

Message in a 2400 year old Bottle

A new DNA technique could provide a revolutionary insight into the lives of the Ancient Greeks - using jars that have lain on the seabed for millennia.

Buried treasure: Amphoras from a shipwreck lie on the seabed

These amphoras were the cargo containers of the ancient world, used for shipping all kinds of things, from wine to olive oil. Studying those left in shipwrecks could tell us much about the trade, agriculture and climate of historic societies - except that the contents wash away over the centuries, leaving archaeologists with glorified empty bottles.

Now a team from Massachusetts Institute of Technology and Woods Hole Oceanographic Institution in the US and Lund University in Sweden has performed the first successful extraction of DNA from the remains of a 2,400-year-old shipwreck off the Greek island of Chios.

The wooden merchant ship sank in the fourth century BC, coming to rest 70 metres down. As it reports in the *Journal of Archeological Science*, the team was able to work with archaeologists in the Hellenic Ministry of Culture, notably Dimitris Kourkoumelis, Katerina Dellaporta and Kalliopi Preka-Alexandri, to obtain DNA sequences from the inside of two amphoras recovered by a submersible robot. One would have contained olive products and oregano; the other probably carried wine.

Chios was well known as a major exporter of highly prized wines - Julius Caesar served them at his triumphal banquets - so the discovery of olive oil containing oregano, which was used as a flavouring and preservative, surprised the archaeologists.

The other amphora is thought to have contained wine because fragments of DNA may have come from mastic, a plant that grows on Chios and was famous for its use in resinating and preserving the drink (the team cannot be certain, as the same DNA sequences are found pistachio nuts). Although these particular findings are limited, the work demonstrates that this technique works - and could be used to identify a vast range of other plant products from shipwrecks around the world. "We can see what crops were grown where and when," says Brendan Foley of MIT and Woods Hole, "giving us an entirely new look at the ancient economy."

It is still to be determined whether the technique will work on amphoras that have been stored in museums, or only on those brought up fresh from the ocean. But there are already plans to use the method to investigate other ancient civilisations. The team is working on artefacts from the Minoan and Mycenaean cultures of the Bronze Age (BC2500-BC1200), as well as Mayan ceramics ritually deposited in sinkholes in Mexico, and has approached experts on Roman amphoras in Britain.

"It will be useful with any coarse ceramic artefacts, jars or ceramic containers that were not glazed," says co-author Maria Hansson "Transport amphoras throughout time were coarse ware, so are perfect for our study."

Reports Roger Highfield 8/1/2008

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