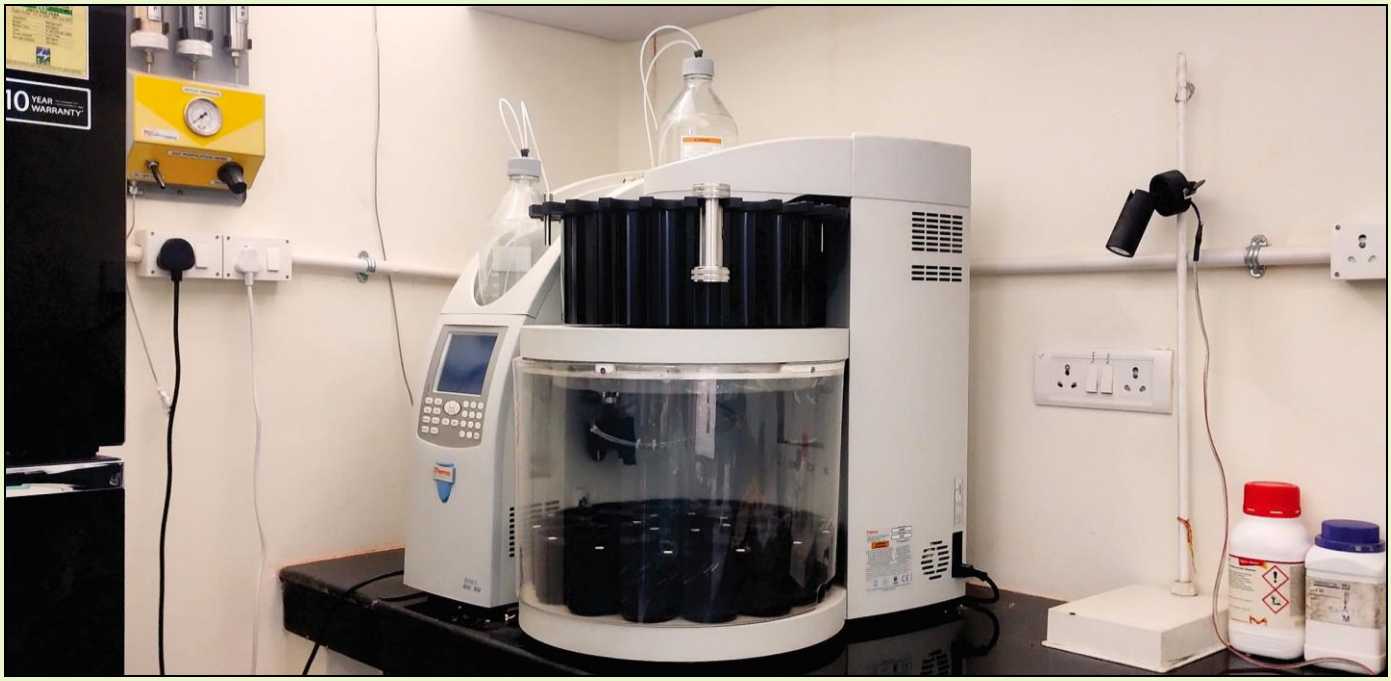
Accelerated Solvent Extractor (Geochemistry Unit)



Name of the Instrument:	Accelerated Solvent Extractor (ASE)
Instrument BSIP Code:	BSIP/SAIF/011
Make:	Thermo Scientific
Model:	Dionex 350
Year of Installation:	2015

Unit In-charge: Dr Anupam Sharma (anupam.sharma@bsip.res.in, Contact: 0522-2742974)

Scientist In-charge of Instrument: Dr Anurag Kumar (anuragkumar@gmail.com)

Facilities under the lab: Instruments necessary for processing of soft sediment/leaf samples for lipid extraction.

Specification: Extraction Cell Sizes: 66 mL (10 Piece), Solvent Reservoir Capacity: 1 liter each, up to 3 different solvents, Number of Samples: 24-position carousel, Temperature Range: 40°C to 200°C, Pressure Range: 500 psi to 3000 psi (34 bar to 207 bar), Static Extraction Time: 0 to 99 minutes, Flush Volume: 0 to 150% of cell volume, Purge Time: 0 to 300 seconds with nitrogen gas

Performance: Temperature Control: ±1°C accuracy, Pressure Control: ±50 psi accuracy, Solvent Delivery: Isocratic solvent delivery system

Physical Specifications: Dimensions: 61 cm (24 in) W x 61 cm (24 in) D x 76 cm (30 in) H, Weight: Approximately 68 kg (150 lbs), Power Requirements: Voltage: 100-240 V AC, Frequency: 50/60 Hz, Power Consumption: 1,500 VA maximum

Compliance: Safety Standards: CE, UL, and CSA certified

Key Features: Automated Extraction: Capable of processing up to 24 samples automatically, Solvent Savings: Uses less solvent compared to traditional methods, Versatile Applications: Suitable for a wide range of sample types and solvents, pH-Hardened Pathway: Allows extraction of samples pretreated with acids or bases

Working Principle: Accelerated solvent extraction is a technique for extracting organic compounds from solid and semisolid samples with liquid solvents. Dionex ASE systems use organic and aqueous liquid solvents at elevated temperatures and pressure to increase the efficiency of the extraction process. Increased temperature accelerates the extraction kinetics, and elevated pressure keeps the solvent liquid above its boiling point, ensuring safe, rapid extractions. Additionally, the pH-hardened pathway allows the extraction of matrices that are pretreated with acids or bases.

Sample Loading: The solid or semi-solid sample is placed in a stainless steel extraction cell, which is then filled with the chosen solvent. The sample can be ground or left as is, depending on the extraction requirements.

Pressurization: The extraction cell is sealed and subjected to high pressure, typically up to 1500 psi (about 10.34 MPa). High pressure is necessary to keep the solvent in a liquid state at elevated temperatures and to ensure efficient penetration into the sample matrix.

Heating: The extraction cell is heated to a temperature range between 50°C and 200°C. Elevated temperatures increase the solvent's ability to dissolve analytes by enhancing solubility and diffusion rates.

Static Extraction: The sample is exposed to the heated and pressurized solvent for a specified period (static time). During this phase, the solvent penetrates the sample matrix, dissolving the desired compounds.

Flush and Collection: After the static extraction period, the system flushes the cell with fresh solvent to ensure all analytes are extracted from the matrix. The extract is then transferred to a collection vial.

Nitrogen Purge: Finally, the system purges the extraction cell with nitrogen to remove any residual solvent from the sample and transfer lines, ensuring a clean and dry sample cell for the next extraction.

Application: Dionex ASE 350 instruments meet the requirements for extraction under US EPA SW-846 Method 3545A for Pressurized Fluid Extraction. Accelerated solvent extraction technique replaces Soxhlet, sonication, wrist shaking, and other extraction techniques, and uses less solvent and less time. In our laboratory, we generally use the ASE 350 for extraction of lipids from sediment and modern leaf samples for compound specific analysis.

Guideline for sample preparation and courier: For Lipid extraction, approximately 100 grams of crushed (~150 mesh) sediment samples (TOC is ~0.1%) should be sent. For samples with lower TOC

concentrations larger amount of samples may be required. For lipid extraction from leaf samples, 1 gram of crushed samples should be sent. Please note that the samples should not be very fine crushed as it may choke the filters. Samples must be properly labeled and packed without contamination. An additional charge applies for crushing and grinding solid samples. Please provide sample details, such as location and depth, in the application. Include TOC values if available. To expedite sample preparation, please provide any related publications. We do not accept explosive, poisonous, or hazardous samples that produce toxic gases or fumes for processing. Samples should be sent at below mentioned address.

Address: Dr Anurag Kumar
Scientist
Birbal Sahni Institute of Palaeosciences, Lucknow
53 University Road
City: Lucknow
State: Uttar Pradesh
Pin: 741246

User instructions:

1. The analytical data/spectra provided cannot be used as certificates in legal disputes.
2. Service charges (including GST) will be payable in advance through BSIP online payment portal or through Draft/RTGS/NEFT in favour of "The Director, BSIP, Lucknow", Payable at Lucknow.
3. Separate samples should be sent for different analysis. Samples will not be analysed until payment is received.
4. In case of prepared samples, the user must specify the procedure that how the sample was prepared (complete methodology).
5. In all correspondence related to analysis, our reference number must be mentioned.
6. Interpretation of data/spectra will NOT be done.
7. It is mandatory for users to acknowledge the facility in their research work and inform the respective laboratory and the Director of BSIP, Lucknow. This information will be communicated onward to DST, New Delhi.
8. For Lab visit, it is mandatory to take prior appointment. The application should be sent to the BSIP director and unit in-charge.

Payment Guidelines: Payment should be done through online payment portal of BSIP or through bank draft in favour of "Director, Birbal Sahni Institute of Palaeosciences". Please visit our web-site for updated rate-List. Please mention the instrument code in remarks at the time of payment. The payment confirmation must be sent to concerned scientists along with the copy performa invoice.