AIAr 2022
La Sostenibilità nei Beni Culturali
Padova 29 giugno - 1 luglio 2022

FROM SITE TO CERAMIC PETROLOGY: THE POTTERY OF THE EARLIEST FOUNDRY OF PRE-ROMAN PADUA AND ITS ECONOMIC ENTANGLEMENT

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"THE EARLIEST FOUNDRY OF PRE-ROMAN PADUA", Project of Excellence CARIPARO (Call 2021)

OVERVIEW

"The earliest foundry of Pre-Roman Padua" is a project financed by the Fondazione Cassa di Risparmio di Padova e Rovigo (CARIPARO) concerning the study and valorisation of the site excavated in 2000-2001 between Riviera Ruzzante and Via Santa Chiara, in the courtyard of the current Questura. The site provided evidence dated between the 9th and 1st centuries BC, with structures and levels related to craft activities and residential areas. The materials discovered (pottery, metals, faunal remains, botanical remains, etc.) are now available for in-depth study, both in terms of functional and chrono-typological aspects, and for detailed archaeometric analysis.

The ceramics from this and other foundry's context include specific types formally coherent with pots common in the hinterland of Friuli (north-eastern plains and Adriatic coast). Such pots might have been used in a systematic trade of salt from the sea coast and, in the central markets of the early Padua, salt could have been a medium of exchange with other high-cost goods, such as copper and textiles. Previous studies (Tenconi et al., 2013) on this type of pottery found in various sites of the Veneto region, pointed out that the clay was deliberately tempered with crushed fragments of speleothems, probably coming from karst environments whose geographical distribution is limited to few localized areas of north-eastern Italy.

MAIN OBJECTIVES

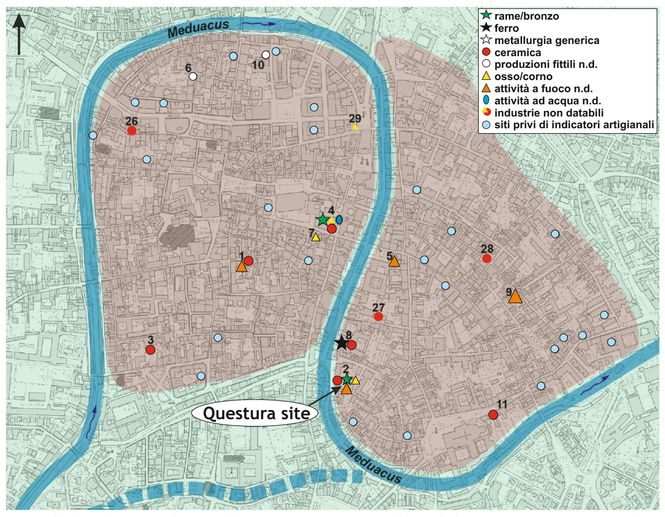
1) To reconstruct the dynamics of the most ancient phases of the site (8-7th centuries BC) and to enhance the archaeological significance of the first coppersmiths of ancient Padua.

2) To define the production technology of the ceramic materials and to emphasize the possible links between copper working and the apparent import of "black pots" from the north-eastern shores of the Adriatic sea.

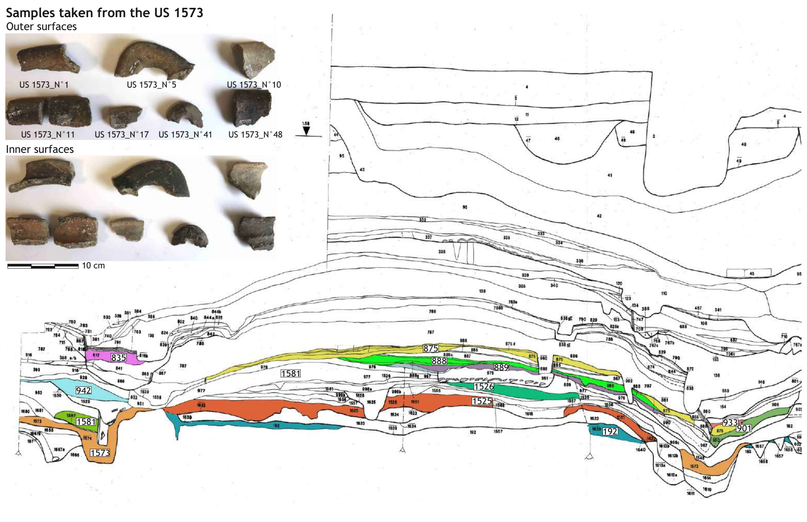
The study will be another important stronghold in a more general investigation of ancient Padua as a focus of advanced proto-industrial production and technological innovation before its absorption in the economic, administrative and military structure of the late Roman Republic.

MULTIANALYTICAL APPROACH

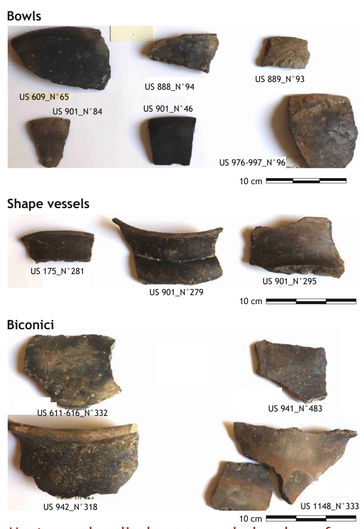
Through microscopic, mineralogical and microstructural analysis, the production technology of the ceramic materials will be defined. Quantity of added temper and its grain-size will be measured by digital image analysis, whereas the firing temperature estimated by X-ray powder diffraction on the fine fraction (micromass), as well as microstructure of the calcite-based temper. The provenance of the clay will be determined by microchemical analysis at the SEM-EDS, and on the basis of type and quantity of heavy minerals. The provenance of the temper will be defined using stable isotope analysis by mass-spectroscopy on the fragments mechanically extracted by the ceramic body. All these pieces of information will address provenance and production technology of this exotic ceramic class, into a unique and comprehensive archaeometric



Overall location of the craft activities areas and workshops in pre-Roman Padua during the 1st millennium BC (from Michelini, 2021).



Stratigraphy of the craft activities areas already excavated, in colours the stratigraphic units (US) from where the first samples have been taken.



Most samples display a very dark colour, frequently with brownish areas, and a smooth finishing.

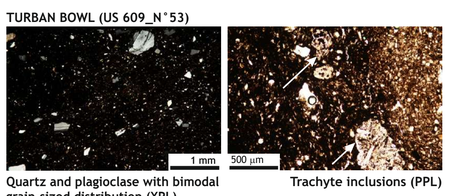
Within the US 975, a large "earthen block", with a dense insulating filling of ceramic sherds, was found below the floor of the metallurgical unit and was removed to be excavated in laboratory.

Archaeometric analysis of the ceramic materials: preliminary results

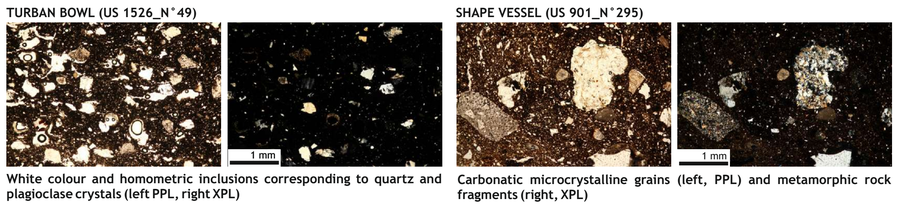
Main macroscopical and petrological features

TYPE 1. CERAMIC BODIES WITH VERY DARK AND DARK GRAY COLOUR

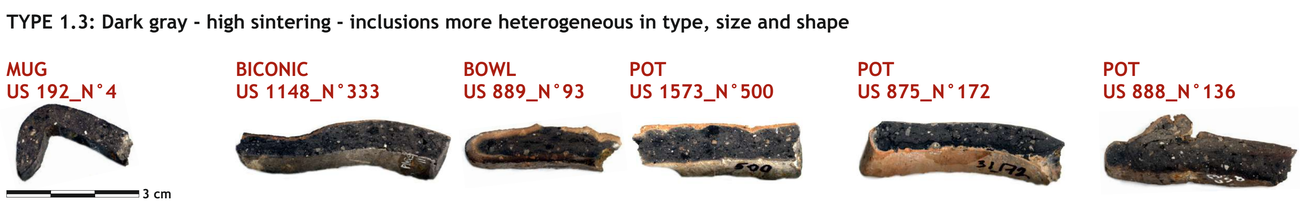
TYPE 1.1: Very dark gray - very high sintering - inclusions highly homogeneous in type, size (< 1 mm) and shape, many with bright appearance



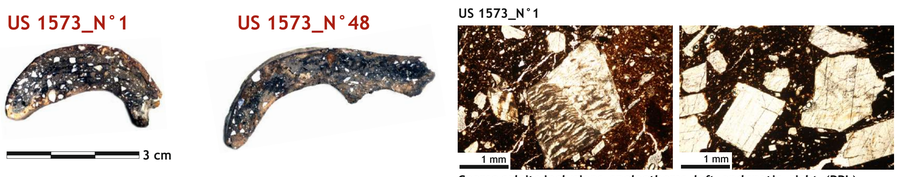
TYPE 1.2: Dark gray - very high sintering - inclusions highly homogeneous in type, size (< 1 mm) and shape, many homometric and with white colour



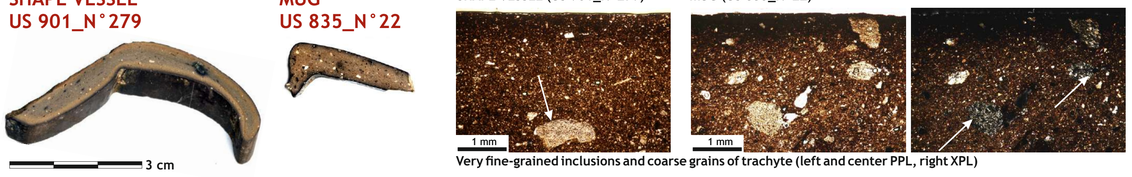
TYPE 1.3: Dark gray - high sintering - inclusions more heterogeneous in type, size and shape



TYPE 1.4: Very dark gray - high sintering - heterogeneous in type, size and shape, many calcareous

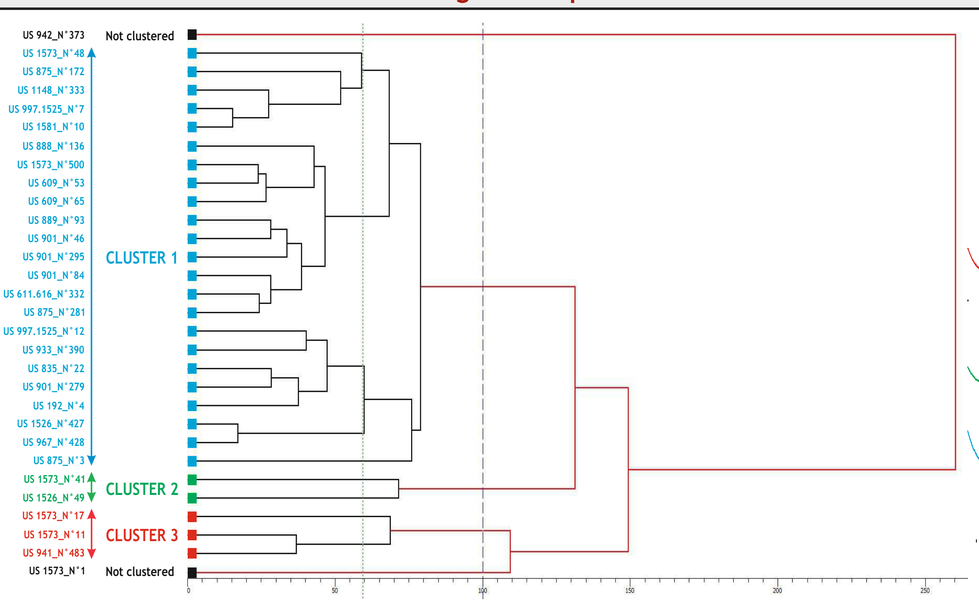


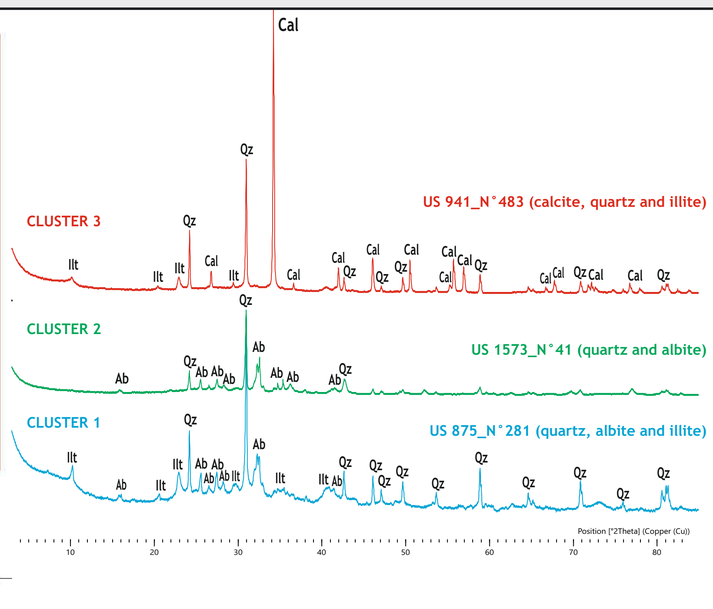
TYPE 2. CERAMIC BODIES WITH BROWN COLOR, MEDIUM TO HIGH SINTERING AND VERY FINE-GRAINED INCLUSIONS



TYPE 3. CERAMIC BODIES WITH GRAY COLOUR, MEDIUM TO LOW SINTERING AND VERY ABUNDANT CALCITE INCLUSIONS

Main clusters based on the mineralogical composition





CLUSTER 1: most samples laid within this cluster 1 and the important background noise in the diffraction patterns denotes the presence of an amorphous phase in the ceramic bodies. The high concentration of quartz, albite and illite detected points out a firing temperature of 850-900 °C.

CLUSTER 2: the identification only of albite and quartz suggests that higher temperatures were reached, leading to the total dihydroxylation of illite.

CLUSTER 3: includes ceramic bodies belonging to type 3 (with calcite inclusions). The mineral assemblage detected (illite, quartz and significative presence of calcite) points out firing temperature circa 800-850 °C, in concordance with the lower sintering of the sherds.

The two samples not clustered corresponds to ceramic bodies where calcite inclusions were also observed.

PRELIMINARY CONCLUSIONS

Considering the raw materials, at least two main productions can be stated, both using illitic-rich clays: i) with quartz and albite (probably a local production, corresponding to dark coloured pots where trachyte inclusions were also observed) and ii) with quartz and highly tempered with calcite (both dark and grey coloured sherds that maybe produced outside the region).

The sherds were fired under reduction conditions, giving rise to dark coloured bodies, and the lighter hue surface observed in many pots denotes an oxidizing atmosphere at the end of the firing.

The tempering with crushed calcite (spatic and speleothems) clearly points out a specific pottery production. Likewise, the presence of plagioclase phenocrystals, carbonatic microcrystalline grains, clay lumps as well as volcanic and metamorphic rock fragments may suggest the use of different local (or not local) base clays in order to produce most of the sherds. Besides, clayey materials with different grain size were used, accordingly with the type of piece to be produced.

Next steps to carry out

1) To perform the archaeometric study of the pottery excavated from the earthen block.

2) To deepen in the production technologies of the ceramic materials by means of: I) digital image analysis, in order to measure the quantoty of the calcite temper and its grain-size, and SEM-EDS analysis, both to describe the microstructure of the calcite inclusions and to state the provenance of the base clays (jointly with microchemical analysis).

3) To define the provenance of the calcite temper through stable isotope analysis and to establish the possible concordance of the pottery from the Questura site with the presumed imported "black pots" from hinterland of Friuli (with karst environments).

References

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