



Stable Isotope Lab

Important Information for sample preparation for C/N - bulk analysis

If you are interested in measurement of stable isotopes, we ask you kindly to get in touch with us beforehand, so we can clarify important issues regarding the procedure. For preparation, samples must be dried (oven or freeze-drier), ground, and weighed into small tin capsules prior to isotope analysis. This handout informs you about some basic points you have to consider. If you have any further questions, do not hesitate to contact us.

Important: Samples containing fluorides or chlorides may harm our IRMS-device. Thus, please make sure that your samples contain NO fluoride or chloride.

Sample-Preparation – Carbonates and lipids

Carbonates: Organic samples that contain carbonates (e.g., soil) may exhibit erroneous $\delta^{13}\text{C}$ values if not pre-treated. You can test the carbonate content by sprinkling with 1 mol/l HCl. If this causes foaming you have to detach the carbonates by treating your samples with 1 mol/l HCl before washing them several times with pure water. Note that it is, however, recommended to determine the $\delta^{15}\text{N}$ with untreated sample material.

Lipids: Compared to other animal tissues, lipids exhibit extraordinary low $\delta^{13}\text{C}$ values. In cases of samples with high lipid content, a lipid-correction is necessary to avoid erroneous values. There are several possibilities to handle such samples (i.e., lipid extraction or mathematical correction via the C/N ratio). If you have questions about this issue, do not hesitate to contact us .

Sample-Preparation – Drying and homogenization

Samples must be dried (either at 50-60°C or via freeze-drying) before analysis. If not the whole sample is used for analysis, it is recommended to grind the sample to reduce variability resulting from internal differences (e.g., caused by different tissues of an animal sample).

Sample-Weighing

The required dry weight for simultaneous analysis of $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ depends mainly on the sample type (especially the nitrogen content). Since nitrogen occurs in lower concentrations than carbon (for most organic materials), the nitrogen content becomes the limiting factor in dual-isotope measurements.

For an optimal measurement, the following amount per element is required and defines the lower limit for measuring reliable stable isotope signatures:

- N-content (abs.) $\geq 0,07$ mg
- C-content (abs.) $\geq 0,05$ mg

Typically required amounts are:

- for animal material: 0,5 – 1,0 mg dry weight
- for plant material: 1,5 – 3,0 mg biomass (NOT dry weight!!!)

If you are doubtful regarding the nitrogen content of your sample or sample type, or it is not possible to get the required amount per sample, please contact us.

Sample-Packing

The appropriate amount of sample has to be weighed into a tin capsule, which needs to be "packed" into a small cube (by folding the capsule). Please find further information about ordering materials below. If necessary, you can borrow a special sealing device and some suitable forceps from the Stable Isotope Lab (we are sorry that we can offer this only to members of the University of Landau). The used balance should have an accuracy of at least 0,01 mg. While packing you have to make sure that there are no air-inclusions, which could affect $\delta^{15}\text{N}$ analysis.

After packing, make sure that there are no cracks in the capsule. This could otherwise result in the loss of material, which would contaminate the IRMS device and affect your isotope and elemental data through incorrect mass determination and subsequent sample-to-sample contamination.

At no point in time should you touch the sample or the tin capsule with your bare hands. If required use powder-less latex gloves. Please note that if a capsule falls on the floor, it should be thrown away. If you are planning to pack your samples the first time, just contact us for a brief introduction.

Only on very rare occasions we will accept non-prepared samples that still require drying, grinding and packing. For such samples, we have to charge additional costs, and approval by our lab must be given before submission. We are sorry, but we cannot accept samples without prior agreement.

Sample-Storage

Packed samples should be placed into a microtitre- or microwell-plate (96 wells) with a lid and stored in a drying oven at 60°C. If required, we can supply microwell plates.

Sample-List, Nomenclature

Please use our Excel-sheet (SI sample list.xls), which is downloadable from our homepage (www.uni-landau.de/umwelt/silab).

Material, ordering-info

You can order required materials e.g. by IVA (IVA Analysentechnik e. K.):

- Tin capsules for solid samples, 5x9 mm, IVA-Order No.: SA76981102L
- Forceps, IVA-Order No.: IVAHSC189-11
- Micro spatula, IVA-Order No.: IVA205-00600-25R

Get your samples measured

Please send us the sample-list and the signed order form (downloadable at www.uni-landau.de/umwelt/silab) at the latest together with your samples.

For further information and if you have any questions regarding the measurement of stable isotopes, please do not hesitate to contact us:

- M.Sc. (Ecotoxicology) Jochen Zubrod
phone.: +49 6341 280-31361
zubrod@uni-landau.de
 - Andreas Hirsch
phone.: +49 6341 280-31343
hirsch@uni-landau.de
- Institute for Environmental Sciences
University of Koblenz-Landau
Fortstr. 7
Germany, 76829 Landau
www.uni-landau.de/umwelt/silab