Technological and functional features of late medieval ceramic vessels from the Vrbovec castle in Klenovec Humski (NW Croatia)

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Vrbovec castle in Klenovec Humski



The castle Vrbovec (lat. *castrum Vrbouch*) is located in the far west of the Hungarian-Croatian Kingdom, i.e. the Kingdom of Slavonia (*Regnum Sclavoniae*), today near Klenovec Humski, a settlement located along the border with Slovenia.

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Sampling strategy











Vessel type	Ceramic structure	Avarage wall thicknes (cm)	Average capacity (liter)	Number of samples
Pot type 1	Coarse	0,46	5	5
Pot type 2	Medium- coarse	0,38	4,5	5
Jug	Fine	0,43	-	3
Beaker	Fine	0,26	-	3





Research objectives

- to determine the mineral and petrographic features of ceramic matrix,
- the type and features of temper material deliberately added by potter;
- determine if there is variability in pottery recipes;
- determine other visible technological indicators such as the techniques of shaping and firing vessels.
- An additional goal is to establish the manner in which the vessels were used.



The samples were prepared at the Laboratory for the analysis of geological materials at the Department of Mineralogy, Petrology and Mineral Resources at the Faculty of Mining, Geology, and Petroleum Engineering in Zagreb.

Ceramic petrography – Compositional analysis



Photomicrographs of thinsections (lower photo XPL)

		Matrix				Tempering material				
Sample number <i>prePOT</i>	Vessel type	Optical activity	Very fine crystall oclasts (%)	Fine crystall oclasts (%)	Iron rich nodule (%)	Biogenic material	Rock fragment amount (%)	Rock fragment size	Rock fragment roundnes s	Fabric subgro ups
392	Pot 1	MH	15		+	-	10	M/C	PS	1.1
393	Pot 1	MH	15		+	-	10	M/C	PS	1.1
394	Pot 1	MH	15		+	-	10	M/VC	PS	1.1
395	Pot 1	MH	25		*	-	15	M/VC	MS	1.2
396	Pot 1	Н	25		+	+	20	M/VC	MS	1.2
397	Pot 2	MH	20		*		25	М	WS	1.3
398	Pot 2	MH	25		*		25	М	MS	1.3
399	Pot 2	Н	20		*		30	М	WS	1.3
400	Pot 2	Н	15		*		30	М	WS	1.3
401	Pot 2	MH	20		*		30	М	MS	1.3
402	Jug	MH	15				20	М	MS	1.3
403	Jug	MH	5				20	М	MS	2.1
404	Jug	MH	15				15	F/M	MS	1.3
405	Beaker	MH	15				20	М	MS	1.3
406	Beaker	MH	15	<5						1.4
407	Beaker	MH	20	<5						1.4

+ present; * sporadically present; MH – medium-high, H – high; M – medium; C – coarse; VC – very coarse, F – fine, MS – moderately sorted; VS – well sorted; PS – poorly sorted

Tempering material

- Temper material is determined on the basis of type, size, shape, and bimodal distribution of clasts.
- The most common and abundant temper materials are various lithoclasts, mostly quartz but also sedimentary and metamorfic rocks.
- shape: sub-angular
- density: 10-25%
- size: medium to very coarse
 (0.25 3.5 mm)
- sortation: poorly to moderatelly sorted







Pottery recipes



Manufacturing techniques

Breaking pattern





Production sequence

Local available raw material (clay and temper)

				<u> </u>
	Pot type 1 (coarse)	Pot type 2 (medium- coarse)	Fine tableware (jugs and beakers)	
Clayey material	Sandy clay	Sandy clay	Sandy clay, Fat clay	
Temper material	Coarse rock fragments 10-20 %	Medium rock fragments 20-25 %	Rock tempered and without temper	1
Manufacturi ng techniques	Wheel- coiling	Wheel-coiling	Wheel-thown (?)	
Firing atmosphere	Incomplete oxidation and oxidation	Incomplete oxidation and oxidation	Complete oxidation (orange core)	

■1.1 ■1.2 ■1.3 ■1.4 ■2.1



Wear analysis

	Pot type 1	Pot type 2	Function properties
Wall thicknes	0.46 cm	0.38 cm	heat conduction rate
Capacitiy	5 liters	4.5 liters	
Stability	Wide base	Wide base	Stabile for maneuvering
Tempering material	Rock tempered 10-20 %	Rock tempered 15-30 %	Resistance to thermal stress
Surface treatment	No surface coating	No surface coating	Permeability - evaporating excess liquid from the walls



Sooting







External Sooting

Conclusions

- The result indicates standardized recipes for making vessels, especially concerning vessels that were used on an open fire for thermal processing of food; in the case of pot type 2, the standardization of the recipe stands out.
- Preliminarily, a slightly greater variability is visible in the recipes for making beakers and jugs
- It is assumed that production took place in a specialized workshop located probably near the castle, but the production could also take place in a wider area using local easily available raw materials. This can indicate both the usage of different sources of clays, and the possibility that the studied wares were made by several potters or in different workshops.
- The results show that the vessels were in use for a limited time, and it is assumed that most of the vessels were not fully used, but were probably broken or damaged by mechanical force during their relatively short lifetime.



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