

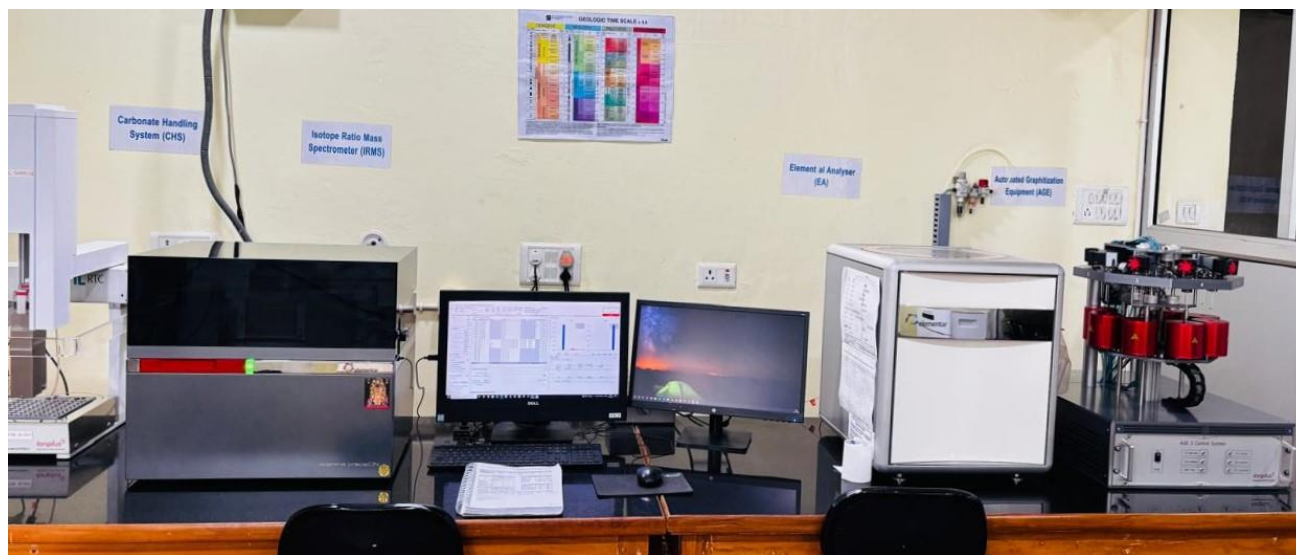
Radiochronology and Isotopic Characterization Laboratory

The Radiochronology and Isotopic Characterization Laboratory is a multidisciplinary analytical facility dedicated to radiocarbon dating and Carbon, Nitrogen, Sulfur stable isotopic characterization of geological, environmental, archaeological, and biological materials. The laboratory provides analytical support for establishing chronological frameworks and reconstructing past environmental and climatic conditions using isotope-based approaches.

The facility integrates Elemental Analyzer (EA) –Isotope Ratio Mass Spectrometry (EA–IRMS) with Automated Graphitization Equipment (Age) for AMS radiocarbon sample preparation, enabling comprehensive investigations from elemental and stable isotope characterization to preparation of graphite targets for Accelerator Mass Spectrometry (AMS) radiocarbon dating.

Instrument Configuration

EA	Make: Elementar Analysensysteme GmbH, Germany (<i>Vario Isotope select</i>)
IRMS	Make: Elementar Analysensysteme GmbH, Germany (<i>Isoprime PrecisiON</i>)
Age	Make: Ionplus AG, Switzerland (<i>AGE-3</i>)



Working Principle

Elemental Analyzer

The Elemental Analyzer combusts the sample at high temperature, converting its constituent elements into measurable gases. These gases are separated, detected, and quantified to determine the elemental composition, particularly C, N and S.

Isotope Ratio Mass Spectrometry

The IRMS ionizes the sample-derived gases and separates the resulting ions according to

their mass-to-charge ratio (m/z). The relative abundance of different isotopes is measured to determine their isotope ratios ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$ and $\delta^{34}\text{S}$).

Automated Graphitization Equipment

The AGE-3 converts purified CO_2 derived from a radiocarbon sample into graphite through a controlled reduction process. The resulting graphite is pressed into targets for subsequent AMS ^{14}C measurement, providing a reproducible and efficient route for radiocarbon target preparation.

Applications

- Paleoclimate and Paleo environment reconstruction
- Marine and Coastal Research
- Archaeology and geo-archaeology
- Geology and Quaternary Sciences
- Sediment biogeochemistry
- Environmental sciences
- Ecology and biological sciences
- Atmospheric studies
- Food and drug authentication
- Forensic investigations

Sample Types

Depending on the analytical objective and sample matrix, the laboratory can undertake analysis of suitable organic matter such as charcoal, wood, bone/collagen, peat, charcoal, textiles, plant remains, and other carbon-bearing materials. Sample suitability should be confirmed with the laboratory before submission, particularly for radiocarbon dating and specialized isotope measurements.

Sample Submission and Preparation

Prior the sample submission users are advised to send a mail for quotation with following details. Send the mail

To: Dr. Srinivas Bikkina (sbikkina@bsip.res.in)

CC: sksgahlaud@bsip.res.in; consultancyservices@bsip.res.in

1. Name of the Investigator:
2. E-mail & Contact number:
3. Communication address:
4. No. of samples:
5. Type /nature of sample:
6. Location of collected sample

7. Analysis required:
8. GST No. :

After receiving the quotation, users are advised to send the samples to lab along with copy of quotation and details of samples.

- Contact the laboratory regarding minimum sample requirements before dispatch.
- Submit samples in appropriate, clean and air tight containers.
- Clearly label individual samples and share the list of samples in mail and along with the samples
- Mention previous chemical or physical treatment. Inform the laboratory about potentially toxic, corrosive or hazardous materials.

Contact Person

In-Charge	Dr. Srinivas Bikkina, Scientist-F sbikkina@bsip.res.in ; 0522-2742942
Staff	Sanjay Kr. Singh Gahlaud, Scientist-C sksgahlaud@bsip.res.in ; +91-8090230913
Address	C-14 laboratory Birbal Sahni Institute of Palaeosciences (BSIP) 53, University Road, Lucknow, Uttar Pradesh, India-226007