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Technology issues of Byzantine glazed pottery from Corinth, Greece

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ABSTRACT

A large assemblage of Byzantine glazed pottery from ancient Corinth, Greece was analysed by a multi-technique analytical approach in order to determine the production technology. The samples cover a long time period (10th–14th c. CE) and a wide range of the most representative wares and classes. SEM/EDS, a standard non-invasive microscopy and analytical technique, was applied in combination with Raman spectroscopy and assisted with advanced, high precision techniques (PGAA, milli-PIXE) in order to examine the ceramic body, the glaze and the clay-glaze interface of the samples. Parameters of the manufacturing process, such as the selection of clay sources, the glaze recipe, the glaze application technique and the glaze firing temperature, were examined using a combination of statistical tools and methodologies. This work comprises the first large scale physico-chemical analysis of Byzantine glazed ceramics from Greece, providing information on the composition and technology of all of the major typological categories of Medieval Greek glazed ceramics. Furthermore, it highlights the significant socioeconomic changes that occurred at the -beginning of the 13th c. CE in the Byzantine Empire and their consequences in the manufacturing and distribution system of glazed ceramics.

1. Introduction

Byzantine glazed pottery has been extensively studied from the point of view of decoration, shape and macroscopic description of fabric. Morgan [1] was the first to offer a chronology of the different classes of glazed pottery, which was later revised by Sanders [2,3,4], focusing mainly on the 12th to the mid-13th century. It is generally accepted that several 12th–13th c. classes, such as 'Green and Brown Painted', 'Slip Painted', 'Fine Sgraffito', 'Incised Sgraffito' and 'Champlevé', were produced by a few specialized workshops and then distributed in the entire Mediterranean region. Indeed, large quantities of table wares belonging to these classes have been found in numerous sites in Italy, France, Serbia, Greece, Cyprus, Turkey, Israel, Lebanon etc., but also in various shipwrecks in the Mediterranean and the Black Sea [5,6].

Recent studies on Byzantine glazed pottery have mainly focused on the identification of the major workshops and the shift of the production centers in the 13th c. CE [5,7,8,9,10]. However, little attention has been given so far to the manufacturing processes applied and their importance for the overall understanding of the ceramic production of the period. Such an effort was made by Armstrong et al. [11], however the sample set of glazed pottery samples examined was very small, thus making it difficult to draw more general conclusions. More recently, Davis and Stocker [12] examined the typology of a small assemblage of medieval glazed pottery from Englianos, in Southern Peloponnese, discussing also the results of the chemical composition of the glazes.

The present work focuses on the application of different analytical techniques and statistical tools in order to understand and evaluate the manufacturing process for the production of Byzantine glazed pottery. Methodologies that have been previously applied to other types of glazed ceramics were now applied for the first time to a Byzantine assemblage. The combined study of individual parameters of the manufacturing process led to a thorough understanding of the technology used for the production of Byzantine glazed ceramics; the resulting 'chaîne opératoire' information provides valuable insight into the social structure of the major Byzantine cities of Greece, through the turbulent period of the 12th and 13th c. CE.

2. Materials and methods

The assemblage consists of 71 Byzantine glazed pottery fragments, which cover a wide range of the most representative wares and classes; 4 unglazed fragments of cooking pottery were also analysed for comparison. All fragments come from unstratified contexts excavated at Corinth, Greece by the American School of Classical Studies in Athens

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Table 1
Date, ware and style type of the Byzantine glazed pottery sherds.

Sample	Ware type	Stylistic type	Date
BYZ51	Redware	Chafing Dish	2nd half of 10th c. CE
BYZ52	Redware	Chafing Dish	2nd half of 10th c. CE
BYZ53	Redware	Chafing Dish	2nd half of 10th c. CE
BYZ54	Redware	Chafing Dish/Cup (?)	2nd half of 10th c. CE
BYZ55	Whiteware	Red Slipped White Ware	6th c. CE
BYZ56	Whiteware	Glazed White Ware II	10th–12th c. CE
BYZ57	Whiteware	Glazed White Ware II	10th–12th c. CE
BYZ58	Whiteware	Glazed White Ware II	10th–12th c. CE
BYZ59	Whiteware	Glazed White Ware II	10th–12th c. CE
BYZ60	Whiteware	Glazed White Ware II	10th–12th c. CE
BYZ61	Whiteware	Glazed White Ware II	10th–12th c. CE
BYZ62	Whiteware	Glazed White Ware II	10th–12th c. CE
BYZ63	Whiteware	Glazed White Ware II	Late 10th–mid 11th c. CE
BYZ64	Whiteware	Glazed White Ware II (Impressed Ware)	Late 10th–mid 11th c. CE
BYZ66	Whiteware	Glazed White Ware	?
BYZ67	Whiteware	Petal Ware	10th c. CE
BYZ68	Whiteware	Petal Ware	10th c. CE
BYZ69	Whiteware	Glazed White Ware II	Late 10th–mid 11th c. CE
BYZ70	Whiteware	Glazed White Ware II	10th–12th c. CE
BYZ71	Whiteware	Coarse Glazed Ware	10th–12th c. CE
BYZ72	Redware	Green and Brown Painted	Late 11th–early 12th c. CE
BYZ73	Redware	Green and Brown Painted	Late 11th–early 12th c. CE
BYZ74	Redware	Green and Brown Painted	1st half of 12th c. CE
BYZ75	Redware	Green and Brown Painted	Early 12th c. CE
BYZ76	Redware	Green and Brown Painted	Mid 12th c. CE
BYZ77	Redware	Green and Brown Painted	1st half of 12th c. CE
BYZ78	Redware	Green and Brown Painted	Mid 12th c. CE
BYZ79	Redware	Green and Brown Painted	Mid 12th c. CE
BYZ80	Redware	Green and Brown Painted	Mid 12th c. CE
BYZ81	Redware	Glaze Painted Ware	13th c. CE
BYZ82	Redware	Glaze Painted Ware	13th c. CE
BYZ83	Redware	Glaze Painted Ware	13th c. CE
BYZ84	Redware	Green and Brown Painted	Mid 12th c. CE
BYZ85	Redware	Glaze Painted Ware (without final glazing)	3rd quarter of 13th c. CE
BYZ86	Redware	Dark on Light	Early 12th c. CE
BYZ87	Redware	Slip Painted Ware	Late 11th–early 12th c. CE
BYZ88	Redware	Slip Painted Ware	Mid 12th c. CE
BYZ89	Redware	Slip Painted Ware	Mid 12th c. CE
BYZ90	Redware	Slip Painted Ware	Mid 12th c. CE
BYZ91	Redware	Slip Painted Ware	Late 12th–early 13th c. CE
BYZ92	Redware	Slip Painted Ware	Late 12th–early 13th c. CE
BYZ93	Redware	Slip Painted Ware	Late 12th–early 13th c. CE
BYZ94	Redware	Dark on Light	2nd quarter of 12th c. CE
BYZ95	Redware	Dark on Light	2nd quarter of 12th c. CE
BYZ96	Redware	Dark on Light	2nd quarter of 12th c. CE
BYZ97	Redware	Spatter Painted Ware	2nd quarter of 12th c. CE
BYZ98	Whiteware	Syrian Blue Frit	12th–13th c. CE
BYZ99	Redware	Fine Sgraffito Ware (Duochrome)	Early 12th c. CE
BYZ100	Redware	Fine Sgraffito Ware (Duochrome)	Early 12th c. CE
BYZ101	Redware	Fine Sgraffito Ware	Mid 12th c. CE
BYZ102	Redware	Fine Sgraffito Ware	Mid 12th c. CE
BYZ103	Redware	Fine Sgraffito Ware	Mid 12th c. CE
BYZ104	Redware	Incised Sgraffito Ware	3rd quarter of 12th c. CE
BYZ105	Redware	Incised Sgraffito Ware	Late 12th–early 13th c. CE
BYZ106	Redware	Incised Sgraffito Ware	Late 12th–early 13th c. CE
BYZ107	Redware	Incised Sgraffito Ware	Late 12th–early 13th c. CE
BYZ108	Redware	Incised Sgraffito Ware	1st half of 13th c. CE
BYZ109	Redware	Incised Sgraffito Ware	1st half of 13th c. CE
BYZ110	Redware	Incised Sgraffito Ware	1st half of 13th c. CE
BYZ111	Redware	Champlevé Ware	1st half of 13th c. CE
BYZ112	Redware	Champlevé Ware	1st half of 13th c. CE
BYZ113	Redware	Incised Sgraffito Ware	Late 12th–early 13th c. CE
BYZ114	Redware	Champlevé Ware	1st half of 13th c. CE
BYZ115	Redware	Measles Ware	2nd quarter of 12th c. CE
BYZ116	Redware	Measles Ware	2nd quarter of 12th c. CE
BYZ117	Redware	Measles Ware	2nd quarter of 12th c. CE
BYZ118	Redware	Measles Ware	2nd quarter of 12th c. CE
BYZ119	Redware	Late Sgraffito	Late 13th–early 14th c. CE
BYZ120	Redware	Late Sgraffito	Late 13th–early 14th c. CE
BYZ121	Redware	Late Sgraffito	Late 13th–early 14th c. CE
BYZ149	Redware	Cooking Pot	9th–12th c. CE
BYZ150	Redware	Cooking Pot	9th–12th c. CE
BYZ151	Redware	Cooking Pot	9th–12th c. CE
BYZ152	Redware	Cooking Pot	?
BYZ157	Redware	Lamp	12th c. CE