Introduction to sampling and sample pre-treatment techniques

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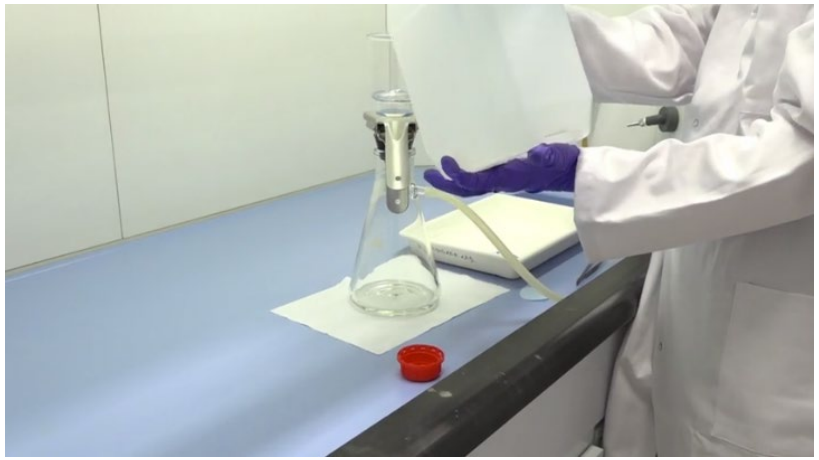
Sampling

- **Sampling is the most important step** – errors made here can not be corrected afterwards
- We can take different kind of samples (water, soil, sediment, biological material, air, dust particles, concrete,…)
- **Sampling must be representative**
- **Prevent contamination and cross-contamination during sampling**

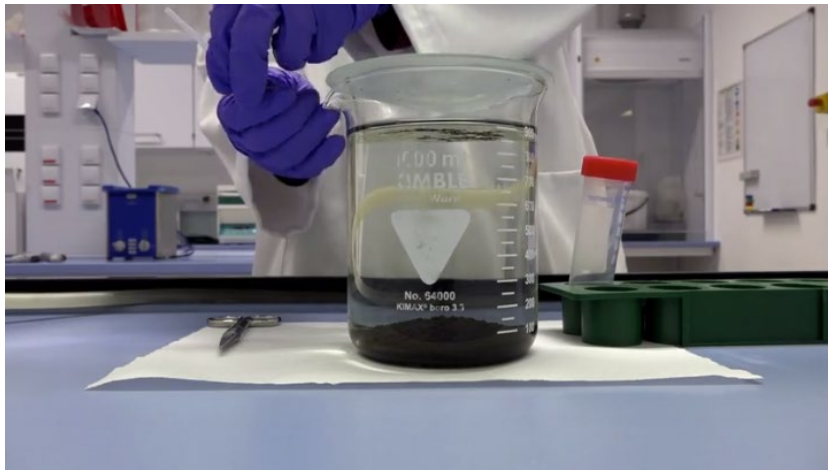
Preserving sample integrity

- To prevent adverse change in analyte concentration or speciation in time between sampling and analysis in the laboratory
- Example: water sample
  - filtration right after the sampling (0.45 µm)
  - change pH to acidic by adding acid to prevent radionuclide loss from water



Sample pre-treatment: water

- Activity concentrations are usually very low **=> need to pre-concentrate radionuclides**
- Co-precipitation:
  - $FeOH_3$
  - MnO_2
  - $PbSO_4$
  - $CaPO_3$
- Evaporation
- Addition of **suitable tracers** for recovery **before** sample pre-treatment



Sample pre-treatment: biological material

- Separation of specific organs or parts of interes or species
  Fish: muscle, bones, liver, spleen,…
  Plants: leaves, shots, roots
- Drying (air, oven, freeze drying, depending on volatility of radionuclide)
- Homogenisation (grinding, milling, sieving, mixing, subsampling)
- Reducing sample mass and removing organic material by ashing (for non-volatile radionuclides)
- Addition of **suitable tracers** for recovery
- Digestion, decomposition, leaching with acids, either on hot plate, microvawe or alkaline fusion

Sample pre-treatment: soil, sediment

- Drying (air, oven, depending on volatility of radionuclide)
- Removal of large stones and roots
- Homogenisation (grinding, milling, sieving, mixing, subsampling)
- Removing organic material by ashing for high organic content soil or sediment (for non-volatile radionuclides)
- Addition of **suitable tracers** for recovery
- Digestion, decomposition, leaching with acids, either on hot plate, microvawe or alkaline fusion

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