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COARSE WARE PRODUCTION IN SELEUKEIA SIDERA (ISPARTA, TURKEY) IN ROMAN AND LATE ROMAN PERIODS

In Seleukeia Sidera, evidence indicating to the local coarse ware production has been obtained during the field surveys and excavations. To identify the scope and scale of the production and to correlate locally produced wares to existing typology, archaeometrical analyses have been done on samples from all coarse ware functional groups including preparing/serving vessels and cooking wares. Moreover, to determine the clay raw materials, analyses also were undertaken on clays collected from two different spots in the close vicinity of the ancient city. Archaeometrical analyses have shown that coarse wares from various functional groups and forms were produced between the 1st century and 7th century AD. Preparing/serving and cooking wares were produced with the clays obtained from an area close to modern Atabey Dam Lake without interruption. In addition, another clay bed in the vicinity of the city was exploited in the Late Roman Period for producing a smaller functional group.

Seleukeia Sidera – Pisidia – coarse ware – pottery production – archaeometrical analysis

1. Introduction

The ancient city of Seleukeia Sidera is situated in the modern-day village of Bayat, in the Atabey district of Isparta (Southwest Turkey). Following the one-season excavation work in 1993 (Bingöl 1994; 2012), archaeological research is continued under directorship of Prof. Dr. Bilge Hürmüzlü since 2016 (Hürmüzlü, Sönmez and Ayaşan 2017; Hürmüzlü et al 2017; Hürmüzlü, Sönmez and Atav-Köker 2020). During these studies, evidence attesting to an uninterrupted pottery production between the 1st and 7th centuries AD was uncovered¹. Archaeometrical analyses conducted on the red slip ware point to the existence of a production center in the ancient region of Pisidia, which has not yet been located (Hürmüzlü and Sönmez 2021; Sönmez 2022). Concurrently, LRD (Sönmez 2022: 235), unguentaria (Hürmüzlü et al. 2021), and coarse ware productions in the city were confirmed (Hürmüzlü, Sönmez and Atav-Köker 2020). In this paper, data regarding the coarse ware production in the city are discussed in the context of typo-chronological and archaeometric analyses.

2. The Typology of Coarse Wares from Seleukeia Sidera

Coarse ware produced in Seleukeia Sidera can be grouped into two main categories: food preparation and serving vessels, and cooking ware. Preparation and service vessels are found in two forms: open and closed shapes. Jugs, one of the closed shapes, are represented in eight forms. The earliest form, Type 1 (**fig. 1, 1**) has two examples which were dated to the second half of the 1st century AD (Degeest 2000: 140, fig. 133). Similar examples of Type 2 (**fig. 1, 2**) were in use between the second half of 1st and mid-7th centuries AD (Degeest 2000: 126-127, fig. 101). Type 3, which has two sub-forms (**fig. 1, 3** and **4**), can be dated from the 4th to the mid-6th centuries AD (Degeest 2000: 192, fig. 193). The most dominant type of jar, Type 4 (**fig. 1, 5**) belongs to the 4th-7th centuries AD (Degeest 2000: 160-161, fig. 188). Type 5 (**fig. 1, 6**) was dated from the 5th to the mid-7th centuries AD (Williams 1989: 87, fig. 52; Degeest 2000: 257, fig. 214), and Type 6 (**fig. 1, 7**) to the second half of the 6th century BC (Yaman 2018: 188-189). Type 7 has three sub-forms: Dating cannot be suggested for Type 7A (**fig. 1, 8**) yet, while 4th-6th centuries AD is suggested for Type 7B based on the context from which the material was recovered (**fig. 1, 9**) and the first half of 5th century to the first half of 7th century AD is suggested for Type 7C (**fig. 1, 10**) (Ergürer 2012: 79). A dating cannot be suggested for Type 8 yet.

Another closed shape is the table amphorae, of which four types have been identified. Type 1 (**fig. 1, 11**) and Type 2 (**fig. 1, 12**) are Late Roman Imperial forms. The 4th-7th centuries AD can be suggested for these forms which were dated based on context data. Type 3 (**fig. 2, 1**) and 4 (**fig. 2, 2**) cannot be dated yet. Open forms include pots, dishes and basins. Pots are represented by a small set of finds, divided into

¹ Pottery groups examined in this paper form a section of the author's PhD thesis (Sönmez 2022). I would like to express my gratitude to Prof. Dr. Bilge Hürmüzlü, the director of Seleukeia Sidera excavation and my supervisor during the PhD for her permit for studying the material and her endless support in every step in my PhD research. Besides, I would like to thank to Ministry of Culture and Tourism, General Directorate of Cultural Heritage and Museums for permit. Analyses of the coarse wares studied as part of the PhD thesis were supported by The Scientific and Technological Research Council of Türkiye (TÜBİTAK), 1002-Short Term R&D Funding Programme (Project No: 220K298). I extend my thanks to Prof. Dr. Yusuf Kağan Kadioğlu and Dr. Kıymet Deniz for their help, and to Prof. Dr. Ünsal Yalçın for his guidance on the interpretation of the analysis results. For the more information about pottery production in Seleukeia Sidera, see: Hürmüzlü et al. 2020; Hürmüzlü et al. 2021: 344-347; Hürmüzlü and Sönmez 2021; Sönmez 2022; 2023.

two main types dated to the late Roman Imperial period. Pot Type 1 (**fig. 2, 3**) was identified based on the parallel forms found in *loci* dated to the post-4th century AD in Xanthos (Pellegrino 2004: 134). Examples of Pot Type 2 (**fig. 2, 4**) were recovered from contexts dated to the 4th-7th centuries AD in Seleukeia Sidera.

Dish Type 1 (**fig. 2, 5**), the first of the five types belonging to this form, was in use between the 3rd-6th centuries AD (Lüdorf 2006: 134; Yaman 2018: 83-84). Based on the contexts these dishes were found in, Type 2 were dated to the late Roman Imperial period. More specifically, Type 2 (**fig. 2, 6**) can be dated to the 4th-6th centuries AD, and Type 3 (**fig. 2, 7**) to the 4th-7th centuries AD. For the Sagalassos parallels of Type 3, 4th to the first half of the 7th century AD was suggested (Degeest 2000: 371). On the other hand, dating could not be suggested for Dish Type 4 (**fig. 2, 8**) and 5 (**fig. 2, 9**). Basin Type 1 (**fig. 2, 10**), which is represented with one vessel, was in use from the end of the 5th until the mid-7th century AD (Degeest 2000: 365).

Cooking wares have the richest variety of forms amongst the coarse wares studied in this paper, cooking pots, casseroles, cooking dishes and lids being the main forms. Twelve types of cooking pots were identified. Type 1, which has two subtypes, is the most common type of cooking pot, and was in use for the longest period. Type 1A (**fig. 3, 1**) was in use between the 1st-7th centuries AD (Degeest, 2000: 376), while Type 1B (**fig. 3, 2**) was dated to between the second half of 1st century to the 8th century AD in different ancient cities (Degeest, 2000: 376; Ladstätter 2008: 188). Type 2 (**fig. 3, 3**, Degeest 2000: 376; De Staebler 2012: 67; Mader 1998: No. 45; Gassner 1997: 102-103) and Type 10 (**fig. 3, 11**, Degeest 2000: 176; Yener Marksteiner 2007: No. C63; Armstrong and

Roberts 2012: 293) were also in use for a long time: from the second half of the 1st century until the 7th century AD. Type 3 (**fig. 3, 4**, Harrison, Firatlı and Hayes 1968: 214; Mader 1998: No. 46; Degeest 2000: 376, Doksanaltı 2006: 725; Lüdorf 2006: 97; Ladstätter 2008: 307; Armstrong and Roberts 2012: 260) and Type 8 (**fig. 3, 9**, Eisenmenger 2003, 195; Yener Marksteiner 2007: 265-266; Yaman 2018: 230-232; Şen 2017: 484) can also be dated to between the 1st and 7th centuries AD. Type 4 (**fig. 3, 5**, Firat 2011: 65-68) was in use between the 2nd and 3rd centuries AD, and Type 11 (**fig. 3, 12**) could not be dated. All remaining types can be generally dated to the late Roman period.

Late Roman cooking pots are represented by a small set of finds. Type 5 (**fig. 3, 6**) was in use between the 5th and the 6th centuries AD (Ladstätter 2008: 115; Şen, 2017: 195, No. 664-665). Similarly, Type 6 (**fig. 3, 7**) can be dated from the 5th to the first half of the 6th centuries AD (Yaman 2018: 225), Type 7 (**fig. 3, 8**) to the 5th century (Yener Marksteiner 2007: No. C62; Yaman 2018: 243-244), Type 9 (**fig. 3, 10**, Şen 2017: 487-489; Yaman 2018: 241-242) and Type 12 (**fig. 3, 13**, Marksteiner and Yener Marksteiner 2010: 229-230; Şen 2017: 485-486) to the 5th-7th centuries AD.

Casseroles, cooking dishes, and lids are each represented by a single type of the form. Casserole Type 1 (**fig. 3, 14**) is a common form which was in use in 2nd-7th centuries AD (Rautman 1995: 69; Degeest 2000: 375; Şen 2017: 509). Dating cannot be suggested for Cooking Dish Type 1 (**fig. 3, 15**). Lid Type 1 (**fig. 3, 16**) is a late Roman form, commonly used in Anatolia. It can be dated to the 4th-7th centuries AD (Harrison, Firatlı and Hayes 1968: 207; Williams 1989: 74-75; Atik 1995: 181-183; Degeest 2000: 368; Ricci 2007: 173; Öz 2020: 132).

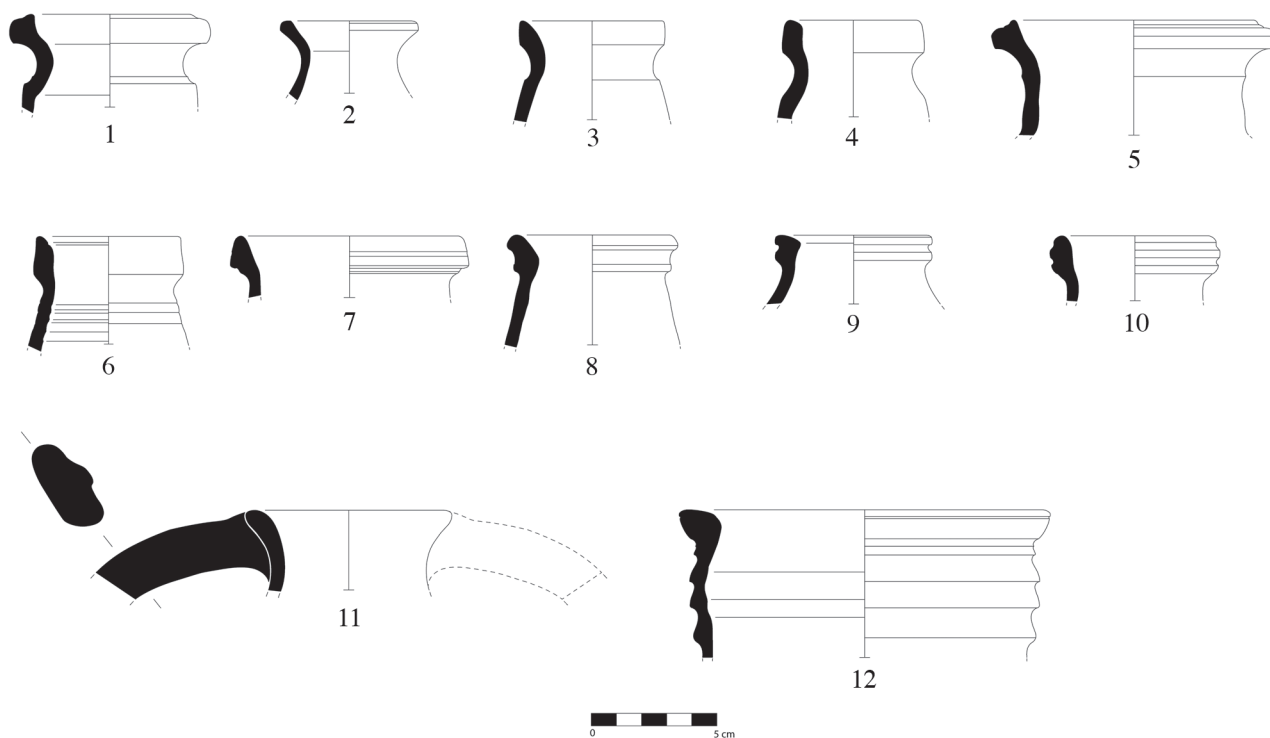


Fig. 1. Local production jugs (1-10) and table amphorae (11-12).

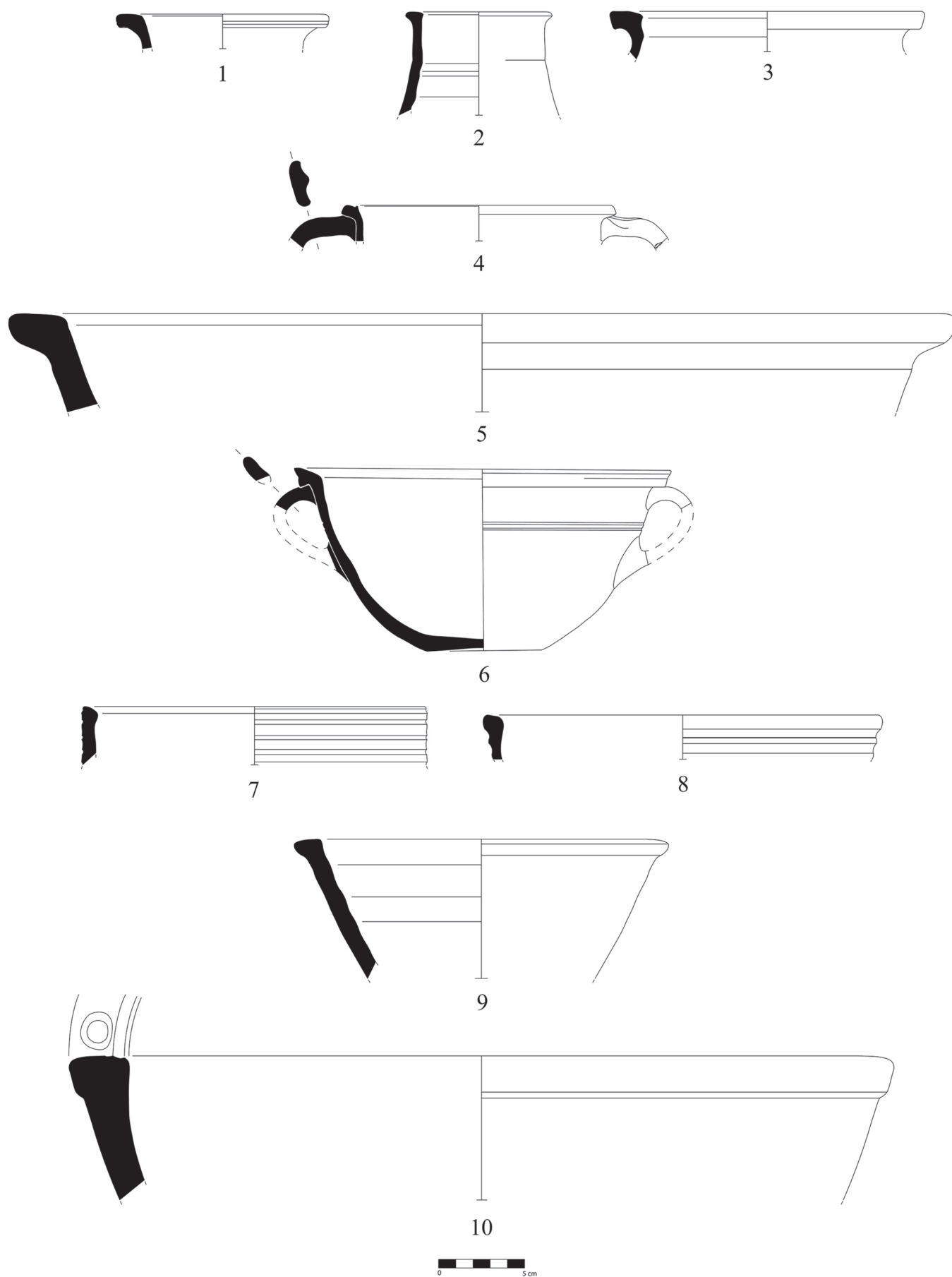


Fig. 2. Local production table amphorae (1-2), pots (3-4), dishes (5-9) and basin (10).

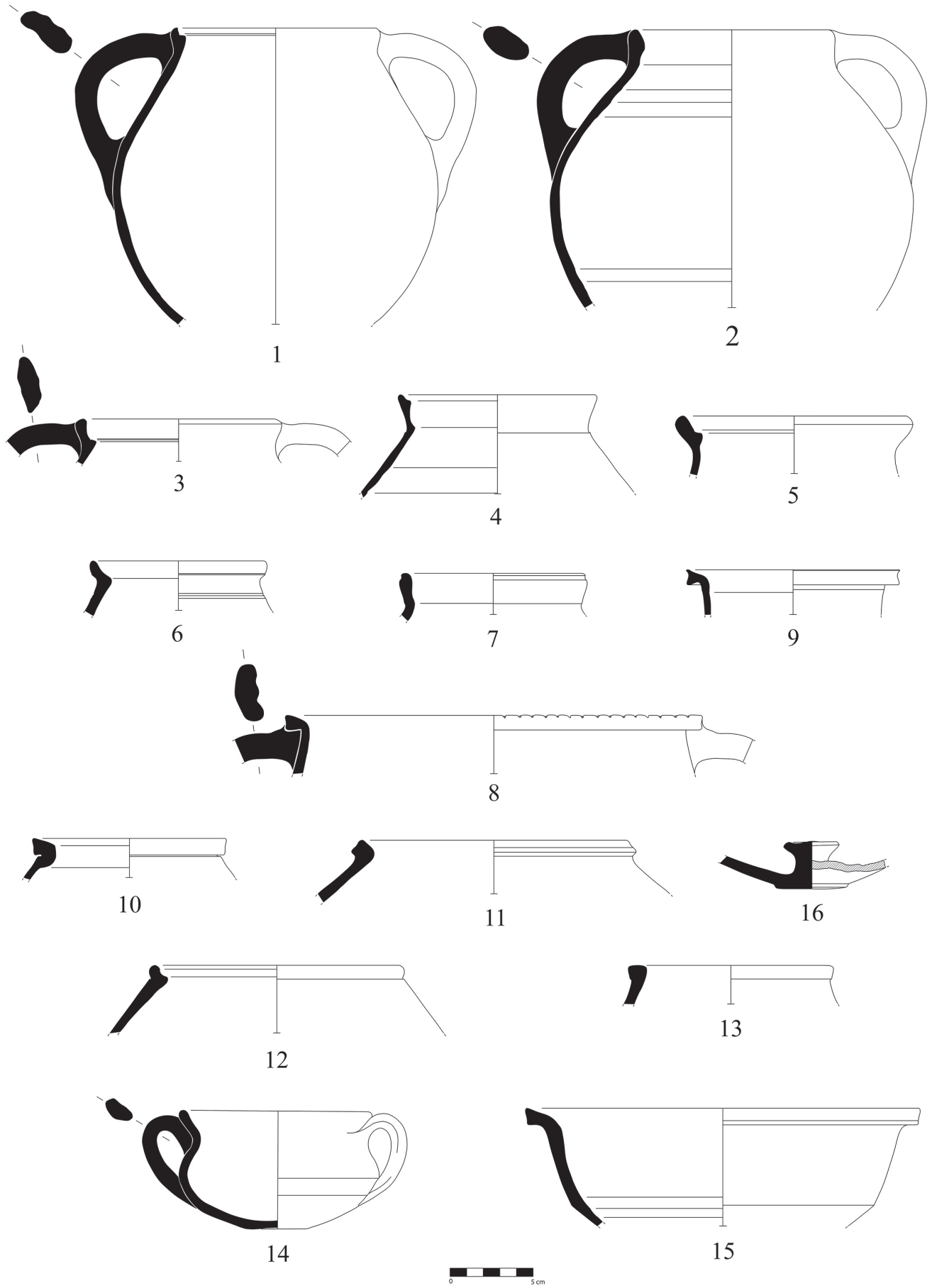


Fig. 3. Local production cooking wares.

3. Archaeometrical Analyses

Coarse ware production in Seleukeia Sidera is attested by the misfired pottery recovered during surveys and excavations. Archaeometrical analyses were conducted in order to establish the pottery types produced in the city and the clay sources used for the production of these vessels. Archaeometrical analyses were conducted in Ankara University Earth Sciences Research and Application Centre (YEBİM) by Prof. Dr. Yusuf Kağan Kadioğlu and his team. Petrographic thin section analysis, X-Ray Fluorescence Spectrometry and X-Ray Diffraction Spectrometry analyses were performed. Spectro brand X-LAB 2000 Polarized Energy Dispersive X-Ray². Analyses were conducted for 40 samples from preparation/service vessels, 25 samples from cooking wares, and four samples from misfired fragments. Furthermore, two clay samples, taken with a drilling core from the Kuleönü plain and three samples from the surface near modern-day Atabey Dam Lake, which is 4600 m to the north of Seleukeia Sidera, were analysed to determine potential clay sources.

Prior to the archaeometrical analyses, ceramics were classified based on their texture, hardness, and macroscopic inclusions. It was observed that the majority of the ceramics formed consistent groups among themselves. Archaeometrical analyses have confirmed that the element content of the samples was concordant with the macroscopic classification. It was concluded, as part of the analysis results, that the locally produced coarse ware can be divided into two groups based on fabric. These fabric types were named Fabric 2 and Fabric 3. Fabric 1 was used in the production of red slip ware from Seleukeia Sidera. The production workshop of this group of tableware and *oinophoroi* has not been identified yet (see: Hürmüzlü and Sönmez 2021; Sönmez 2022; Sönmez 2023). Fabric 4 is coherent with the samples taken from the Kuleönü plain (see: Hürmüzlü et al. 2021). The clay was used in locally produced *unguentaria*.

Fabric 2

Among the analysed coarse wares, the majority of the samples belonged to Fabric 2. These samples are characterized by a moderately hard fabric with moderate, small, or medium-sized voids. The size and frequency of rock fragments vary; small lime inclusions are visible in sparse to moderate frequency. Quartz is commonly visible, with sparse to moderate frequency, and small to large size. Some samples contained sparse quantities of grog too. Fabric colour, apart from small changes, is recorded as red in almost all samples. The most common colour is 2.5YR-5/8 Red³, followed by the second most common 2.5YR-5/6 Red.

Out of 69 samples of food preparation and serving vessels, and cooking wares, 59 were identified as Fabric 2

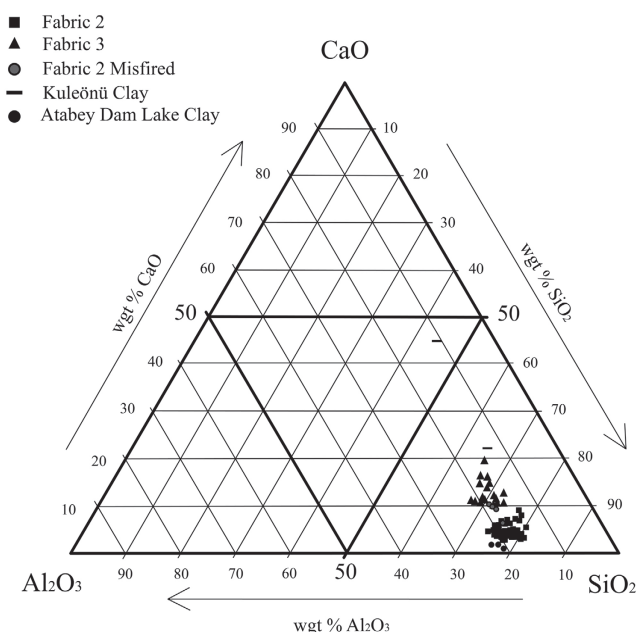


Fig. 4. CaO-Al₂O₃-SiO₂ diagram of fabrics and clay raw materials.

(fig. 4 - 6a), including four misfired ceramics. It was established that all food preparation and serving vessels, and cookwares were produced from the same clay, the only exception being the Table *Amphorae* Type 2, one Lid Type 1 fragment (fig. 3, 16) and two individual fragments. XRF analysis results are provided in table 1.

Fabric 3

Fabric 3 is the second category of fabrics used in the production of food preparation and serving vessels at Seleukeia Sidera. The fabric of the wares included in this group is moderately hard with moderate, very small to medium-sized voids. The frequency and size of rock fragments vary; small lime inclusions are visible from scarce to moderate frequency. Quartz is commonly visible in the majority of the samples. Based on the analysis results, 6 out of 69 coarse ware samples, belonging to the Table *Amphorae* Type 2 (fig. 1, 12), and fall into the Fabric 3 category (fig. 4 - 6b), as does one Lid Type 1 sample (fig. 3, 16). XRF analysis results are presented in table 2.

Evaluation of the Ni/Cr Levels

Because of their immobile and compatible nature, Ni/Cr content of the wares provide important information about the clay raw material sources used in their production. Based on the Ni/Cr content, the sample set can be divided into two main groups (fig. 5). The division formed by samples belonging to the Fabric 2 and Fabric 3 categories are highly consistent with the groups determined for major element oxides. In addition,

² Fluorescence Spectrometer (PEDXRF) was used. XRF analyses were performed with the GEO-7220 method and the calibration of the device was made using the K02-GSR-09 and G01-GS-N-Granite standards, which were created by the USGS for plutonic rocks (granite, granodiorite, etc.).

³ Munsell Color Chart 2009 Edition was used for identifying the colours.

Ni/Cr element ratios provide information about the raw material sources, disparate from the major element contents of the wares. Clay samples taken from the Atabey Dam Lake shore are (**table 3**) in the same grouping as Fabric 2, as well

as four misfired fragments belonging to preparation/service vessels. This indicates that clay raw materials used in the production of these ceramics were taken from or near the area where Atabey Dam Lake is located today.

Sample No.	Na2O	MgO	Al2O3	SiO2	P2O5	K2O	CaO	TiO2	MnO	Fe2O3	LOI	Total
	%	%	%	%	%	%	%	%	%	%	%	%
67	1,78	1,68	14,50	60,07	0,31	3,56	4,88	0,58	0,12	5,92	6,91	100,31
69	1,23	2,40	14,72	60,14	0,31	3,44	7,59	0,56	0,14	6,10	3,33	99,96
70	1,36	2,43	15,05	58,75	0,34	3,40	7,84	0,57	0,14	6,13	3,77	99,78
71	1,37	2,41	15,05	56,98	0,31	3,23	8,12	0,59	0,14	6,36	5,31	99,87
103	0,93	1,93	16,94	64,35	0,25	3,09	3,57	0,62	0,12	6,95	0,23	98,98
104	0,05	1,63	14,64	56,36	0,31	2,56	13,75	0,70	0,13	6,49	3,77	100,39
105	0,51	1,57	16,28	66,39	0,26	3,10	3,02	0,64	0,12	6,69	2,43	101,01
106	0,79	1,57	16,96	65,64	0,24	2,72	2,67	0,65	0,13	7,39	0,73	99,48
107	0,31	1,58	17,41	65,33	0,20	2,97	2,95	0,58	0,10	7,02	1,77	100,22
108	0,84	1,62	17,11	65,97	0,23	2,86	2,72	0,63	0,13	6,69	0,73	99,53
109	0,08	1,55	12,09	59,19	0,47	2,79	10,10	0,61	0,13	5,86	6,93	99,79
110	0,05	1,19	13,85	57,81	0,42	2,63	11,92	0,68	0,13	6,20	4,65	99,52
111	0,38	1,49	16,20	64,55	0,22	3,03	3,24	0,58	0,10	6,49	3,66	99,94
113	0,35	1,57	15,74	67,40	0,21	2,53	2,86	0,68	0,13	6,73	1,74	99,94
115	0,94	2,03	14,71	64,23	0,32	3,42	5,88	0,57	0,17	6,01	1,63	99,90
116	0,66	2,17	17,35	59,71	0,39	3,27	6,35	0,64	0,12	6,91	2,83	100,40
117	0,58	2,05	15,73	62,23	0,37	3,12	6,75	0,67	0,14	6,73	1,83	100,19
118	0,54	1,43	16,80	62,30	0,37	2,90	3,14	0,68	0,12	6,85	4,62	99,75
121	0,45	1,47	14,32	66,89	0,22	2,49	3,21	0,52	0,12	6,15	3,52	99,36
122	0,14	1,39	14,61	62,26	0,31	2,45	9,57	0,69	0,15	6,49	1,83	99,89
123	0,65	1,89	14,27	63,84	0,37	3,39	5,76	0,61	0,13	6,03	2,93	99,86
125	0,61	3,14	14,86	59,58	0,39	3,40	8,22	0,57	0,13	5,92	2,73	99,55
146	0,11	1,56	15,39	65,22	0,26	2,39	3,28	0,57	0,10	6,40	4,30	99,57
149	0,08	1,35	13,71	65,56	0,14	2,39	2,34	0,65	0,12	6,82	6,33	99,49
150	0,29	1,54	13,59	64,70	0,21	2,67	3,71	0,59	0,11	6,59	5,87	99,86
151	0,64	1,41	15,94	62,02	0,22	3,00	2,71	0,67	0,11	7,51	5,87	100,11
152	0,29	1,47	16,00	63,64	0,22	2,45	3,31	0,58	0,10	7,27	4,85	100,17
153	0,94	1,54	16,60	64,15	0,21	3,51	2,63	0,61	0,12	6,63	2,65	99,59
154	0,50	1,48	16,04	62,05	0,19	2,64	3,10	0,57	0,10	7,02	5,32	99,02
155	0,06	0,91	12,96	60,31	0,20	2,11	8,53	0,70	0,09	7,07	6,64	99,57
156	0,25	1,11	13,88	58,24	0,35	2,48	9,66	0,67	0,13	6,45	0,33	93,56
157	0,04	1,05	11,48	63,53	0,12	2,30	7,50	0,55	0,10	5,39	7,76	99,80
159	0,38	1,52	15,24	62,53	0,28	2,68	3,63	0,63	0,13	6,95	5,74	99,70
161	1,53	2,35	15,45	60,73	0,31	3,98	7,34	0,54	0,11	5,43	1,85	99,62
162	0,05	1,18	13,34	67,37	0,17	2,64	2,65	0,57	0,11	6,33	5,83	100,24
163	0,54	1,63	16,02	60,14	0,92	2,92	4,62	0,57	0,11	6,59	5,43	99,48
164	0,05	1,39	11,73	64,74	0,13	1,96	4,29	0,51	0,12	6,86	7,94	99,72
165	0,16	1,23	13,52	62,45	0,13	2,32	3,04	0,52	0,11	6,72	9,63	99,83
166	1,08	1,39	14,30	64,67	0,20	3,13	4,02	0,63	0,13	8,12	1,84	99,50
167	0,06	1,14	14,83	62,97	0,17	2,66	4,88	0,77	0,13	7,61	4,88	100,10
168	0,72	1,51	16,39	62,21	0,23	3,34	3,44	0,60	0,11	6,48	4,83	99,86
169	0,58	1,38	14,77	63,84	0,14	2,68	2,65	0,69	0,16	6,98	5,62	99,47
170	0,81	1,49	17,17	61,20	0,26	3,05	4,03	0,72	0,14	7,23	3,83	99,93
171	0,66	1,69	15,36	66,32	0,19	2,57	3,23	0,62	0,12	6,81	2,44	100,00
172	0,51	1,68	14,06	64,02	0,28	2,63	5,23	0,60	0,11	6,27	5,83	101,21
173	0,05	1,06	16,05	63,18	0,23	2,42	3,11	0,98	0,17	9,32	3,82	100,38
174	0,79	1,43	15,71	61,30	0,18	3,09	2,97	0,61	0,12	6,56	6,77	99,54
175	0,42	1,85	16,10	62,74	0,21	2,79	4,53	0,70	0,16	6,93	3,72	100,14
176	0,68	1,60	17,59	64,42	0,21	3,08	2,99	0,66	0,10	7,54	0,65	99,51
177	0,53	1,62	18,10	61,60	0,26	3,21	3,66	0,66	0,12	7,29	2,69	99,74
178	0,21	1,71	14,15	65,97	0,21	2,37	2,81	0,52	0,11	6,56	5,84	100,46
180	0,40	1,89	14,62	60,08	0,41	3,16	5,15	0,65	0,14	6,36	6,82	99,68
181	0,58	1,28	16,82	60,51	1,74	2,99	3,66	0,60	0,12	6,77	4,92	99,98
182	0,09	1,55	17,30	61,41	0,22	2,55	3,03	0,63	0,11	7,33	6,02	100,24
183	0,59	1,30	11,72	66,70	0,22	2,54	4,12	0,56	0,12	5,90	5,99	99,74
184	0,50	1,55	16,68	65,51	0,20	2,72	2,91	0,69	0,13	7,18	2,01	100,08
185	1,20	1,65	17,29	64,54	0,27	3,27	3,60	0,65	0,12	6,78	0,22	99,58
186	0,40	1,45	16,26	64,17	0,57	2,65	3,25	0,60	0,11	6,90	3,82	100,18
187	1	1,47	17,05	65,74	0,54	3,04	2,32	0,66	0,13	6,99	0,25	99,19

Tab. 1. XRF results of Fabric 2 group.

Sample No.	Na ₂ O %	MgO %	Al ₂ O ₃ %	SiO ₂ %	P ₂ O ₅ %	K ₂ O %	CaO %	TiO ₂ %	MnO %	Fe ₂ O ₃ %	LOI %	Total %
97	0,33	2,54	17,19	53,54	0,93	3,45	8,69	0,89	0,10	7,58	4,67	99,91
98	0,05	2,41	14,00	59,56	0,57	2,81	8,42	0,81	0,08	6,89	4,67	100,27
99	0,08	4,08	15,74	56,86	0,32	3,24	9,59	0,82	0,10	7,16	1,45	99,44
100	0,05	1,72	13,00	57,42	0,21	2,77	16,79	0,62	0,07	5,86	1,33	99,84
101	0,05	1,29	14,98	66,88	0,13	1,87	5,89	0,83	0,08	7,18	0,34	99,52
102	0,05	2,29	15,80	57,83	0,26	2,95	12,23	0,83	0,10	7,44	0,42	100,2
145	0,04	1,65	18,89	59,76	0,12	3,41	1,11	0,87	0,08	7,40	6,40	99,73
147	0,05	1,66	13,56	54,55	0,26	3,10	10,80	0,63	0,05	6,21	8,50	99,37
158	0,05	3,30	16,63	57,81	0,36	3,45	8,95	0,85	0,09	7,49	0,32	99,3
160	0,05	1,89	13,47	56,62	0,28	2,98	12,86	0,73	0,09	6,78	3,82	99,57

Tab. 2. XRF results of Fabric 3 group.

Sample No.	Na ₂ O %	MgO %	Al ₂ O ₃ %	SiO ₂ %	P ₂ O ₅ %	K ₂ O %	CaO %	TiO ₂ %	MnO %	Fe ₂ O ₃ %	LOI %	Total %
25	0,31	1,03	15,37	51,49	0,11	2,65	1,02	0,58	0,16	6,00	21,83	100,55
207	0,06	0,94	16,33	64,44	0,12	2,05	0,53	0,58	0,11	6,27	8,58	100,01
208	0,09	1,19	18,33	65,41	0,14	2,33	1,19	0,79	0,15	7,66	2,73	100,01

Tab. 3. XRF results of the clay raw material from Atabey Dam Lake.

Sample No.	Na ₂ O %	MgO %	Al ₂ O ₃ %	SiO ₂ %	P ₂ O ₅ %	K ₂ O %	CaO %	TiO ₂ %	MnO %	Fe ₂ O ₃ %	LOI %	Total %
24	0,05	3,15	6,946	28,06	0,08	1,48	28,45	0,32	0,06	3,39	26,60	98,59
210	0,23	2,83	9,866	57,37	0,14	2,25	19,62	0,40	0,08	4,06	2,64	99,49

Tab. 4. XRF results of the clay raw material from Kuleönü Plain.

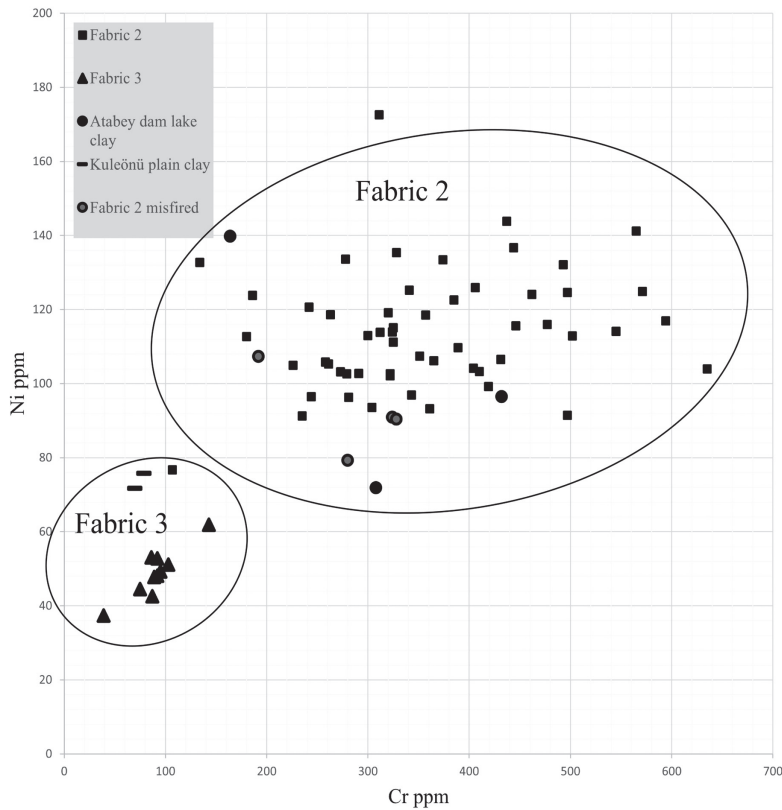


Fig. 5. Ni-Cr graph of fabrics and clay raw materials.

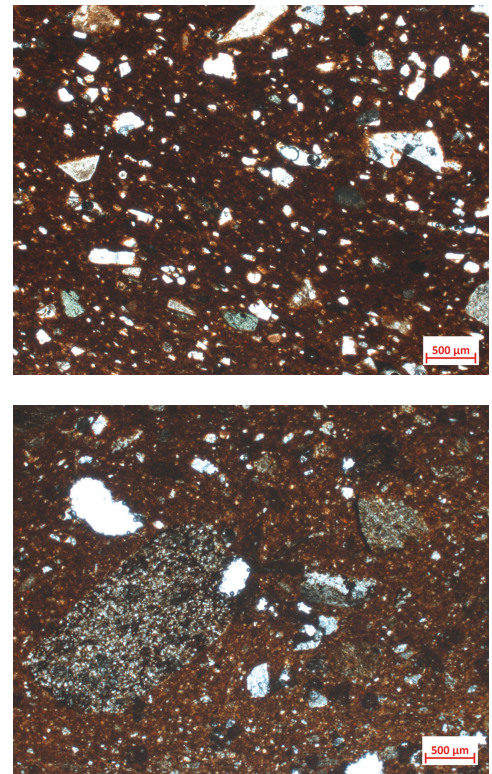


Fig. 6. Thin section photographs of Fabric 2 (above) and of Fabric 3 (below).

In the Ni/Cr graph, the samples that fall into the Fabric 3 category form a different division than those in the Fabric 2 category (**fig. 5**). Clay samples taken by drilling core from Kuleönü Plain (**table 4**) have very similar Ni/Cr values to Fabric 3: they form a clear division in the same parts of the chart. This shows that the raw materials were taken from the Kuleönü Plain or a clay bed nearby, in the production of samples belonging to the Fabric 3 group.

Conclusions

When the typo-chronological classification of the ceramics and the results of the archaeometrical analysis are evaluated together, it is clear that the coarse ware production, which started in the 1st century AD in Seleukeia Sidera, continued

until the 7th century AD. Clay raw materials taken from Atabey Dam Lake, 4600 m north of the city, were used in the production of the group named Fabric 2. This fabric was used in the production of all preparing/serving vessels except Table *Amphorae* Type 2, one Lid Type 1 sample and two individual fragments. Fabric 3 was used in a more limited range of vessels. The clay raw material for Fabric 3, taken from the Kuleönü plain or its immediate surroundings, was used in the production of Table *Amphorae* Type 2, one Lid Type 1 sample, and two individual fragments during the 4th-7th centuries AD.

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