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

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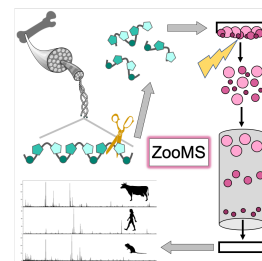
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Protocol status: Working

We use this protocol in our group and it is working. It is a part of a collection of several ZooMS protocols.

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Keywords: ZooMS, Zooarchaeology, Archaeology, mass spectrometry, MALDI, peptide mass fingerprinting, collagen, protein extraction, bone, zooarchaeology by mass spectrometry, use on archaeological bone, acid insoluble protocol the bone shadow, protocols for zooarchaeology, archaeological bone, bone collagen, extracted collagen, mass spectrometry, peptide mass fingerprinting, taxonomic identification by the peptide mass fingerprinting, zooarchaeology, bone material, bone as the starting material, collagen, acid soluble protocol, acid soluble protocol the acid, bone, rapid communications in mass spectrometry, flight mass spectrometry, taxonomic identification, small amount of collagen, acid insoluble protocol, ammonium bicarbonate, hydrochloric acid, soluble protocol, peptide, species identification by analysis,

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 destructive 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 hydrochloric 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 shaddock that remains after demineralization is washed to remove the acid and then heated in ammonium bicarbonate to gelatinize 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>

Attachments



[ZooMS_WetChemProtoc](#)

[O...](#)

994KB

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.

Guidelines

See individual protocols.

Materials

See individual protocols.

Troubleshooting

Attachments

 ZooM
S_WetC
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ZooMS_WetC
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Files

 SEARCH

Protocol



NAME

Zooarchaeology by Mass Spectrometry (ZooMS) for bone material - AmBiC protocol

VERSION 1

CREATED BY



Sandra Hebestreit

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Protocol



NAME

Zooarchaeology by Mass Spectrometry (ZooMS) for bone material - Acid insoluble protocol

VERSION 1

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NAME

Zooarchaeology by Mass Spectrometry (ZooMS) for bone material - Acid soluble protocol

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