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Original article

## Archaeometric study of 17th/18th century painted pottery from the Belgrade Fortress

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### ABSTRACT

The chemical and mineralogical composition of ceramic bodies, glazes and pigments, as well as the firing temperatures of main groups of Austrian period painted pottery excavated at the Belgrade Fortress on the territory of Serbia, two groups of Malhornware and one group of Anabaptist faience, were determined by a combination of powder X-ray diffraction (PXRD), Fourier transform infrared (FTIR) spectroscopy, energy dispersive X-ray fluorescence (XRF) and micro-Raman spectroscopy. Investigated pottery was uncovered in the same archaeological context and dated the end of 17th/first decade of 18th century. The obtained mineralogical and chemical composition shows the similarities between the Malhornware groups that indicate a similar production technology. Use of calcareous clay fired at temperatures in the range 850–900°C indicates a different production technology for the Anabaptists faience. The compositional data treatment by multivariate statistical analysis reveals heterogeneity in the Anabaptist faience group of samples, suggesting potential interactions between the local potters and the Anabaptist communities.

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### 1. Introduction and research aims

Modern Period aesthetics, with the elements of Renaissance and Baroque art, has made its mark in pottery, lavishly coloured and decorated with nature-inspired motifs. Although the glazed pottery products of Italian (Montelupo, Savona), French (Rouen, Nevers) and Dutch (Delft) workshops are well-known for their design, painted pottery was also produced in the 17th–18th century in other European regions, including the Habsburg (Austrian) Monarchy. From the late Middle Ages, Central Europe and the surrounding regions have shared a similar ceramic tradition that was in many ways continued at the time of the Austrian government [1–4].

The Austrian period painted pottery style is based on the Renaissance floral design and East Persian or Turkish flower patterns. There are three main groups, which differ in colouring and ornament patterns. Two of them belong to the so-called

Malhornware [5], while the third group can be classified as Anabaptist or Haban faience [6,7]. Painted pottery belonging to all three groups spread throughout the Habsburg Monarchy. However, findings from present-day Austria, Hungary, Croatia and Serbia display a higher degree of common characteristics [8–11].

Although the Austrian period pottery (including painted pottery) was mainly analysed through individual case studies [9,12–14], more detailed and broader investigations of chronology and classifications in terms of formal and morphological features of the finds have also been performed [15]. In addition, archaeological and ethnographic analyses conducted mostly in Hungary and Austria [1,2,16–18], represent solid foundations for further research and specialised pottery studies. In spite of these recent studies, the Austrian period painted pottery production technology and the localisation of workshops are at the early stages of research. There are reports on the pottery craft, techniques and technological features derived from written documents [1,19], and experimental archaeometric studies have also been initiated. So far, painted pottery analyses from only a small number of excavation sites have been reported, such as the studies of Malhornware from Upper Austria [20] and Anabaptist or Haban faience from south Moravia [21] and Hungary [22].

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The investigation of the Austrian period pottery found at the Belgrade Fortress presented here is highly complementary to these studies, as the samples represent the main groups of painted pottery (Malhornware and Anabaptist) and come from a well-studied and narrowly dated archaeological context [6,12,23]. It is therefore of interest to obtain data regarding the production process, the composition of the ceramic body and the glazes, and the firing temperatures, in order to comprehend these results in the context of the previous knowledge related to the production of painted and glazed ceramics of that time. Investigated pottery samples are dated at the early 18th century when the weakening of the internal unity of the Anabaptist communities started, and some Anabaptists assimilated into the local population firstly by joining guilds and later by converting to Catholicism [24–26]. The aim of this work is to determine similarities and differences between the three groups of pottery studied in regard to production technology. On the other hand, overall features of (painted) pottery can direct to issues of craft specialization and mass production that are associated with the establishment of manufactories in the second half of the 17th century, enabling improvement of trade and consequently firmer economic and cultural ties between parts of the Austrian Empire [27,28].

In the longer term, the results of these studies will make an important contribution to the knowledge of painted ware technology and localisation of workshops in Central Europe.

## 2. Context and chronology of the finds

As a fortress in the sphere of interest of the two great empires—Austrian and Ottoman, Belgrade has suffered due to frequent armed conflicts, especially from the late 17th century and during the 18th century. For the Austrians, as for the Turks before them, Belgrade gained importance as the main border fortress, becoming the key stronghold and the strategic point for advancing into the European possessions of the Turks. In order to transform the oriental town with old-fashioned fortifications into a modern baroque fortified town, large-scale reconstructions began shortly after the 1717 Austrian capture of Belgrade [23]. The dynamic activity in the Belgrade fortress and large-scale architectural work are

evidenced by numerous archaeological contexts and findings that have the characteristics of Central European craft. The best resource for the research of the Austrian period material culture in general is the so-called blockhouse of the Belgrade Fortress (BF), a special edifice constructed in the eastern part of the Upper Town.

The blockhouse was a rectangular fortified building with loop-holes on the ground floor and a spacious subterranean vaulted chamber. It was built between 1718 and 1721, and filled in shortly afterwards due to changes in the concept of the fortification. During levelling works between 1723 and 1739, the underground chamber was partly filled in, and the rest of it and the upper parts of the building were covered a little later, following the erection of the new rampart. Unfinished and filled in, the blockhouse is not depicted on maps from that time. It was discovered during the 2008–2009 archaeological excavations. The unique stratigraphy and clear context make the filling layer one of the most significant archaeological units from the Early Modern Period in general [6]. Although various archaeological items have been found, it is the pottery collection that best defines the character of that particular epoch. It contains nearly 1000 cooking and table vessels. Painted pottery makes about a third of ca. 300 vessels of the latter group. This pottery assemblage may be regarded as “military pottery”, as it was purchased especially for the Austrian garrison. It was in use for a relatively short time, from 1717 to 1739. Consequently, the pottery (or at least the majority of the finds) must have been produced before 1717, but not much earlier than the beginning of the 18th century.

## 3. Materials and methods

### 3.1. Description of the samples

In this work, a total of 50 samples of the Austrian period painted pottery were analysed. Three main types of vessels were identified among the findings—bowls, plates and pitchers—each with distinctive design, motifs and colours (Fig. 1). Samples were classified into three groups (BF I, BF II and BF III) according to the decoration styles in the following manner.

Group BF I (18 samples) is characterised by red painted decoration on white background (Fig. 2). The group consists of conical



Fig. 1. Early modern painted pottery from the Belgrade fortress: Malhornware (BF I, BF II) and Anabaptist faience (BF III).

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