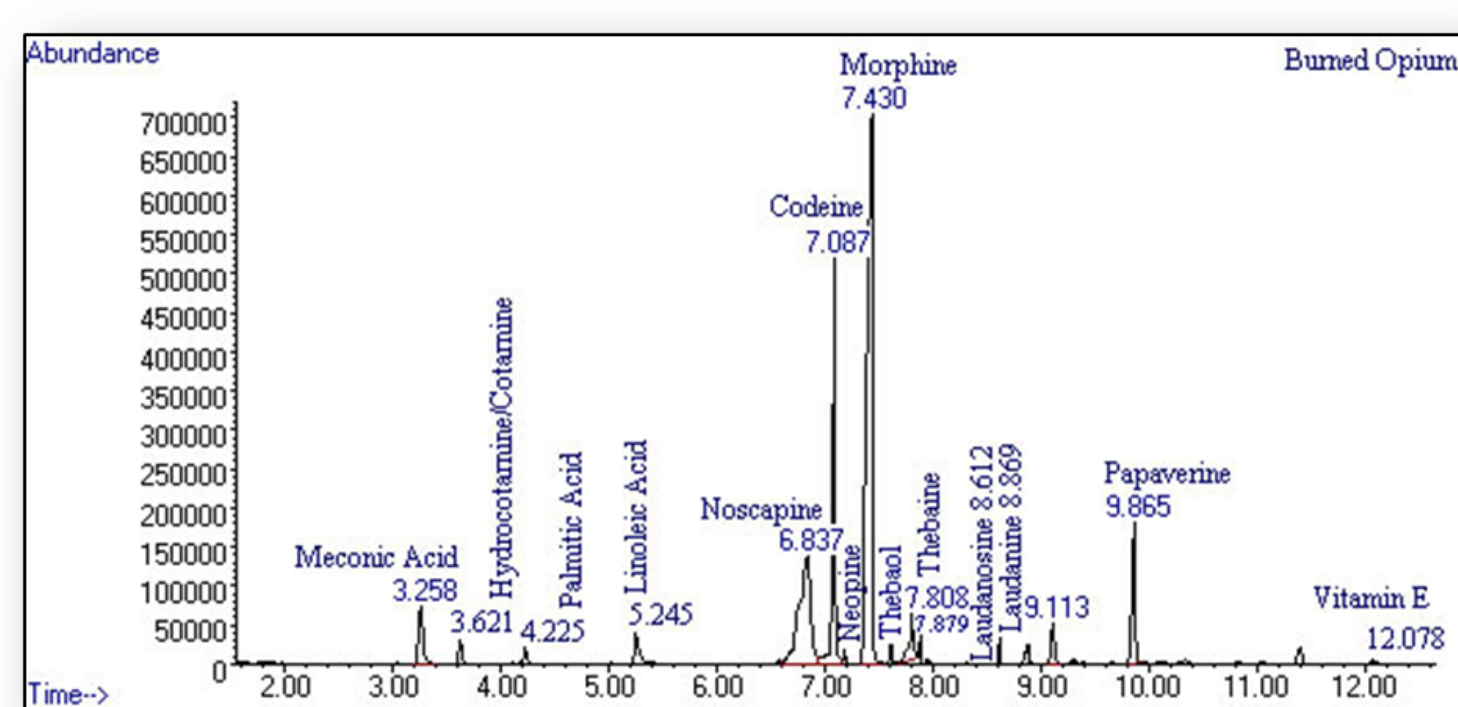


ABSTRACT

Organic residue analysis (ORA) studies in Near Eastern Archaeology are increasingly more common. This analysis is often conducted by specialists outside of Archaeology or by archaeologists with variable levels of training in the physical sciences. Following a workshop on ORA at the 2017 meeting, a point was raised that having some guidelines for evaluating analytical results that archaeologists are provided would be useful for those who are not well-versed in the interpretative nuances of ORA. This poster aims to address this need by clarifying the analytical process, the way in which data is interpreted, and some suggestions for better evaluating the relevance of analytical data to archaeological questions.

BACKGROUND & NEED

ORA as a specialization of Archaeometry aims to identify the residues of plant- or animal-based products made by, consumed, or otherwise used by humans. Since the field's inception over 40 years ago, ORA studies have become increasingly diverse with the range of publications more technical.



- . *Journal of Archaeometry*: est. 1958: 200+ focused on ORA
- . *Journal of Archaeological Science*: over 1000 since 1998, double digits in 2003, triple in 2014
- . *Journal of Archaeological Science Reports*: 165+ since 2015
- . Regional Journals: e.g., *Mediterranean Archaeology & Archaeometry*

WHO IS THIS GUIDE FOR?

- . Archaeologists and others without expertise in the physical sciences, but who may be reading literature on chemical analysis related to Archaeology.
- . Field archaeologists submitting samples for analysis hoping to accurately evaluate results provided by a third-party.
- . Archaeologists interested in incorporating ORA into future projects.

MODERN ORA IN ARCHAEOLOGY REQUIRES

- 1) archaeological context,
- 2) appropriateness and expertise in methodology,
- 3) accurate interpretation of analytical results, and
- 4) relevance of anthropological interpretative frameworks.

How these requirements are achieved depends on parties involved.

WHO DOES THE ANALYSIS?

- 1) A chemist/other scientist conducting one-time analysis for archaeologist, reporting analytical results
- 2) A chemist or archaeologist with variable levels of expertise or experience in other disciplines
- 3) An archaeologist trained as an analytical chemist
- 4) A group of chemist(s) and archaeologist(s) collaborating on an integrated research project

Evaluating the nature of a collaborative relationship is key to a successful ORA project and be a consideration for readers of ORA literature.

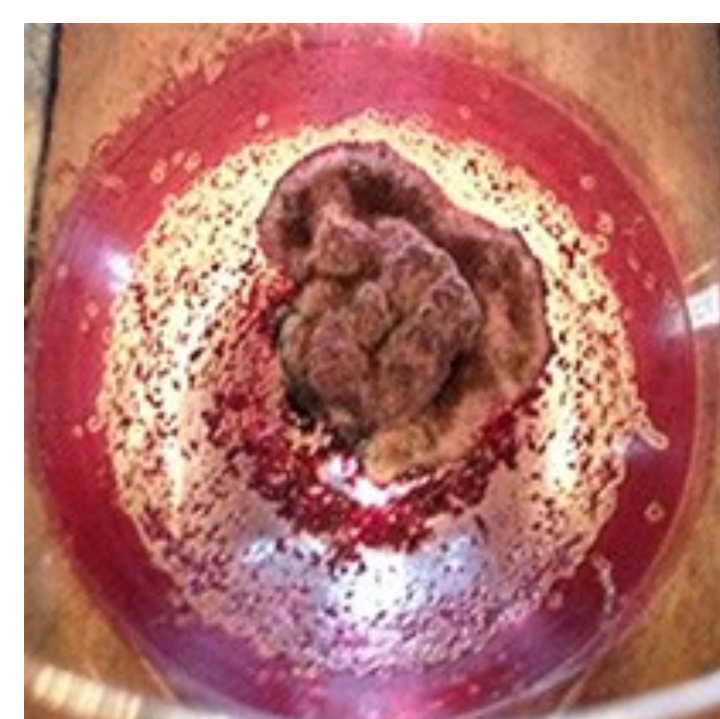
TYPES & SOURCES OF RESIDUES:

Is it visible, well-preserved, on the surface?

- . Is not necessarily limited to ceramic containers (e.g., blood residues, remnants of hafting)
- . If so, does this level of preservation make sense for preservation in archaeological context?

Is the residue presumed to be absorbed into the ceramic matrix?

- . Consider likelihood of preservation and potential uses Is ceramic fine or coarse ware?
 - . Shape open or closed?
 - . Interior surface slipped or otherwise treated to prevent absorption?



KEY CATEGORIES OF ORGANIC CHEMICAL COMPOUNDS

- . Lipids
- . Alkaloids
- . Essential Oil Compounds
- . Human/Animal Bone Collagen
- . Proteins



SAMPLE CONSIDERATIONS

- Type of sampling and amount of sample required
- From stratified excavation or museum specimen
- Time since excavation or acquisition
- Handling, Processing, Storage Environment
- Likelihood of Introduction of Contaminants
- Reconstruction with glue or other modern materials, storage in plastic bags, labeling with ink or acrylic, chemical washing, smoking while handling.**

QUESTIONS TO GUIDE EVALUATION OF RESULTS

- . Is analytical methodology, & interpretation described?
- . Are data (e.g., chromatogram) provided & explained?
- . Were **biomarkers** identified? (chemical compounds with a limited distribution, such as morphine or noscapine in opium poppy)
- . Do results seem too good to be true?
 - . Do results match level of preservation at site?
 - . Is this a single result or are there multiple results?
 - . Is this the first time the product being reported in region/ timeframe?
- . What types of organic products are being targeted?
 - . Is the product a complex mixture with multiple ingredients?
 - . Are only one or two compounds being reported?
 - . If so, are biomarkers being identified?