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# Sampling of timber for stable isotopic analysis

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### Introduction

Reference sampling of timber for the stable isotope method has to follow strict rules. The aim is a robust description of the sampling site with minimal time and effort. Especially in tropical rain forests this can be a challenge. In general sampling has become easier over time during the time.

Regarding our experiences from various projects, it is advised to do the sampling as follows.

### Recommended technical facilities:

1. Drilling machine with rechargeable battery / cordless screwdriver; recommended torque:  $\geq 65$  Nm, e.g. "Makita BDF 451" (cost 200 to 300 USD).
2. Auger (see picture below): length 20 cm, diameter 10 mm (cost 5 to 10 USD).
3. Recommended: car charger to charge the cordless screwdriver battery in field
4. Recommended: extra rechargeable battery for the cordless screwdriver
5. GPS device ([en.wikipedia.org/wiki/GPS\\_navigation\\_device](http://en.wikipedia.org/wiki/GPS_navigation_device)) to receive latitude and longitude information)
6. Cotton drawstring bags (see picture below): 10 \* 14 cm, cost: approx. 0,50 USD; e.g. [foxxshirts.de/Zuziehbeutel-klein-10-x-14-cm.html](http://foxxshirts.de/Zuziehbeutel-klein-10-x-14-cm.html); [save-on-crafts.com/muslinbags.html](http://save-on-crafts.com/muslinbags.html)
7. *In case problems are expected when shipping the collected samples it is recommended to take each sample twice and store them in two different cotton bags with the same marking. From experience this procedure is much faster and cheaper compared to resampling.*



### Preliminary:

1. **Assessment of the sampling site:** A sampling site is described through wood samples from different trees. The ideal scenario is to identify different wood species in the field and take wood samples of five different individuals from each species. This will not always be possible in the field.
  - a. Is it possible to identify wood species in focus on the sampling site?

- b. Is it possible to identify five trees *of the same* species within a circumference of 100 to 200 m?
- c. Is it possible to identify five species of *different* species within the same circumference of 100 to 200 m?

If it is possible to find at least more than one tree of the same species (ideally five), it is worth it to start sampling.

➔ Five trees of each sample = good sampling site

In the exceptional case that only one tree of the focused species can be found at the sampling site and at the same time it is very unlikely to find a better sampling site in the area, a reference sample from this tree can be taken.

➔ Less than five trees of each sampling site = sampling site of lower quality

2. What to do if the **wood species can't be identified** clearly in the field?  
In case there are doubts about the wood species it is recommended to remove a small piece of wood (approx. 1 cm<sup>3</sup>) with the machete. The sample can be taken from the root, trunk or branches of the tree. The sample can be put into the cotton bag together with the drill sample from the same tree.
3. Prepare Excel-sheet to **record sampling information** (obligatory):
  - a. Name of responsible person
  - b. Within which organisation or company the responsible is employed?
  - c. Clear ID to each sampling
  - d. GPS data
  - e. Wood species identified in the field
  - f. General comments about the sampling site (e.g. close to a river; very stony ground; hilly; swampy soil...)

## Procedure:

1. Sampling location: 50 to 100 cm above ground
2. Drilling depth: 20 cm (in case of strong bark, remove bark first e.g. with a machete)
3. *In case of double sampling (see "Recommended technical facilities") drilling has to be repeated in each tree and stored in different cotton bags with the same marking.*
4. Hold box directly below borehole location while drilling to make sure that drill chips are collected entirely.
5. Give clear ID to each sample
6. Place drill chips into cotton bag and mark sample ID in clear letters with water resistant marker on the cotton bag.
7. Record recommended information in Excel sheet (see "Preliminary", Nr. 3)
8. Storage of the sample: to prevent mould, cotton bags should stay in contact with air and should not be put or carried inside a plastic bag or plastic box. Any drying is helpful. The cotton bags are practical for avoiding fungi and for drying the samples easily e.g. in the sun.
9. Clean Auger and box after each tree to make sure reminder from the last tree are removed. A brush can be helpful.

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