

CHIOS : Metabolomic analysis of amphora organic content



Harbor of Apollonia pontica. 5th c. BC.

First lipid extract, medium-concentrated. We identify:

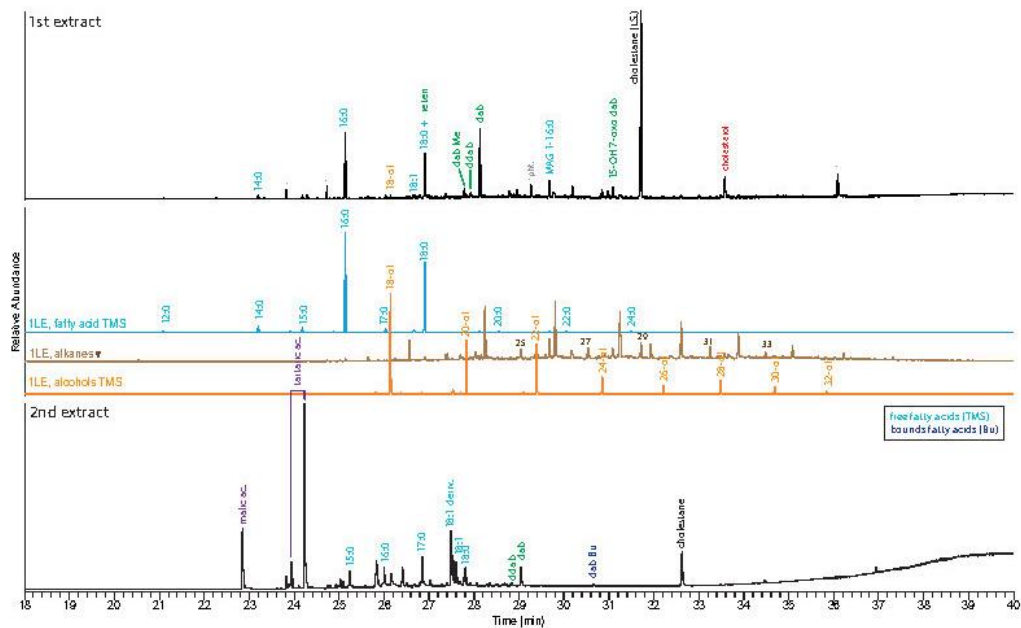
- conifer pitch: free and methylated dehydroabietic acid, associated with retene and its degradation products by natural oxidation;
- an animal fat (cholesterol, with chol/sito ratio 14.02). The distribution of fatty acids (even acids 14:0 - 18:0 in the majority, odd linear and branched 15:0 and 17:0, isoprenic TMTD and phytanic acids, short-chain acids 5:0 - 12:0) points to a dairy product. The wide distribution of diglycerides (DAG 20:0 - 36:0) and monoglycerides (MAG 10:0 - 18:0) confirms this identification.

Vegetable waxes and plastic pollutants are negligible.

The second extract is highly concentrated and characterized by :

- very abundant tartaric acid, associated with malic acid (cTar 47.52 µg/g, Mal/Tar 0.65), with no syringic acid present, corresponding to white grapes;
- no trace of alcoholic fermentation acids;
- conifer pitch.

Conclusion. - The amphora was waterproofed with conifer pitch and contained a very large quantity of white grapes. Fermentation markers were not detected and do not allow us to conclude to a white wine. If these were never present, it would have been white raisins or white grape juice concentrated into syrup by evaporation (ancient defrutum or modern-day petimezi in Crete). A dairy product is also present, in significant quantities. The contents may be successive.



Chromatograms of the first and second lipid extracts obtained from impregnations of the amphora, trimethylsilylated (ZB5-MSi column, Exactive mode EI detector 70 eV resolution 60k).