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## *IMOG Abstract*

### **Molecular study of organic residues in an exceptional collection of potteries from Deir el-Médineh (XVIII<sup>th</sup> dynasty, Egypt).**

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Within this study of molecular archaeology, an exceptional set of Egyptian organic remains stored in containers from Deir el-Médineh (XVIII<sup>th</sup> dynasty), and put at disposal by the Department of Egyptian Antiquities of the Louvre Museum has been analyzed. These containers, still full (Figure 1), were found in a necropolis located on the east side of the Valley of the Kings. This necropolis, excavated by Bernard Bruyère in 1933, was occupied by a population, who seemed to have a particular socio-cultural profile (Pierrat-Bonnefois, 2002). The identification of the complex organic mixtures, present inside the containers via the biomarkers analysis, may help to have some information about this population, and to understand their funeral rites.



Figure 1: Photographs of three containers (E16432, E14013 and E16446).

The molecular and isotopic study of a diversified sampling of these organic residues, based on chromatographic techniques and mass spectrometry (GC-MS, LC-MS and GC-C-irmMS), was carried out. Half of the analyzed samples contained about 40% of triglycerides which are indicators of a lipid base (animal fat or vegetable oil). Hydrolysis and oxidation products of triacylglycerols are detected (diacylglycerols, monoacylglycerols, free fatty acids,  $\delta$ -lactones,  $\gamma$ -lactones,  $\alpha,\omega$ -

dicarboxylic acids, and dihydroxylated fatty acids). These results and the analysis of stable carbon isotopes of the methyl esters favoured plants over animals as the lipid source (Romanus, 2008). The presence of odd numbered *n*-alkanes, phytosterols and co-elutions of wax esters, has highlighted the complex mixtures with cuticular waxes of flowers or leaves (Ribechini, 2008). The absence of diagnostic terpenic structures excludes the use of natural resins. The others samples are characterized by the presence of degradation products of fatty material, but the triglycerides are not detected, which could indicate different preparation methods. This investigation was completed by the study of fresh plant oils and of oils submitted to thermal degradation in order to determine their molecular fingerprint and the alteration products.

These containers seem to belong to the same family: ointments or cosmetics. They were used by the population of the necropolis but are they in relation with their profession or just offering for the eternity travel and their afterlife?

Pierrat-Bonnefois, G. (2002). Cimetière est du village ou cimetière à l'est de Deir el-Médineh?, *Deir el-Médineh et la Vallée des Rois*, colloque, Musée du Louvre, Edition Khéops-Musée du Louvre

Ribechini, E., Modugno, F., Colombini, M.P., Evershed, R.P. (2008). Gas chromatographic and mass spectrometric investigations of organic residues from Roman glass unguentaria. *Journal of Chromatography A*, 1183, 158-169.

Romanus, K., Van Neer, W., Marinova, E., Verbeke, K., Luybaerts A., Accardo, S., Hermans, I., Jacobs, P., De Vos, D., Waelkens, M. (2008). Brassicaceae seed oil identified as illuminant in Nilotic shells from a first millenium AD Coptic church in Bawit, Egypt. *Anal Bioanal Chem*, 390, 783-793.