"89° Congresso SIMP (Società Italiana di Mineralogia e Petrologia) “L’evoluzione del sistema Terra: dagli atomi ai vulcani” ; titolo del poster: “A multi analytical approach for the characterization of ceramic findings from Aiano-Torraccia di Chiusi (Siena-Italy) archaeological site”; Ferrara 2010"

Cavalieri, Marco

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A MULTI ANALYTICAL APPROACH FOR THE CHARACTERIZATION OF THE CERAMIC FINDINGS FROM THE AIANO-TORRACCIA DI CHIUSI (SIENA-ITALY) ARCHAEOLOGICAL SITE.

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In the archaeological site of Aiano-Torraccia di Chiusi (Siena-Italy) the remains of a Roman Villa, dated from the beginning of the 4th century to the end of the 5th century or the beginning of the 6th A.D., were discovered. The complex, abandoned in the 6th century A.D. was occupied by a group of barbaric artisans (Lombards or Ostrogoths) in the period between the 6th and the 7th century A.D. Numerous ceramic findings (simil africane, ingobbiate, acrome grezze) dated back to 5-7th century were discovered in the archaeological site. These findings were analyzed using different analytical methodologies (OM, XRD, XRF, SEM-EDS, ATR FTIR and micro-Raman) in order to characterize the paste and the cover of the ingobbiate (INGR) and simil africane (TCC), the paste and the tempera of the acrome grezze (AG) and to determine the compositional relationship among different kinds of ceramics.

THE RED COVERED CERAMICS

Red covered ceramics represents an imitation, often on a regional basis, of the late African Red Slip ware, already starting from the 2nd-4th century A.D. until the 7th century A.D. In particular, from the 7th century A.D. the typologies produced in Tuscany start a process of transformation that will give, after a progressive diversification from the typologies attested in other parts of Italy, specific and autonomous characters during the 7th century A.D.

![Image](image1)

For the characterization of red covered ceramics the use of chemical or mineralogical techniques for the bulk are not very useful, because the data obtained on the powders show the mean composition of the samples, without any difference between paste and covering. The micro chemical and mineralogical analyses, such as FTIR, SEM-EDS and micro-Raman performed on small samples' fragments allow to discriminate the composition and texture of paste and covering. The red covered ceramics are clearly subdivided in two groups:

**Samples TCC** were fired at a temperature >900°C, probably imported. The temper, observed with OM and SEM-EDS, is constituted by sorted and rounded quartz fragments (frequently found in African territory), besides the covering is characterized by a significant Fe enrichment.

**Samples INGR** that do not show clear chemical and mineralogical difference between ingobbio and paste (comparing SEM-EDS and ATR FTIR data), while the most relevant difference is linked to the grain size, that is small in the covering with respect to the paste. The covering seems to be obtained using well sorted clayey raw material. This ceramic has been produced using low firing temperatures. The ingobbio of the INGR samples contains the same constituents of the ceramic paste, with a small difference in the intensity of the peak of hematite (FTIR analyses).

THE ACROME GREZZE

This kind of ceramic findings shows a complete summary of typologies, with a dowry constituted by olive, bowl-lids, caserolets, lids, juglets, small jugs, dated back to the second half of the 5th-6th century A.D. The acrome grezza were analyzed through XRD, OM, performed on the bulk and SEM-EDS on the temper and paste. These ceramics were realized reemploying the material coming from the mosaic tesserae of the Roman Villa (white and yellow marbles, Lapis Lacedemonios, Lapis porphyrites, Portasanta, Greco scritto).

![Image](image2)

STATISTICAL COMPARISON AMONG ACROME GREZZE - SIMIL AFRICANE - INGOBBIATE DI ROSSO

The comparison among the analyses of red covered ceramic's paste has been performed with the areal data (investigated area 20x30 micron) obtained by SEM-EDS. A statistical approach was tried in order to emphasize the difference among the pastes.

![Image](image3)

The PCI and PC2 supply the 94% of information of the samples variability. The graph of scores, compared to the loadings ones represents the variables in the new space formed by the principal component and reveals that samples' grouping along the first principal component is mainly due to the relative content in SiO₂, Al₂O₃, TiO₂, K₂O, while the second one is characterized by the Na₂O and SiO₂ content.

From this comparison it's clear that the TCC ceramic findings are obtained using different raw material with respect to AG and INGR samples. Otherwise at the present moment it's not evident an unmistakable differentiation between AG and INGR samples.