



# From archaeological ceramics to chronology

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*This article summarises methodological developments for compound-specific radiocarbon analyses of lipids preserved in archaeological ceramics, as well as the first applications of this method.*

Archaeological ceramics are valuable archives of the past. Their typology and decorations allow archaeological sites to be relatively dated, but their absolute dating using the radiocarbon method is much more complex.

Since the mid-2010s, new methodological developments have focused on the dating of organic food remains preserved in the clay matrix. This approach targets individual molecules from degraded animal fats of archaeological origin. It therefore makes it possible to avoid external contamination deriving from the burial environment, handling, post-excavation storage or the chemical treatment procedure prior to dating. With this method, two fatty acids are dated, which allows to obtain two measurements per ceramic and an internal quality control.

The method was first developed on fats extracted from Irish “bog butters”, which led to the creation of new radiocarbon standards for the dating of individual fatty acids. It was then validated by the dating of archaeological ceramics from sites of known ages with very varied preservation conditions. The validity of this method opens up a whole range of possibilities for the chronological studies of archaeological sites and ceramics.

To date, around fifteen articles present radiocarbon measurements on individual compounds isolated from archaeological ceramics. These studies were carried out to answer various questions. We can cite the resolution of the chronology of archaeological sites presenting a dearth of remains (bones, charcoal, etc.) commonly used for radiocarbon dating, the

precision of relative chronology established on archaeological ceramics, the quality control on the analyses of lipid residues of ceramics and the dating of specific foodstuffs. This last application has focus on the dairy exploitation among pastoral populations across Europe and Africa, the exploitation of equine products in Central Asia and the exploitation of marine resources by coastal populations.



*Figure : Fraction collector coupled with gas chromatography. The target compounds extracted from the ceramic matrix and are separated by chromatography from external contaminants then are trapped in the glass wool traps contained in the traps to be measured by the radiocarbon method.*



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