The analyses can be extremely challenging due to the sample matrix and the limited volume of sample available. Detection limits in the sub-part per billion (ppb) range are commonly requested and the analyses are supported by strict QA/QC protocols.

Columbia Analytical Services™

With locations across the United States, we continue to exceed client expectations by providing sound analytical science, unsurpassed testing quality and excellent customer service.



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