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Lead provenance of Late Roman Republican artefacts from Monte dos Castelinhos archaeological site (Portugal): insights from elemental and isotopic characterization by Q-ICPMS.

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ABSTRACT

A set of lead artefacts were recovered at the Late Roman Republican archaeological site of Monte dos Castelinhos (Portugal), located in a prominent position on the right bank of the Tagus River, in the rear of its estuary. All artefacts, namely 16 shapeless fragment, seven *glandes plumbeae* and six possible metallurgical remains, were analysed using Q-ICPMS to determine minor and trace elemental compositions (Ag, As, Bi, Cu, Ni, Sb and Sn) and Pb isotope ratios. Statistical analyses of these data allow us to identify elements with similar behaviours and to differentiate raw materials used in the manufacture of the lead artefacts. Variation on the concentrations of Ag, Bi, Cu and Sb suggests galena as the most probable lead ore source, although some artefacts with a high Cu content may suggest the reduction of litharge obtained from argentiferous jarosites containing Cu. Pb isotope ratios point to raw materials with a probable Iberian provenance, namely from mines of the Sierra Morena and Ossa Morena Zone. Besides, there is evidence of the use of lead also resulting by the reduction of litharge, a by-product of the silver cupellation, in our case using argentiferous jarosites from the Iberian Pyrite Belt mixed with lead from other provenance.

Keywords:

Pb isotope ratios; Elemental composition; Multivariate analysis; Late Roman Republican lead artefacts; Q-ICPMS

1. Introduction

The Iberian Peninsula was a very important metalliferous region of the Ancient World. In classical literature, Strabo, Pliny and Diodoro mention the geographic characteristics of mining areas of the Iberian Peninsula as well as its importance to the Roman economy [1]. One of the most abundant minerals in the Iberian Peninsula is galena (PbS), the main source of lead and also, in the case of argentiferous galena, an important source of silver largely used by Romans

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