

Sampling guidelines for residue analysis

Laboratory of Applied Spectroscopies in Cultural Heritage,
Institute of Electronic Structure and Laser, Foundation for Research and Technology
NMR Laboratory, University of Crete, Department of Chemistry

Where are organic remains found in archaeological materials?

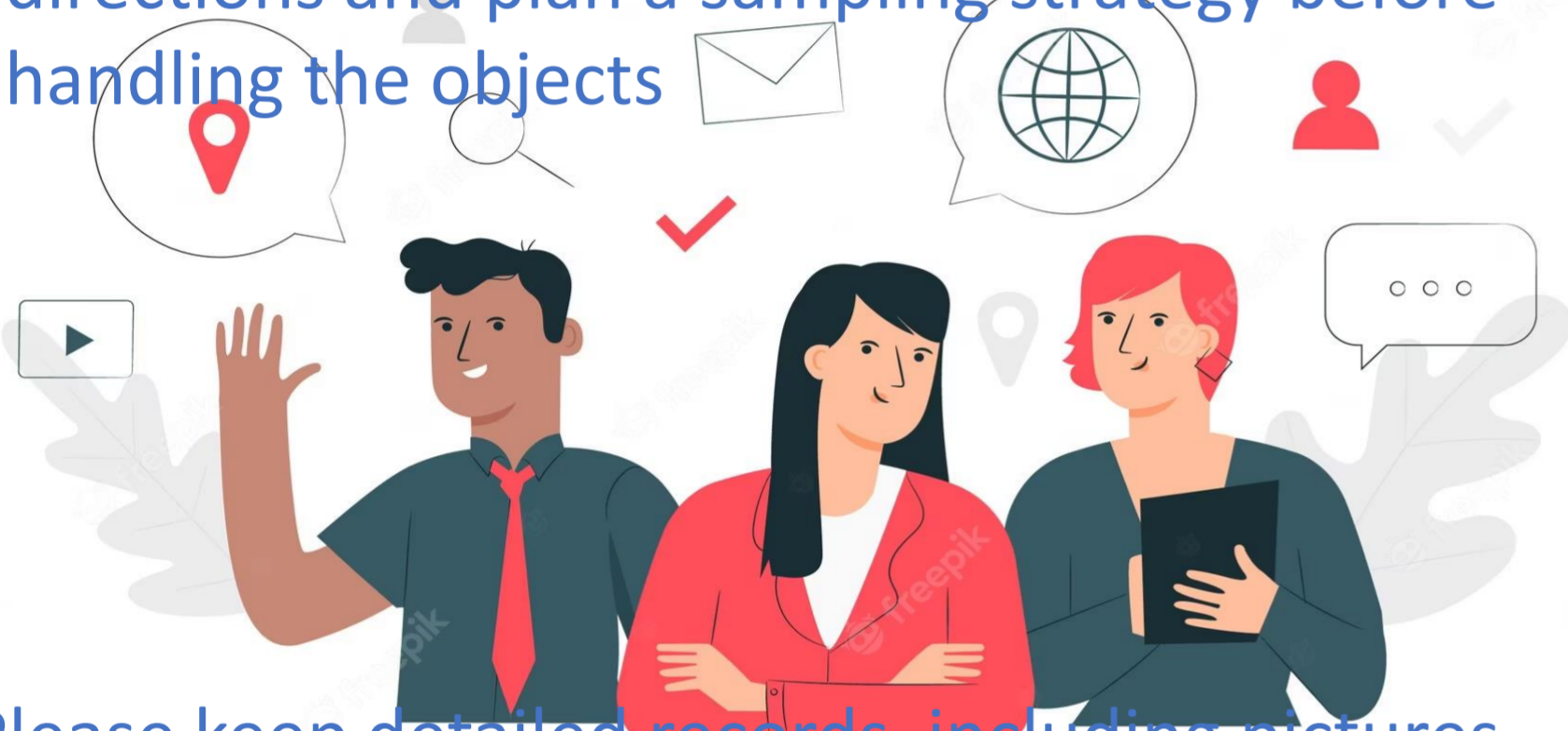
- ❖ Ceramic containers and objects
- ❖ Glass vessels and objects
- ❖ Metallic objects
- ❖ Stone tools
- ❖ Sedimentary matrices
- ❖ Wood objects and remains
- ❖ Plant remains
- ❖ Human and animal skeletal remains (also soft tissues and mummies)



- a) Food residues
- b) Coatings
- c) Adhesives
- d) Decoration
- e) Sooting residues

Organic remains might be visible, invisible or amorphous deposits

- ✓ When possible, speak to experts, ask for specific directions and plan a sampling strategy before handling the objects



- ✓ Please keep detailed records, including pictures, context observations, relevant measurements, reference to excavation diaries, when necessary.

- Please avoid using glue, varnish, tape on the objects selected for residue analysis
- Sample the surroundings: they will serve as reference. Keep part of the sediments present in ceramic (or other) containers
- Avoid storing in humid places. Try storing away from light and in most cases (special drying conditions apply for bones, leather, fibers) after samples are dry
- Avoid sample contamination by post-depositional processes



Do not wash, clean, dechlorinate or use acid



Avoid handling and contact with plastics.

Use gloves (non powdered)



Wrap dry samples (ceramics, bones, amorphous deposits...) in aluminium foil or in glass containers

Material	Weight requirements (Also depending on the material available)
Ceramic containers (or other porous matrices)	2 – 5 g
Bones (Washed with water and air-dried prior to sampling)	1 – 5g
Amorphous organic matter	50 – 100 mg
Sedimentary matrix	A minimum of 10g

Useful bibliography

- Barnard, H. and Eerkens, J.W. eds., 2007. *Theory and practice of archaeological residue analysis* (p. 42). Oxford: Archaeopress.
- Colombini, M.P. and Modugno, F. eds., 2009. *Organic mass spectrometry in art and archaeology*. John Wiley & Sons.
- Evershed, R.P., 2008. Organic residue analysis in archaeology: the archaeological biomarker revolution. *Archaeometry*, 50(6), pp.895-924.
- Roffet-Salque, M., Dunne, J., Altoft, D.T., Casanova, E., Cramp, L.J., Smyth, J., Whelton, H.L. and Evershed, R.P., 2017. From the inside out: Upscaling organic residue analyses of archaeological ceramics. *Journal of Archaeological Science: Reports*, 16, pp.627-640.
- Shillito, L.M., Almond, M.J., Wicks, K., Marshall, L.J.R. and Matthews, W., 2009. The use of FT-IR as a screening technique for organic residue analysis of archaeological samples. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 72(1), pp.120-125.
- <https://historicengland.org.uk>



ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
UNIVERSITY OF CRETE