

New insights on the Roman glass production of Aquileia: a multi-analytical approach

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During a recent archaeological field survey carried out in Roman Aquileia (UD) a large quantity of glass fragments (chunks, artefacts and waste) was collected: most finds dated back to the 1st century AD, but the assemblage included also fragments from Middle and Late-Empire. Aquileian artisans had established a flourishing trade in glasswork and ancient sources describe the city as home of one of the most relevant productions of glass in antiquity. However, definitive archaeological proofs of the presence of glass furnaces are still missing and the discussion about the provenance and nature of the raw glass used in the production is still open.

In this study, the characterisation of part of the rescued archaeological finds was carried out by means of Laser Ablation - Inductively Coupled Plasma - Mass Spectrometry (LA-ICP-MS), Scanning Electron Microscopy - Energy Dispersive Spectroscopy (SEM-EDS) and UV-vis Reflectance Spectrophotometry.

The elemental composition of the raw materials (sand and flux) provided interesting insights about the production technology of the recovered glass, its provenance and its nature of recycled raw material.

The elemental analysis detected 54 elements - in particular the main elements related to the flux (Na, K, P, Mg) and to the sand (Al, Ca, Sr, Zr, Ba) - enabling to define the relationship between the three different classes of glass samples (*i.e.*, chunks, artefacts and waste). UV-vis detected the common chromophore ions employed in that period, whereas SEM-EDS was applied in the study of particular metals inclusions.

The results obtained indicate a common origin of the analysed fragments, independently from their type, and the fact that they were all made up of recycled glass. Moreover, the analysis of two metallic inclusions encapsulated within two glass chunks suggests the use of the bronze scraps for colouring the raw glass, a known practise still partially studied.

Keywords: Roman glass, Aquileia, LA-ICP-MS, SEM-EDS, UV-vis