METAL CONTAINERS OF THE 4TH CENTURY BC.
ANALYSIS OF THEIR COMPOSITION AND CONTENTS

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In the region of the ancient city Lete, at Derveni near Thessaloniki, the deceased members of a rich and important family were interred in a cluster of seven tombs dated to the last years of the 4th century BC. In tomb B, the cremated remains of a man were placed in an elaborate bronze vessel, today known as the famous Derveni krater. That individual was an important member of the elite, probably a royal companion who died when he was approximately 35-50 years old. Among the numerous grave goods, expensive vessels, weapons and jewellery, was also a set of unusual bronze containers preserving their original content: A case with a hinged lid is divided in three compartments, each filled with a mass of clay; one is still preserving the finger impressions of its user. In two miniature bowls is preserved a thin dark colored cake. A small cylindrical box is still filled with a red powder. The use of the containers and the nature of the contents are both uncertain.

Because the finds survive in an intact state there was no possibility of sampling. The analytical technique that was carried out, on them, is the X-Ray Fluorescence (XRF) spectroscopy because it offers non-destructive and multi-elemental analysis with practically no limitations in the number of samples (positions) analyzed in-situ. According to this, analytical information was received from every different part (lid, body, fastening nails), taking into account the surface corrosion problems. For the implementation of the XRF spectroscopy an energy dispersive mobile spectrometer was used that has been designed specially for the demands of archaeometry. Its lateral resolution is between 200 and 1500 µm depending on the type of collimator used (for the present study the 650 µm and the 200 µm collimators were used). Besides the main elements, Cu and Sn, were detected Pb, As and Fe in different amounts. The analytical results of the XRF study were useful for the better understanding of the metallurgical technology and the corrosion.

For the study of the well preserved content of the metal boxes, the combination of XRF spectroscopy, X-rays diffractometry (XRD) and Gas Chromatography–Mass Spectrometry (GC-MS) was employed. The first technique was employed for the detection of the inorganic chemical elements of the vessels, the second technique in order to investigate the mineralogical constituents and the third one for the detection and identification of the organic substances contained in the material under study. Especially for the extraction of the volatile compounds the Solid Phase Micro-Extraction (SPME) technique was used in the headspace mode. The results of XRF show the existence of Br into one mass of clay and the results of GC-MS the existence of fatty acids among other constituents. Finally the possible uses of the analyzed sets and its contents are discussed.