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(Article begins on next page)

The Third-Century monetary crisis: chemical analysis of Denarii and Antoniniani

G. Marussi^a, M. Crosera^a, E. Prenesti^b, B. Callegher^c, G. Adami^a

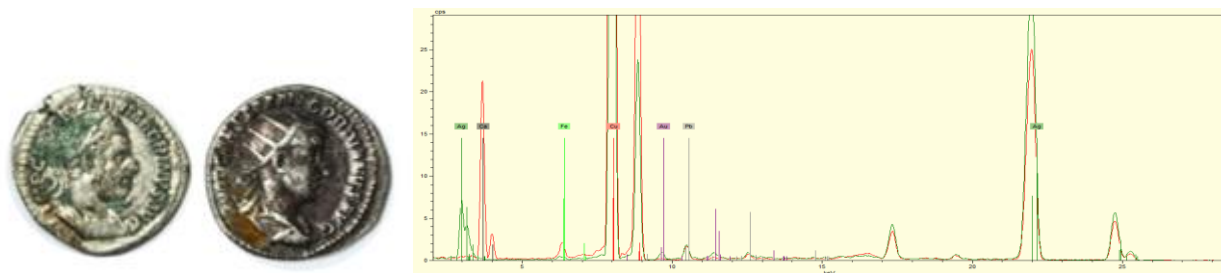
^a Dipartimento di Scienze Chimiche e Farmaceutiche, Università di Trieste, Via L. Giorgeri, Trieste, Italy; ^b Dipartimento di Chimica, Università degli Studi di Torino, Via Pietro Giuria, 5, Torino, Italy; ^c Dipartimento di Studi Umanistici, Università di Trieste, Via del Lazzaretto Vecchio 8, Trieste, Italy

Analytical chemistry plays a crucial role in the characterisation of cultural heritage and in supporting archaeometric studies. The combination of non-destructive techniques with micro-destructive techniques, which are more informative, is essential to gain more information about the composition of the "bulk" (the innermost part) of the objects and not only regarding the surface [1], [2].

In this work, we adopted an optimised method from the University of Trieste suitable for destructive and non-destructive chemical analysis of ancient coins. It has been used for the study of folles (copper coins of the 10th century) [3] and late antique gold solids (Gratian-Justin I, 4th-6th centuries) [4].

A set of 160 Denarii and Antoniniani (silver or silver alloy coins of the 3rd century) from a hoard found in the Balkan area, now kept in the Numismatics Laboratory of DiSU (University of Trieste) was analysed [5]. Initially, a non-destructive elemental analysis was performed by an ARTAX 200 micro-XRF spectrometer (supplied by Bruker Nano GmbH), followed by a micro-destructive ICP-MS analysis with a NexION 350x Spectrometer (PerkinElmer, USA) equipped with an ESI SC Autosampler. Thus, information related on the surface and mass composition of the samples was obtained and these results may be correlated with the socio-economic situation of the historical period.

The processing of the μ -XRF spectra collected for each coin revealed the presence of elements such as Ag, Cu, Au, Pb, Zn, Fe and Ca (the latter being present in the concretions, suggesting the deposition of CaCO_3). The subsequent destructive ICP-MS analysis will be focused on these specific elements, in order to determine their concentration in the coin specimens.



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