

ABSTRACT

Silver isotopes nowadays present a very fast evolving system. One of the field in which this isotopic system is used is archaeology where the silver isotopes are used as a tracer of monetary and power changes between geographical regions. Through statistical analysis of measured data and their comparison with so far published values can be estimated probability of common source area of metal used for coinage.

On Celtic coin samples (180–70 BC) provided by the Institute of Archaeology of the CAS, Prague (A. Danielisová) the isotopic composition of silver was measured. Silver was separated from the matrix elements by a method which uses ascorbic acid to precipitate silver. However, the weights of samples commonly used for this method are generally distinctly higher than the amounts of the obtained fragments of Celtic coins.

Regarding the differences in the method and low weights of fragments, tests with variable concentrations of ascorbic acid and amounts of silver were performed. The amounts of silver used for this method are commonly ~30x-70x higher. The results showed that this method effectively separates silver from matrix elements and is sufficient for higher concentrations of silver; with lower ones the yields are reduced.

The separated silver was measured using MC-ICP-MS. The adjusted instrumental setting for isotopic measurements using MC-ICP-MS proved long-term stability of the measured $^{107}\text{Ag}/^{109}\text{Ag}$ ratios for NIST SRM 978a. The $\epsilon^{109}\text{Ag}$ values measured by MC-ICP-MS were in agreement with so far published values for historical coins.

Despite the long-standing hypothesis that Celts remelted coins from the Mediterranean area, the statistical tests performed question this hypothesis and do not imply any dependence among the source areas of Mediterranean and Celtic silver, i.e. exploitation of the same deposit type.

Keywords: precipitation, ascorbic acid, silver isotopes, MC-ICP-MS, archaeology