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Chapter 6

Painted pottery and culinary practices: Use-alteration analysis of painted pottery from the site of Starčevo-Grad

Olga Bajčev

Introduction

Food practices and their social implications in the Early and Middle Neolithic of the Central Balkans have become an area of interest for recent archaeological inquiry. Although very inspiring, the research in this area is rather problematic for several reasons. The settlements themselves have not been sufficiently investigated. Archaeobotanical and archaeozoological research are still in their early stages (Filipović and Obradović 2013; Stojanović and Bulatović 2013), while stable isotope analyses of human skeletons have been applied only in a few investigations: in Danube Gorge and at the site of Vinča-Belo Brdo (Bonsall *et al.* 2002; Grupe *et al.* 2003; Borić *et al.* 2004; Nehlich *et al.* 2010). The recent functional analysis of Early Neolithic pottery from Blagotin (Vuković 2006; 2009; 2011) has indicated the potential of this methodology for researching and understanding the Neolithic diet and related issues. In this paper, I wish to discuss the role that painted pottery, in particular, played in the culinary practices of Neolithic people.

Painted pottery is generally regarded as being tableware because of its elaborate ornamentation and visual expressiveness (e.g. Henrickson and McDonald 1983; Nieuwenhuyse 2009). In the central Balkans, painted pottery is characteristic of Early and Middle Neolithic Starčevo culture (6200–5400 BC). It holds a prominent position in the study of Neolithic pottery. For a long time, archaeologists in Serbia were mostly focused on defining cultural groups and constructing chronologies and periodisations for archaeological cultures in the area (Garašanin 1979). To this end, painted pottery has been acknowledged as one of the main dating tools (Nikolić 2005, 47–48), which is why it has attracted a lot of scientific interest (Milojčić 1949; Aranđelović-Garašanin 1954; Jovanović 1968; Garašanin 1971; Dimitrijević 1974; Brukner 1997, 243; Tasić 2009). This approach to painted pottery has highly influenced

the way it has been studied. Archaeologists have mostly been focused on style and typology as chronological markers, while other aspects of painted pottery have not been systematically investigated (painted pottery is analysed in more detail from the perspective of design symmetry and symbolic communication– see Tasić 2003; 2009; Naumov 2010). In Serbian archaeology, painted pottery is generally interpreted as a fine luxury good, different from everyday utilitarian pottery (Aranđelović-Garašanin 1954; Tasić 2009, 124). But we still do not have any direct information on how these vessels were actually used. The function of painted vessels has not yet been systematically studied.

This paper presents a study designed to test the assumptions that painted pottery was stationary and non-utilitarian, or used only as tableware. Following the object-biographical approach, I investigated how the biographies of these vessels can inform us about use activities and whether these activities are linked to food practices. The archaeological contexts of painted pottery from sites in the Central Balkans most often do not reflect the use of painted pottery, but rather the way it was discarded. The only way to investigate its actual function was to look at the vessels themselves. Based on this recognition, use-alteration analysis was performed on painted pottery from the site of Starčevo-Grad, Serbia. This case study allowed me to investigate the 'life-experiences' of individual vessels and obtain the first direct evidence of how painted vessels were used at this particular site.

Starčevo-Grad: Archaeological background

The archaeological site of Starčevo-Grad is located in the vicinity of Pančevo, in South Banat, about 3.5 km from the Danube (Fig. 6.1). The size of the Neolithic settlement is estimated at 11.3 ha (Živković *et al.* 2011, 7). The site was first excavated by Grbić in 1928 (Grbić 1930), with further excavations done by a joint Serbian-American team in 1931, 1932, 1969, and 1970 (Fewkes *et al.* 1933). New small-scale excavations and geophysical surveys were carried out in a number of field seasons from 2003 to 2008 (Živković *et al.* 2011).

The archaeological excavations have revealed around 20 pits of different shapes and sizes. Some of them have been interpreted as pit-houses and others as refuse pits (Grbić 1930; Fewkes *et al.* 1933; Živković *et al.* 2011). Radiocarbon dating indicates that the settlement was occupied in three different phases between *c.* 5900 and 5500 BC, with some areas being used successively (Whittle 2002, 81). Scarce archaeozoological and archaeobotanical data provide preliminary insight into the settlement's subsistence economy and diet. Archaeozoological analysis of material from the old excavations has indicated the prevalence of domestic animals over wild ones. Among domestic animals, the bovine predominated, although the importance of the ovicaprine should not be overlooked. Pigs were present in a very small percentage (<1%) (Clason 1980). Examination of plant impressions in pottery and daub (Renfrew 1979) identified einkorn (*Triticum monococcum* L.), emmer (*Triticum dicoccum* Schrank),

Figure 6.1: Location of Starčevo-Grad site.

barley (*Hordeum vulgare* L.), pea (*Pisum sativum* L.), cornelian cherry (*Cornus mas* L.) and wild apple (*Pirus malus* L.). A recent archaeobotanical analysis of scant charred plant remains from the 2007 excavations indicates the presence of domesticated cereals: einkorn, emmer, barley, and common millet (*Panicum miliaceum* L.). Edible wild species are represented by two charred seeds of black-bindweed (*Polygonum convolvulus* L.) (Medović 2011, 145).

Painted pottery from Starčevo-Grad

The painted pottery analysed in this paper originates from the 1928, 1932, and 1969/70 excavation seasons. The sherds are from pits and cultural deposits outside the site's structures. A total of 880 specimens have been identified. No complete vessels have been found. Only two vessels with a complete profile have been registered, one of which has been fully reconstructed and conserved. A dozen samples have a complete body profile without the base, while the remainder are diagnostic sherds of different vessels' parts and plain body sherds.

Most painted vessels are bowls of various shapes: globular, semi-globular, slightly bi-conical, and conical. They may have pedestal or flat bases. Closed-shaped vessels are present in very small quantity. The vessels were made with slips on their exterior and interior surfaces that were finely burnished or polished, and fired red and light brown. They were painted in white and dark brown with linear, curvilinear, and spiral ornaments typical for the Starčevo culture of the Central Balkans (Dimitrijević 1974; Garašanin 1979; Tasić 2009). They generally have a fine fabric without inclusions, or a medium fabric with chaff and fine sand, which is probably a natural clay inclusion. Mineral inclusions like coarse sand have been identified only in two cases.

Methodology – Biography of objects and use-alteration analysis

The biographical approach to studying material culture emphasises the dynamic life of individual objects (Kopytoff 1986; Gosden and Marshall 1999). According to scholarship, the morphological and aesthetic characteristics of objects can only offer the basic potential for their function and meaning, but 'their use-life can meander in [a] way not foreseen by their design' (Van Keuren and Cameron 2015, 30). The perception, meaning, and role of these objects in the social life of people using them are not inherent to their design. Meanings arise through the interaction of people and objects, which change through re-use and re-engagement. Through empirical analysis of archaeological contexts and objects themselves, we can explore at least some segments of this complex biography and try to understand the relationship between material culture and human behaviour.

Use-alteration analysis is one of the methods used to model the life-histories of objects (Skibo 1992). Analysis in this study was mainly conducted according to the methodology of D. Hally (1983; 1986) and J. Skibo (1992; 2013; Schiffer and Skibo 1989), elaborated by numerous scholars (e.g. Arthur 2002; 2003; Vuković 2009; 2010; 2011;

Vieugué 2014; Van Keuren and Cameron 2015). Skibo distinguishes two main groups of ceramic alterations: accretion and attrition. Accretion implies deposits on the ceramic walls, such as sooting or organic residues (Skibo 1992, 39). Attrition is defined as the removal or deformation of ceramic surfaces in different abrasive and non-abrasive processes (Skibo 1992, 106; 2013, 120). Abrasive attritions caused by mechanical contact of the vessel with an abrader in situations such as cooking, food preparation, storing, and serving, or during other activities involving the handling of the vessel (Schiffer and Skibo 1989, 101–102; Skibo 1992, 107–109; 2013, 120–121). The marks resulting from these processes are scratches, chips, and abrasions (Vieugué 2014, 623). Non-abrasive use attrition, in the form of pitting or erosion of the interior surface, is caused by chemical reactions in the contents of the vessel (Hally 1983, 14–20; Skibo 2013, 122–123). Ethnoarchaeological research shows that fermentation of food is a possible cause of alterations to a vessel's interior surfaces (Arthur 2002; 2003; 2014). Presumably, 'when liquid penetrates the interior wall, escaping carbon dioxide and other gases expand and escape just below the surface and create erosion' (Skibo 2013, 122).

Use-alteration analysis appeared to be most effective when performed on complete vessels (Skibo 2013, 155). However, well-preserved vessels are very rare in the assemblage from Starčevo, which is why all available painted sherds were analysed, including plain body sherds. Vessels with complete or almost complete profiles, as well as the diagnostic parts of those vessels, such as rims, bases, handles, and the zones of greatest diameter, were considered in more detail.

The analysis focused on identifying alterations and recording their location, distribution, and intensity. Location and distribution of alterations is used as the key parameter for distinguishing use-wear traces from postdepositional changes. Experimental studies have shown that postdepositional ceramic alterations produce traces that have a random distribution on the surfaces and edges of pottery sherds (Skibo and Schiffer 1987; Vieugué 2014, 624). Use-alteration traces occur only on the surfaces of the walls and are mostly located on specific parts of the vessel (Skibo 1992; 2013; Vieugué 2014). Traces were inspected macroscopically, with some samples being examined under low magnification. The research sample was too small to allow a quantitative analysis of a correlation between use-alterations and other pottery features.

Results

Out of 880 examined specimens, 205 show use-alterations of various kinds. Only attrition was present, caused by abrasive and non-abrasive processes. Sooting, oxidation, discolouration and internal carbonisation were not detected. This means that there are no clear indicators that the painted pottery was used for food preparation by heating over a fire. The use-alteration traces will be presented according to their location on the vessels' surfaces. Alterations caused by abrasive processes will be discussed first.

Table 6.1: Quantification of use-alterations within painted pottery from Starčevo-Grad.

Attrition type	*N*	*Comment*
Rim abrasion	164	17 sherds are too small (around 2% of the rim preserved) to be considered as representative for the entire rim of the vessel; 11 sherds apart from having an abraded rim, show an abraded slip on broken edges (in those cases it was difficult to determine whether the rim abrasion was caused by use of the vessel or taphonomic processes).
Interior surface abrasion	15	For 3 specimens – high confidence level for interpretation 4 samples – medium confident (small samples but abrasion pattern is indicative; Fig. 6.5B) 5 samples – low confidence level (small fragments and abrasion pattern is not that obvious) 3 samples – interior scratches maybe caused by use (confidence level low/medium; Fig. 6.6)
Interior base abrasion	2	Figs 6.7 A,B
Exterior surface abrasion in the zone of greatest diameter	6	5 body sherds with slight plastic ornaments 1 tunnel shaped handle
Rim abrasion + interior surface abrasion	1	–
Rim abrasion + interior surface abrasion + exterior base abrasion	1	Flat base: very small part of the base is preserved; visible tiny spots of red slip on the base (I assume the abrasion is caused by use, since it is so heavily abraded compared to the rest of the outer surface)
Interior surface abrasion + exterior base abrasion	2	One flat base: very small part of the base is preserved One pedestaled base: interior abrasion resulted from non culinary activities
Exterior base abrasion	9	3 flat bases and 6 pedestaled bases (Figs 6.9 A,B)
Rim abrasion + interior surface abrasion + exterior abrasion in the zone of greatest diameter	1	Fig. 6.8
Rim abrasion + interior surface erosion	1	Fig. 6.10
Interior surface erosion	3	Confidence level medium; small fragments but erosion present only on interior surface (Fig. 6.11)
Total	205	

Abrasion

Abrasions were noted on 202 samples. They were identified on both exterior and interior surfaces within a number of different areas on the vessel: rim, exterior base, exterior side in the zone of greatest diameter, interior side, and interior base.

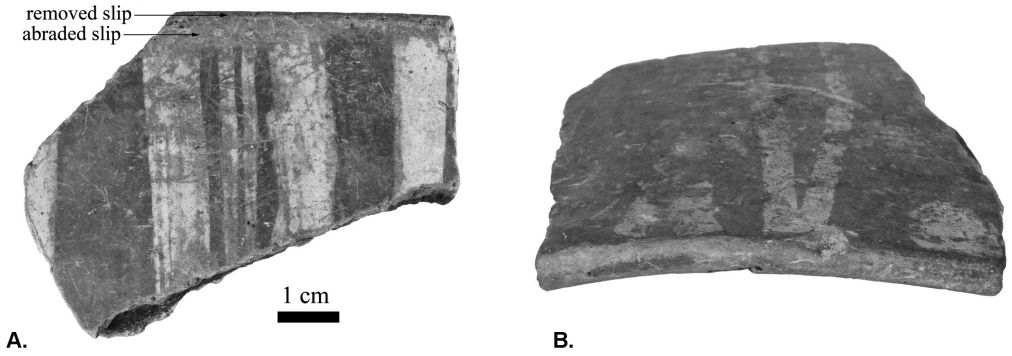


Figure 6.2: A. White painted sherd with abraded rim; probably used for storage (inv. No. 03_03356); B. White painted sherd with rim abrasion – slip almost completely removed from the lip.

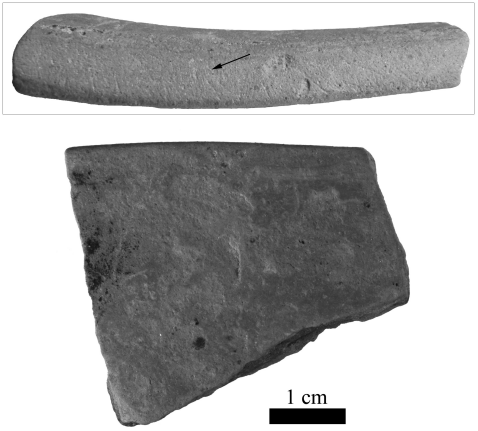


Figure 6.3: Dark-brown painted sherd with rim worn completely flat; visible scratches on the flat surface.

Rim abrasion

Abrasion of the rim is the most commonly found attrition. It was identified on 164 samples (57% of rim sherds; Table 6.1). Varying degrees of abrasion were registered, from partial or total abrasion of the paint and slip to high abrasion where the slip has been completely removed, along with a thin layer of the underlying paste (Fig. 6.2). The most common is moderate abrasion where the slip has been partially or completely removed. On the two most extreme examples, the paste has been abraded in such a way that the lip of the rim has been flattened (Fig. 6.3). This flattened surface shows short scratches oriented vertically along the rim line.

Only in one case was chipping of the rim identified as a possible use-wear trace (Fig. 6.4). Chips result from mechanical contact with different objects, and various activities can chip a vessel's rim. For example, 'occasionally lids are dropped on the rim, causing a chip' (Skibo 1992, 129). The rim of this closed-shaped vessel is highly abraded and the slip has been completely removed. The damaged rim as well as small perforations across the vessel's neck may indicate that the vessel had been covered, the lid being fastened by threading a string through the holes on the neck. This vessel was probably used for storing and/or transport of liquid, but it could also have been used for serving drinks.

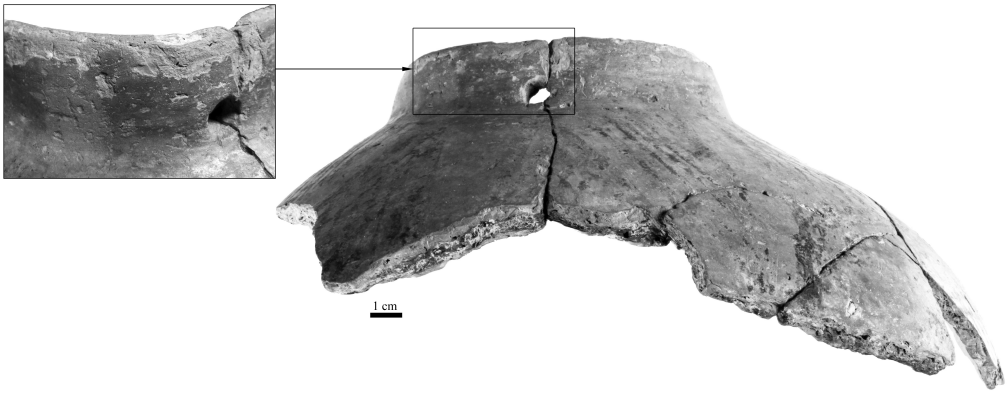


Figure 6.4: Dark-brown painted closed-shaped globular vessel with aggressive abrasion of the rim.

A number of studies have documented rim abrasion (e.g. Skibo 1992; 2013; Vuković 2011; Vieugué 2014). Skibo (2013, Fig. 4.15, 4.16) believes that rim attrition on the Kalinga cooking pots (linear scratches along the rim and chipping) are a result of contact with the ground as the pots were rotated during exterior washing. Although these vessels were frequently covered and uncovered (with ceramic or metal lids) during cooking, Skibo (1992, 128–132; 2013, 135–137) thinks that this activity would leave no traces on the rim.

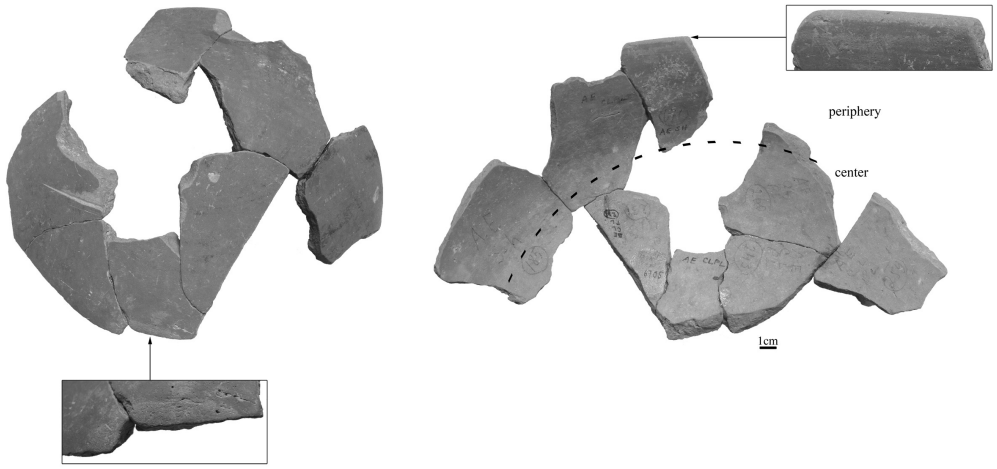
Vuković (2011, 208) interprets abrasion of the rim and horizontal scratches below the rim on vessels from Early Neolithic Blagotin (central Serbia) as marks left by capping the vessels and tying a cover of some soft material onto them. She argues that the pitting on the rim from removed temper particles is the result of mechanical contact with a harder abrader, such as stone or pottery without organic admixtures. She suggests that these vessels were probably used for storage. Vieugué (2014) also notes attrition on the rim of vessels from Early Neolithic Kovačevo, Bulgaria. He considers two possible causes: covering or there having been tidied up in the upside down position (Vieugué 2014, 627, Fig. 7).

If we presume that the rim attrition found on Starčevo pottery was caused by contact with a lid, we can assume that vessels with only this kind of attrition were used for storage. The scratches on the rims indicate that the abrasion was not caused by rotating the vessel, but by movements vertical to the rim, which may indicate contact with a lid. However, we cannot be sure that they were used only as storage vessels, because most sherds do not allow examination of the whole vessel's profile. In the extreme cases, where rims have been worn completely flat, we may also consider a secondary use of fragments as polishers. Some vessels do exhibit other use-alteration marks in addition to rim abrasion and they will be considered in the next section.

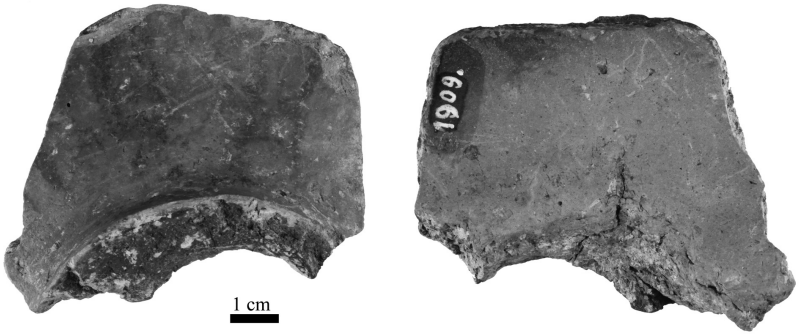
Interior side abrasion

20 vessels show abrasion of the interior side (Table 6.1). The distribution of traces could be observed on four better preserved bowls: two globular (Fig. 6.8), one slightly bi-conical (Fig. 6.5A), and one conical. On these samples, distinct zones of centre and

periphery with different rates of abrasion could be clearly distinguished (Fig. 6.5A). The rate of abrasion is lowest in the upper part of these vessels and gets higher toward the base. On one slightly bi-conical bowl with a flat base, individual marks in the form of horizontally oriented scratches are visible on the periphery. On the lower part of the vessel and base, the slip has, for the most part, been completely removed and individual marks could not be detected. On other samples, upper or lower body sherds, a centre and periphery cannot be clearly distinguished, although increased



A.



B.

Figure 6.5: A. Dark-brown painted slightly bi-conical vessel with abrasion of the rim, interior surface and exterior base; exterior surface is evenly abraded – maybe due to frequent handling of the vessel during food preparation or/and consumption (inv. No. 03_06705); B. Small lower body sherd with entirely preserved exterior surface and completely removed slip on the interior.

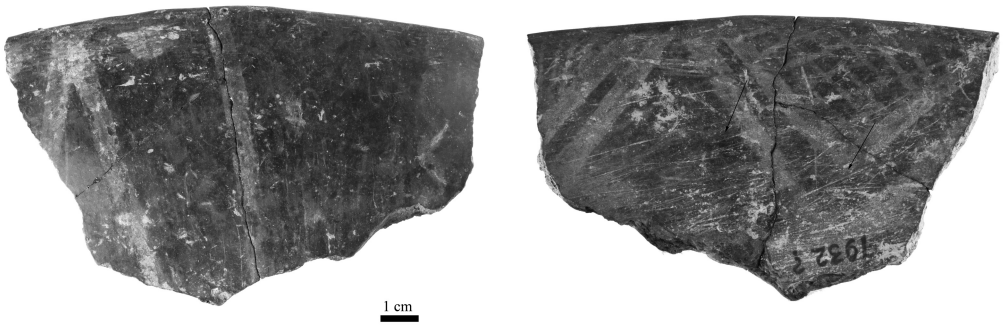


Figure 6.6: Conical vessel with scratches on the interior surface; possible traces of washing or stirring/ scraping the contents with some kind of utensil.

abrasion intensity can be observed toward the lower part of the vessel. On four smaller lower body/base sherds, total abrasion of the slip is observable on the interior side, while the exterior surface is completely preserved (Fig. 6.5B). Although sherds are very small, the abrasion distribution pattern may indicate that the attrition of the interior surface resulted from use and not from taphonomy.

Individual scratches or surfaces with scratches can be observed on three samples (Fig. 6.6). These traces are clearly different from scratches caused by cleaning the vessels in recent curation activities (Fig. 6.9B).

According to ethnoarchaeological studies, abrasion of a vessel's interior side results from stirring or scooping its contents during preparation or consumption of food (Skibo 2013, 137, 142). Fine scratches on the interior side may also appear as the result of washing (Skibo 1992, 141). Horizontal marks noted on the slip of some samples from Starčevo indicate the abrader's circular movement and point to stirring of the contents as the cause of wear. The pattern of the abrasion's spatial distribution on the interior walls of the vessels further supports this interpretation. The abrasion rate on some samples (Fig. 6.5A) indicates prolonged and frequent use of the vessels. The interpretation of samples with scratches remains uncertain; scratches could be a result of stirring the contents and scraping the walls with some kind of utensil during food preparation or consumption, but they could also be formed during the vessel's washing. The sherds are too small to infer reliable conclusions.

A number of the vessels with an abraded interior surface show abrasion of the rim, base, and exterior walls in the zone of greatest diameter (Table 6.1). Attrition of the base and the exterior walls indicates frequent handling, while rim abrasion indicates the possibility that food preparation involved covering the vessels. It may also imply multi-functionality: use of these vessels for storage, preparation and consumption of food.

Interior base abrasion

Two pedestal base sherds show distinct abrasion patterns (Table 6.1). The interior base of the first specimen displays an abraded surface of irregular shape where the

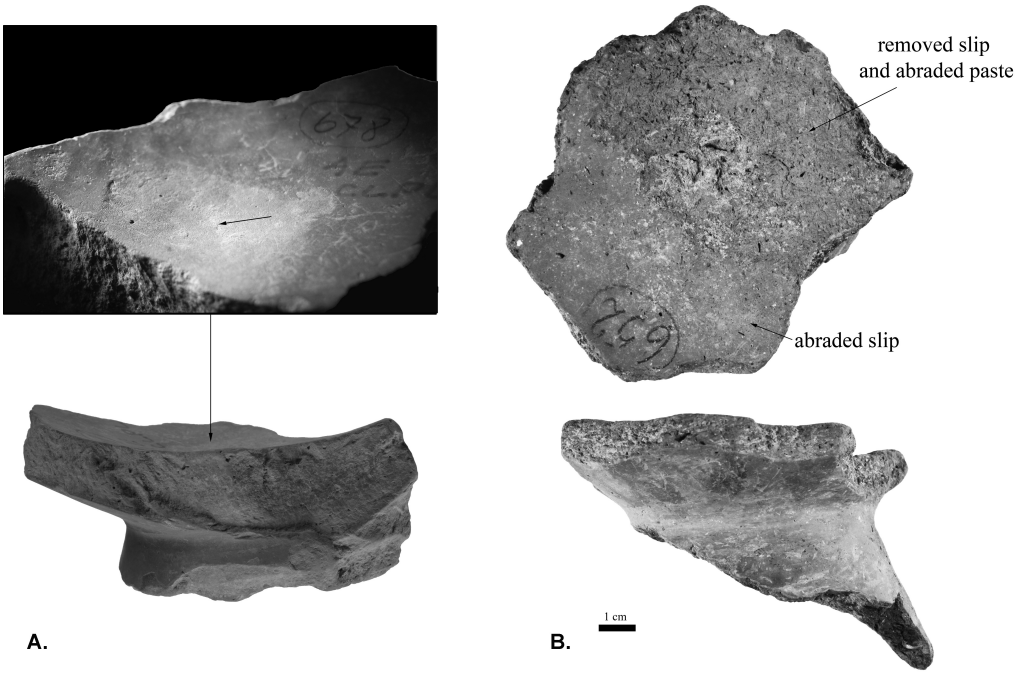


Figure 6.7: A. Pedestal base sherd with interior base abrasion indicating grinding of soft material; B. Pedestal base sherd with interior base abrasion indicating grinding of harder material (inv. No. 03_06800).

slip has been removed along with a thin layer of underlying paste (Fig. 6.7A). In the middle of this surface there is a slight circular depression (1–2 mm deep), presumably created by more-intensive abrasion. The dimensions of the abraded surface are 2.5 × 2 cm, with the diameter of the internal depression being about 1.5 cm.

The second specimen (Fig. 6.7B) shows abrasion on the original surface of the slip located on the lower body interior wall. The interior surface of the base displays more-intensive abrasion, and the slip has been completely removed, along with a thin layer of paste. The surface with intensive abrasion also shows pitting, with some pits perhaps resulting from removal of mineral inclusions. As in the first case, it seems that intensive abrasion is confined to the small surface of the vessel's base. Again, in the central part of this surface there is a slight depression.

The abrasions' shape and small size point to contact with a smaller, rounded abrader – perhaps a pestle (cf. Vieugué 2014, 626). These abrasions may have resulted from the use of the vessel as a mortar for grinding small quantities of foodstuffs. The first vessel (Fig. 6.7A) might have been used for grinding soft foodstuffs, maybe soft plant parts, given the low degree of abrasion present and the absence of mechanical damage such as pitting. Abrasions on the base of the second sample appear rougher and more aggressive, which may indicate grinding of harder foodstuffs. The spatial distribution of the abrasions indicates that an initial crumbling of the substance – more aggressive in nature – was performed at the very base (e.g. pounding a hard coarse-grained

substance), and then, once the substance had turned softer with finer grains, grinding was performed by rubbing it against the vessel walls (Fig. 6.7B). The explanation of the attrition found on these two samples is speculative, however, because only small fragments of the vessels have been preserved and it was, thus, not possible to examine the rest of the vessel's interior surface.

Exterior body (surface) abrasion

Eight samples show abrasion of the exterior wall in the zone of greatest diameter (Table 6.1). The slip has been mostly removed from the abraded surfaces, which are not continuous along the whole circumference of the sherds. In the case of one well-preserved globular bowl (Fig. 6.8), the abraded area is 6 cm wide. This vessel also shows abrasions on the interior surface, which indicates stirring of the contents.

The zone of greatest diameter as well as the handles of a vessel are its most protruding parts and, therefore, most exposed to contact with other vessels or other hard objects when the vessel is manipulated. This mechanical contact leaves scratches and abrasions on the exterior surface. Abrasions of this type cannot point to any specific activities related to food preparation, but generally indicate the intensity of handling and moving of vessels (Vuković 2011, 206).

Exterior base abrasion

Among 14 bases registered in the assemblage, 12 (five flat and nine pedestaled bases) show abrasion of various degrees on the exterior base (Table 6.1; Fig. 6.9). A high degree of abrasion is noted on six pedestaled bases where the surface of the base is slightly flattened. The most intensive abrasion is registered on two samples, where

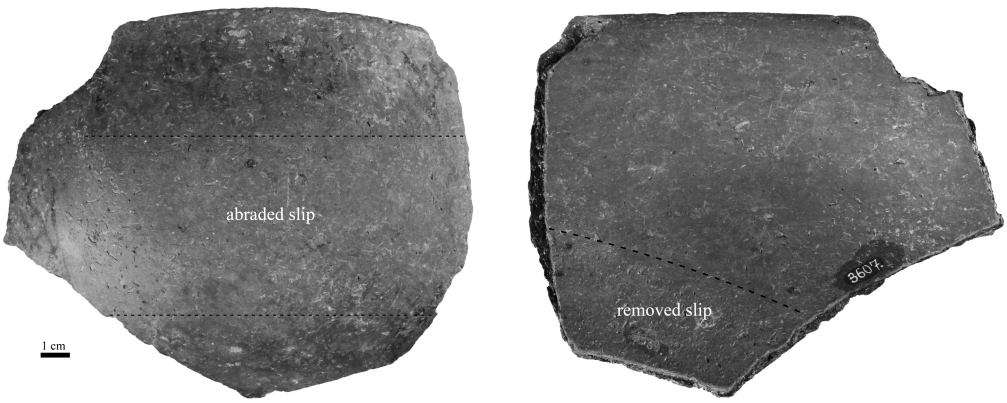


Figure 6.8: Dark-brown painted globular bowl with interior surface abrasion indicating stirring of the contents; abrasion of rim and exterior wall indicate covering and handling of the vessel (inv. No. 03_03607).

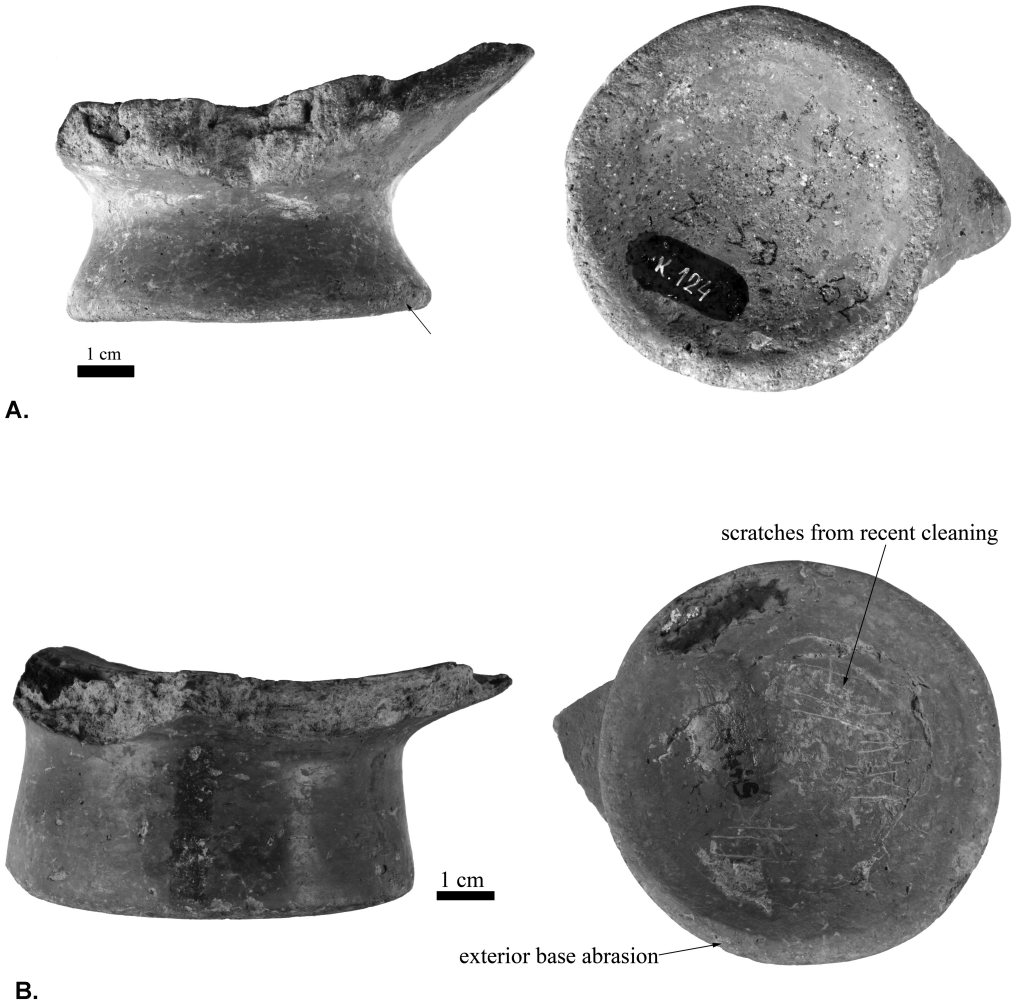


Figure 6.9: A. Pedestaled base sherd with abrasion of the base (inv. No.03_10152); B. Pedestaled base sherd with abrasion of the base; visible scratches caused by recent cleaning of the sherd during modern curation activities (inv. No. 03_05442).

the paste surface is abraded to such an extent that the underlying black core has been exposed.

A high degree of abrasion is also noted on two flat bases on which the slip has been removed and the paste surface slightly abraded (Fig. 6.5A). In both cases, the base fragments are too small to allow analysis of the abrasion distribution pattern.

Ethnoarchaeological studies show that abrasion of the exterior base is caused by contact with the ground while the vessel is in an upright position – i.e. placing and lifting vessels on to and off of different surfaces or dragging and rotating them along the ground (Skibo 1992, 113–118; Vieugué 2014, 625). Abrasion of the base, like

abrasion of the exterior surface, cannot offer direct information about the function of a vessel, but it can indicate the frequency of the vessel's repositioning. Pedestaled bases from Starčevo show clear evidence of abrasion, suggesting prolonged and frequent manipulation. The flat bases are far less well-preserved, but may point to the same conclusion. The small number of preserved bases does not allow for a quantitative analysis, but the ratio between the abraded and non-abraded bases in this small sample can be indicative for the whole class.

Nonabrasive traces – erosion of interior surface

Four samples feature erosion of the interior surface due to nonabrasive processes (Table 6.1). The distribution of the traces could be observed only in one case: on a slightly bi-conical bowl (Fig. 6.10). The slip is preserved on the upper part of the vessel and the zone with dense pitting starts 2–3.5 cm below the rim. The lip of the rim shows mechanical abrasions on the slip. The same kind of traces and the same distribution are found on both fragments of the vessel. Another sample shows slight shallow pitting that starts at the zone of greatest diameter and extends to the lower body.

Two other samples (Fig. 6.11) represent small plain body sherds on which the distribution of attrition could not be observed. The interior of these sherds is completely eroded. In both cases pitting penetrates the vessel wall to its core. The exterior surface of these samples does not show this kind of attrition, although, on one sample, the slip on the exterior side shows mechanical abrasions in the zone of greatest diameter, indicating frequent manipulation (Fig. 6.11).

Recent ethnoarchaeological studies demonstrate that such alterations appear on vessels that were used for production of dairy, fermented food, and beer (Arthur 2002; 2003; 2014). However, nonabrasive attrition in the form of spalling and pitting can also appear during pottery manufacture or postdeposition (Skibo 2013,

Figure 6.10: Dark-brown painted bowl with pitting on the interior surface; vessel was probably used for fermentation of food.

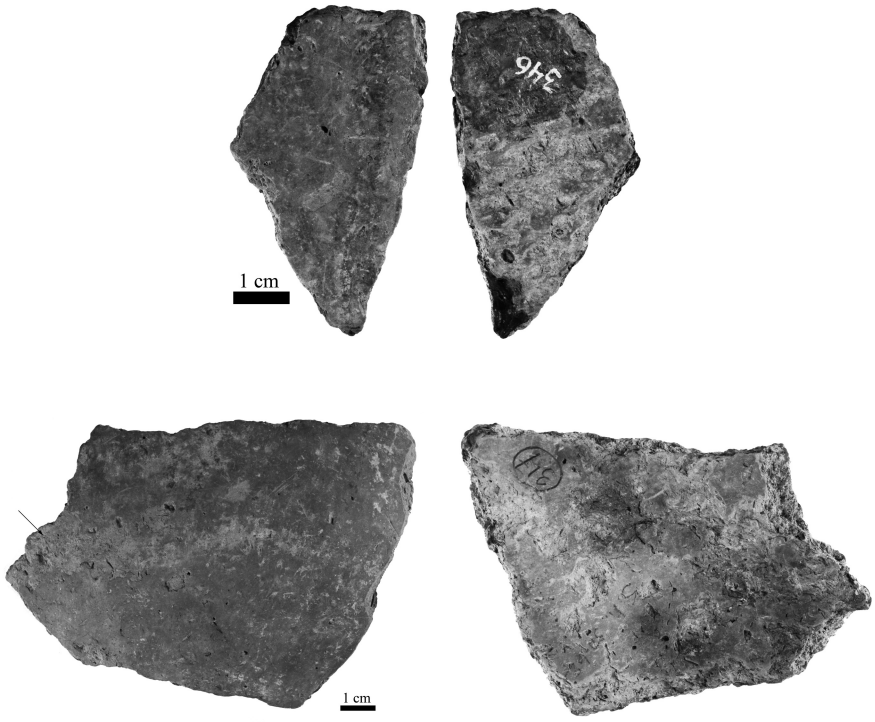


Figure 6.11: Two body sherds with intensive pitting on the interior side caused probably by chemical reactions in the vessels content.

122–123). The distribution of traces is, therefore, very important for interpretation. In the case of Starčevo, all four examples studied show alterations on the internal surface only, which could support their interpretation as being due to use-wear. The high degree of erosion found on two of the samples may indicate their exposure to frequent or prolonged aggressive chemical processes. The traces found on the other two samples probably exemplify the initial phase of attrition. The first of these two – the bi-conical bowl – can be more reliably interpreted due to its distinct distribution of traces. The boundary between the upper zone of the preserved slip and the eroded zone probably presents the so-called filling level (cf. Vuković 2009, 29). Rim abrasion may imply that the vessel was covered during food preparation or that it was used for storage.

Discussion

Culinary practices

The results of the analysis at hand revealed that the painted vessels from Starčevo were not simply static and non-utilitarian objects used only for social display, but that at least some vessels, at some point in their life, were used for various food-related

activities. The use-alteration analysis showed traces attributable to: the covering of vessels used for storage; mechanical processing of food – stirring and grinding; and the preparation of food by fermentation.

The function of *storage* may be difficult to identify based on use-alteration traces, since it implies the immobility of vessels and, generally, a lack of use-wear. Ethno-archaeological research has not offered a use-alteration analysis of vessels that are used exclusively for storage and are covered with a lid. Rim abrasion, supposed to be an indicator of the storage function, remains disputable in the light of Skibo's (1992, 75) argument that covering vessels does not leave any traces on the rim (see the section on rim abrasion). However, Skibo based his study on an analysis of cooking pots, arguing that they displayed all types of use-alterations. Since those cooking pots must have been intensively washed, damage caused in the process could have erased other traces on the vessels. I, therefore, think that the covering of vessels should not be excluded as the cause of rim abrasion.

Rim abrasion is the most frequent kind of attrition found on the painted pottery from Starčevo, which may indicate that these vessels were most commonly used for storage. Rim abrasion is noted on both open and closed types of vessels. Vessel capacity ranges from 1–6L and indicates small-scale, and probably short-term, storage (although duration correlates to the type of food being stored). These vessels were not well suited for long-term storage of surpluses to be used for buffering of risk and replanting. A relatively small amount of some foodstuff may have been stored in them, which was kept covered and consumed on a regular basis. The question remains as to what kind of food this may have been. We have very little direct evidence of food storage from the Early and Middle Neolithic in the central Balkans (Trbuhović and Vasiljević 1983, 15; Filipović and Obradović 2013, 32, 36; Tripković 2013, 133–134). We can only presume that they could have been used for storing ingredients like grains, berries, dried fruit, honey, or fat intended for daily use; other possibilities include storing ingredients for medicinal purposes or for special occasions. The closed-shaped vessels are likely to have been used for transport and storage of liquids.

Rim abrasion has also been registered on the so-called fine pottery from Blagotin. Vuković (2011, 208) argues that these fine bowls were used for storage. She also suggests that the low frequency of the fine vessels in Blagotin was an argument in favour of this interpretation. Given the storage function, which implies a lack of repositioning, the bowls would not have been moved often and so would only rarely have been broken and, thus, infrequently replaced with new ones. As painted pottery is also fairly infrequent at all the sites of the Early and Middle Neolithic in the central Balkans, the same argument might stand for this type of pottery, as well. Nevertheless, abrasions on exterior surfaces of the painted pottery indicate their having been subject to some amount of repositioning. Taken to imply that storage was not the foremost function of these vessels, we would seem to require an additional explanation for the limited production of painted pottery. But if we accept that being used for storage does not rule out some amount of repositioning, then this function can still

be considered. Large, heavy vessels full of foodstuffs were probably stationary, but smaller bowls used for storage could have been moved often during access, which could have caused attrition to the exterior base. If multiple vessels were stored next to each other, moving them could have caused abrasion to the exterior walls.

Traces from *stirring and scooping* of contents are noted on the three types of bowls studied: globular, slightly bi-conical, and conical bowls with flat or pedestal bases. As no traces of exposure to fire are registered, we may assume that cold food was prepared in them. This food was prepared via intensive stirring or was poured in and additionally processed after having been cooked in other vessels. The function of food consumption cannot be excluded, either, since similar traces might have resulted from scooping and scraping a vessel's contents during a meal. For instance, porridge-like foods become sticky when cold, requiring considerable effort, such as scraping, to remove them from a vessel's interior walls.

Similar traces from stirring have been registered on the fine bowls from Blagotin (Vuković 2010, 18; 2011, 208). Vuković (2011, 206) says that these traces may have been caused by abrasive action during washing but that it is more likely that they were caused by stirring the contents with some kind of utensil.

Rim abrasion on vessels with traces of stirring could indicate that these vessels were covered and uncovered in the course of food preparation. We must also consider that vessels were multi-functional, that they were used for storage, food preparation, and consumption.

Abrasion on the interior surface of the base points to the use of painted pottery for *grinding* foodstuffs. Vieugué (2014, 627, Fig. 8; 628, Fig. 10) identified a similar abrasion pattern on painted vessels from Kovačevo and assumed the use of a pestle as a possible cause of the abrasion. We still do not know what was ground in these vessels. Samples from Starčevo have been observed under the microscope and no remains were detected in the pores of the abraded surfaces. Given the relatively thin walls of these ceramic vessels, heavy pounding of food has to be excluded. The intensity and character of abrasion indicate the grinding of soft food in one case (Fig. 6.7A) and of medium hard food in the other (Fig. 6.7B). The small surface of the abraded zone suggests a small quantity of the substance, which in the context of food practice could be spices. However, painted vessels could have been used for preparing non-food substances, for example for grinding pigments or making medicinal mixtures. We must also consider a secondary use, since the pedestal base of an already broken vessel might have been a suitable recipient for light pounding.

Fermentation of food is another practice inferred from detected use-alterations. The interpretation of the Starčevo samples is rather problematic because only a small number of sherds show nonabrasive damage (Figs. 6.10 and 6.11). If we assume that these alterations were caused by use in this capacity, the small number of affected specimens indicates that painted pottery was rarely used for fermentation. Very obvious non-abrasive use-alterations are, however, registered on fine bowls from Blagotin, which Vuković also considers to be a result of fermentation (Vuković 2009).

Ethnoarchaeological research has shown that erosion of internal surfaces does result from fermentation during production and storage of dairy products, different kinds of cereal gruels, and beer (Arthur 2002; 2003). Recent studies have confirmed the use of milk and dairy products in the Early Neolithic (Craig 2003; Craig *et al.* 2005; Evershed *et al.*2008; Nieuwenhuyse *et al.* 2015), including the central Balkans, where dairy residues were registered on pottery from Blagotin, Grivac, and Divostin (M. Ivanova-Bieg, pers. comm.). Fermented gruels represent a possible mode of cereal preparation in the Early Neolithic diet (Vuković 2009, 32). Ethnographic data explain various ways of preparing fermented gruels. In addition to soaking grains in water, some of them include processes of grinding, cooking, adding germinating seeds, and mixing cereals with dairies or legumes (Steinkraus 1996; Blandino *et al.* 2003).

Studies on nutrition show that fermentation improves the nutritional value and safety of food and prolongs its storage-life (Haard *et al.* 1999; Blandino *et al.* 2003), which was probably very important for Neolithic people. Beer is also considered a highly nutritional beverage and ethnographic studies show the importance of beer production and consumption in the social life of many traditional societies (Katz and Voigt 1986; Arthur 2003; 2014; Dietler and Herbich 2006). In most cases, beer is made of barley, but it can be made from other cereals and fruits, including wheat and millet (Katz and Voigt 1986, 33; Dietler and Herbich 2006). Ethnoarchaeological research shows that beer was often considered a food rather than a beverage (Arthur 2003, 517). We also need to consider the production of mead by fermentation of honey in water, as well as the fermentation of fruit. Use of honey in the Central Balkans has been confirmed for the Late Neolithic, based on lipid analysis of ceramic vessels (Roffet-Salque *et al.* 2015).

Abrasion on the exterior of the base and the external walls in the zone of greatest diameter indicate *frequent handling* of painted pottery. Such damage to external surfaces is present on almost all vessels with traces from stirring and the preparation of food by fermentation, which adds to the dynamics of their use. Intensive manipulation of painted pottery has been confirmed at the site of Kovačevo in Bulgaria on the grounds of abrasion to the base (Vieugué 2014, 625–626). Abrasive damages, indicating frequent movement, have also been noted on the external surfaces of fine red slipped ware from Blagotin (Vuković 2011, 206).

Limitations and outlook

Although use-alteration analysis showed itself to be a very helpful tool for inferring use-activities, it has its own limitations. Traces inform us only in part about the activities that ceramic vessels were involved in. Some actions either do not leave traces on pottery, or have to be repeated with enough frequency to leave alterations on ceramic walls. After finally being discarded, pottery is exposed to various taphonomical processes that can severely damage ceramic surfaces and remove or alter traces of use so they cannot be recognised.

High fragmentation of the material was the main problem in the analysis of the Starčevo assemblage. It made interpretation more problematic and, in some cases, less reliable. But the distribution of traces on certain vessel surfaces makes a good argument for interpretation of the traces as being due to use-wear, rather than taphonomic effects. For example, on vessels that were assembled from several sherds, the abrasion pattern was observed to be the same on all fragments. Another problem, however, was postdepositional abrasion, which, in the case of some sherds, had removed the paint and almost the entire slip of the former vessel's walls.

A number of samples show very obvious traces of use. But one of the problems encountered is that we cannot know at what point in their lives these vessels were used in the mentioned activities. It could be that they were primarily used as tableware, and only after losing their shine and beauty were they employed as ordinary kitchen ware. Or it may be that, after breakage, pedestal bases were used as small grinding vessels. Yet, even if this was the case, it doesnot change the fact that the actual reality was certainly more complex than we tend to presume based solely on the visual appearance of painted ware. Also we should not overlook the possibility that the ceramic vessels in question were (in fact) used for purposes other than food related practices.

Considering the preservation level of this assemblage and our inability to perform any quantitative analysis, we cannot, at this point, arrive at general conclusions about any specialised use of painted pottery. Conclusions about culinary practices are mostly based on just a few examples, except for rim abrasion, which is problematic itself. Scarce examples from other Early Neolithic sites from the region do show some similarities in use-alterations and may indicate general trends. But we need additional functional analyses of non-painted pottery from Starčevo, and pottery from other sites, in order to put these results in a wider context. We have also seen that the same type of traces can be caused by different activities. We, therefore, need experiments to test certain hypotheses: for example, that vessels were used as mortars or that covering them with lids can have left traces on the rim. Organic residue analyses would be very useful for understanding what kinds of food were stored and prepared in these vessels. Analyses of other artefacts would also be advisable, for example in regard to lids: What kinds of lids might have been used? Were other vessels used as lids? – in such a case, those vessels would exhibit use alterations as well. Perhaps large sherds were used to cover vessels. All these potential new data would have to be considered in light of established knowledge about the domestic life of these Neolithic communities.

Final considerations

The present use-alteration analysis of painted pottery from Starčevo has provided additional data and raised further questions regarding food practices in the Central Balkans during the Neolithic. This study has also introduced a new perspective from which to investigate the status of painted pottery. The examples presented make it clear that so-called fine pottery, including painted pottery, had a role in

various activities; they were not just static non-utilitarian objects used solely for social display, serving, and consumption of food on special occasions. The attrition visible on the internal walls of the vessels from Starčevo indicate their having been used in activities involving stirring, scratching, covering, and possibly fermentation. The intensity of the use-wear on individual samples indicates use in everyday food preparation, rather than their limitation to more-exclusive activities. However, the new data regarding the use of painted pottery in the practices of storage and food preparation do not necessarily rule out their having been used in the serving and consumption of food. They merely enlarge the range of activities and contexts of its use, lending further complexity to our understanding of how painted pottery was used. By the same token, the fact that painted pottery was utilitarian does not preclude its having a social or symbolic meaning and function. Information about its actual use provides new elements to consider when thinking about contexts and mechanisms for forming, maintaining, and changing meanings. All this is to say that the issue of painted pottery – that is, its function – and food practices in the Neolithic has now become even more complex. To put it in the words of Skibo, 'it gets progressively more difficult'; but this is just another of the joys of archaeology.

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