



ERYTHRAE : Metabolomic analysis of amphora organic content



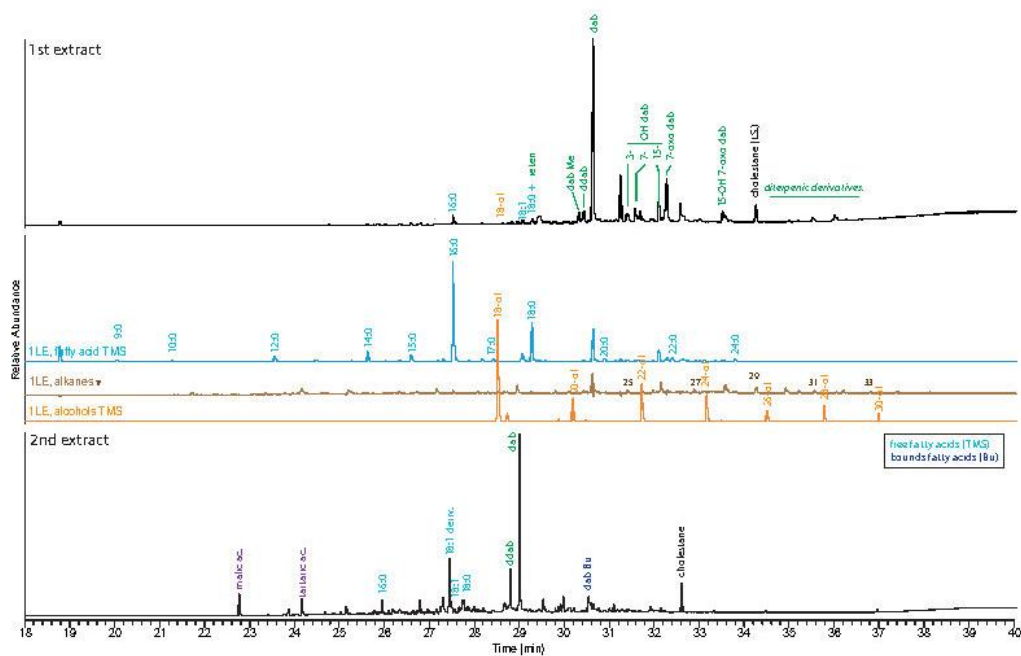
Ribarska str., 19, Apollonia pontica. 5th c. BC

First highly concentrated lipid extract, composed essentially of conifer pitch markers: free and methylated dehydroabietic acid, associated with retene and its degradation products by natural oxidation, characterizes conifer pitch. No other lipid materials are present in significant quantities. Vegetable waxes and plastic pollutants are very low and negligible.

The second extract is characterized by :

- conifer pitch markers (free, methylated and butylated dehydroabietic acid);
- tartaric acid associated with malic acid in higher proportions (cTar 3.96 $\mu\text{g/g}$, Mal/Tar 2.71), characteristic of a fruit rich in malic acid. These are the *Rosaceae* in particular, from which we can rule out apple, for lack of concentrated phloridric acid (derived from phloridzin, an apple-specific marker). It could be pear, quince, plum, cherry...
- no trace of alcoholic fermentation acids.

Conclusion. - The amphora, heavily waterproofed with conifer pitch, contained a malic-acid-rich fruit other than apple. It could be pear, quince, plum, cherry... whose discriminating markers are not yet known for archaeological samples.



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).