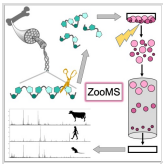

Jun 29, 2020

Zooarchaeology by Mass Spectrometry (ZooMS)- Pretreatment protocols for bone material

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1 Works for me dx.doi.org/10.17504/protocols.io.bf5djq26

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ABSTRACT

This collection details some of the different established protocols for Zooarchaeology by Mass Spectrometry (ZooMS) for use on archaeological bone. ZooMS allows for taxonomic identification by the peptide mass fingerprinting of collagen type I. These protocols can be used individually or combined depending on the preservation, sample size, and ability to do destructive analysis. All protocols are optimized for bone as the starting material.

The AmBic protocol can be used on samples where distructive analysis cannot be undertaken. Samples are pretreated by soaking in ammonium bicarbonate at room temperature followed by a brief heating step to "melt" a small amount of collagen out of the bone. The bone can then be dried at room temperature.

Both acid based protocols are destructive as the samples are pretreated with hydrocholric acid to demineralize the bone. In the acid soluble protocol the acid is removed and the collagen is filtered from the acid. In the acid insoluble protocol the bone shaddow that remains after demineralization is washed to remove the acid and then heated in ammonium bicarbonate to gelitinize the collagen. Both acid based protocols can be done on the same sample in conjunction with each other and then either analyzed separately on the MALDI or combined before analysis.

In all protocols the extracted collagen is then digested with trypsin and the peptides are purified using C18 ZipTips.

If you are using any of the protocols please cite the DOI for the protocol, the following paper, and any papers in the additional individual protocols:

Buckley, M., Collins, M., Thomas-Oates, J., & Wilson, J. C. (2009). Species identification by analysis of bone collagen using matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry. *Rapid Communications in Mass Spectrometry: RCM*, *23*(23), 3843–3854. https://doi.org/10.1002/rcm.4316

THIS COLLECTION ACCOMPANIES THE FOLLOWING PUBLICATION

Wang, N; Brown, S; Richter, K. K; Ditchfield, P; Hebsetreit, S; Kozilikin, M; Luu, S; Wedage, O; Grimaldi, S; Chazen, M; Horwitz, K. L; Spriggs, M; Summerhayes, G; Shunkov, M; Douka, K. (2020). Testing the efficacy and comparability of ZooMS protocols on archaeological bone. Under review.

ATTACHMENTS

ZooMS_WetChemProtocol_Bone_V2_InternalVersion.pdf

DOI

dx.doi.org/10.17504/protocols.io.bf5djq26

COLLECTION CITATION

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KEYWORDS

ZooMS, Zooarchaeology, Archaeology, mass spectrometry, MALDI, peptide mass fingerprinting, collagen, protein extraction, bone

IMAGE ATTRIBUTION

Image created by Kristine Korzow Richter. Rat by Rebecca Groom from phylopic.org, cow by Alessandro Suraci and scissors by Lluisa Iborra from thenounproject.com, collagen from smart.servier.com.

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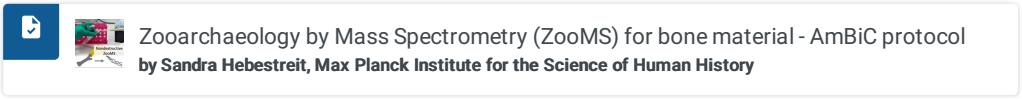
See individual protocols.

MATERIALS TEXT

See individual protocols.

FILES



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