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Archaeological Studies Sgraffito Ware Production Workshops in Iran (10th–14th Centuries CE): Insights from Archaeological Excavations at the Aghcheh Rish Site, Northwest Iran

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Abstract

For several centuries (9th to 14th CE), Sgraffito-type pottery was widely distributed across a vast region, including Iran, the Caucasus, Anatolia, Eastern Europe, and Transoxiana. Based on typological studies by Grube and Allen, this pottery tradition is classified into five main groups—Simple Sgraffito, Splashed Glazed Sgraffito, Champlevé/ Garrus, Agh Kand, and Amol—each named after geographic locations in Iran where examples were first identified. Despite this established classification, our knowledge of the actual production contexts—workshops, kilns, tools, and technological processes—has remained speculative, relying mainly on unverified accounts from antique dealers. No systematic archaeological investigations of production sites had previously been undertaken. These gaps raise significant research questions: How did Sgraffito pottery technology develop over a span of five centuries? Which styles represent earlier phases, and which embody the latest technical innovations? In 2015, the authors initiated their fieldwork in the southern part of northwestern Iran, a region with a rich tradition of pottery production. Field surveys led to the identification of more than 20 sites containing substantial remains of Sgraffito pottery. Among these sites, Aghcheh Rish was selected for excavation, making this research the first archaeological project in Iran specifically aimed at identifying and excavating Sgraffito pottery production workshops. Accordingly, the research was based on the analysis of Sgraffito pottery finds recovered from the excavations. Excavations revealed a complex dating from the 9th to 14th centuries CE. Finds included multiple pottery kilns, extensive quantities of Garrus and Agh Kand wares , residential structures, workshop buildings, kiln-support tools such as bars and tripods, glass bracelets, 10th-century coins, tombs, and a historical cemetery. The presence of both domestic and industrial features provides valuable insight into the organization of pottery production and the daily lives of the craftspeople. This article first examines the workshop activities at Aghcheh Rish, offering rare archaeological evidence of Sgraffito production in Iran, and then presents a detailed typological analysis of the pottery assemblage, contributing to a deeper understanding of its technological and chronological development

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1. Introduction

The production of sgraffito-type pottery, characterized by its decorative technique of scratching or incising designs into the surface of the clay before firing, represents a significant aspect of ceramic craftsmanship in medieval Iran. The period spanning the 9th to the 14th centuries CE witnessed the flourishing of distinct regional pottery traditions, with sgraffito pottery being a key element in the cultural and economic landscapes of the time. The Aghcheh Rish site, situated in the northwest of Iran, offers a valuable opportunity for understanding the dynamics of pottery production in this period, particularly through the lens of archaeological and archaeometric investigation. Recent archaeological excavations at Aghcheh Rish have uncovered evidence of pottery workshops that date from the early Islamic period through the late medieval era. These workshops are of particular interest because they appear to have been centers for the specialized production of sgraffito ceramics, a craft that involves both skillful artistry and precise technological knowledge. The stratigraphy of the site, coupled with a diverse assemblage of pottery fragments, provides critical data on the continuity and change of production techniques over several centuries. The integration of archaeometric methods, such as petrographic analysis and chemical profiling of ceramics, enables a deeper understanding of the materials, firing techniques, and trade patterns associated with these workshops. This study aims to present new insights into the technological, economic, and social aspects of pottery production at Aghcheh Rish, contributing to the broader discourse on the role of craft production in the medieval Islamic world. Through both traditional archaeological methods and advanced scientific techniques, the research seeks to shed light on the interplay between local traditions and broader regional influences in the context of pottery production.

2. Project Aims and Methodology

The primary objective of the excavation was to investigate the archaeological deposits at the Aghcheh Rish site, identify earlier occupation layers, and analyze the sequence of activities. This included recovering artifacts to refine the chronological framework and workshop practices, as well as adding to the regional pottery typology. Understanding the social context of Sgraffito pottery makers was also a significant aim. With a permit for sondages, 23 trenches were planned and designated with letters (1–23). Of these, trenches 4, 9, 10, 11, 16, 17, 18, and 21 were explored in detail, while trench 4 was later abandoned in favor of work in other areas. Trenches 4 and 18 revealed pottery kilns, while others uncovered building structures, a stone floor, and an underground cistern. Trenches with surface scatters of kiln slag, bars, and wasters were targeted for evidence of pottery workshops.

3. Geographical Location of the Site

The southern part of Eastern Azerbaijan Province, Iran, has historically been a crucial connection between northwest Iran, the Caucasus, Anatolia, central Iran, and Transoxiana (Figs. 1-2). This strategic location led to the establishment of major cities such as Maragheh, Takht-i Suleiman, Soltaniyeh, and Ujan, which served as capitals of Iran during the Middle Islamic period (14th–

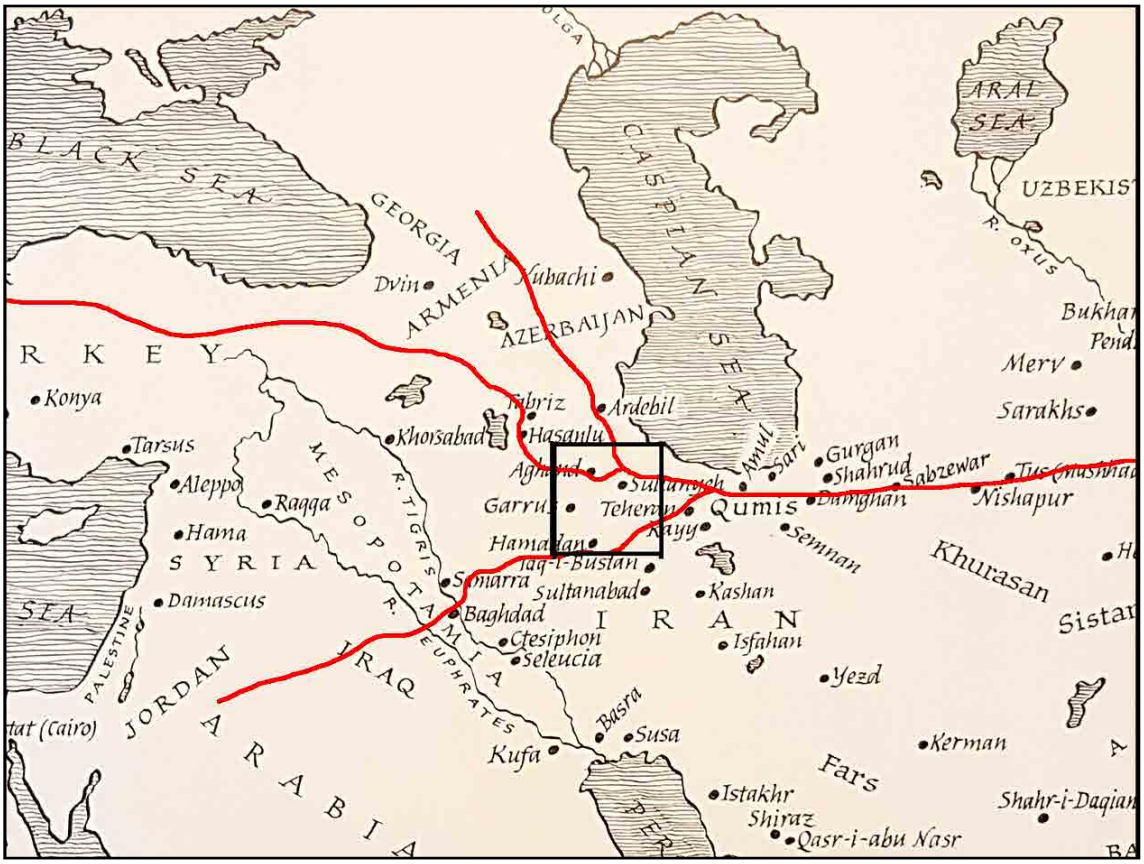
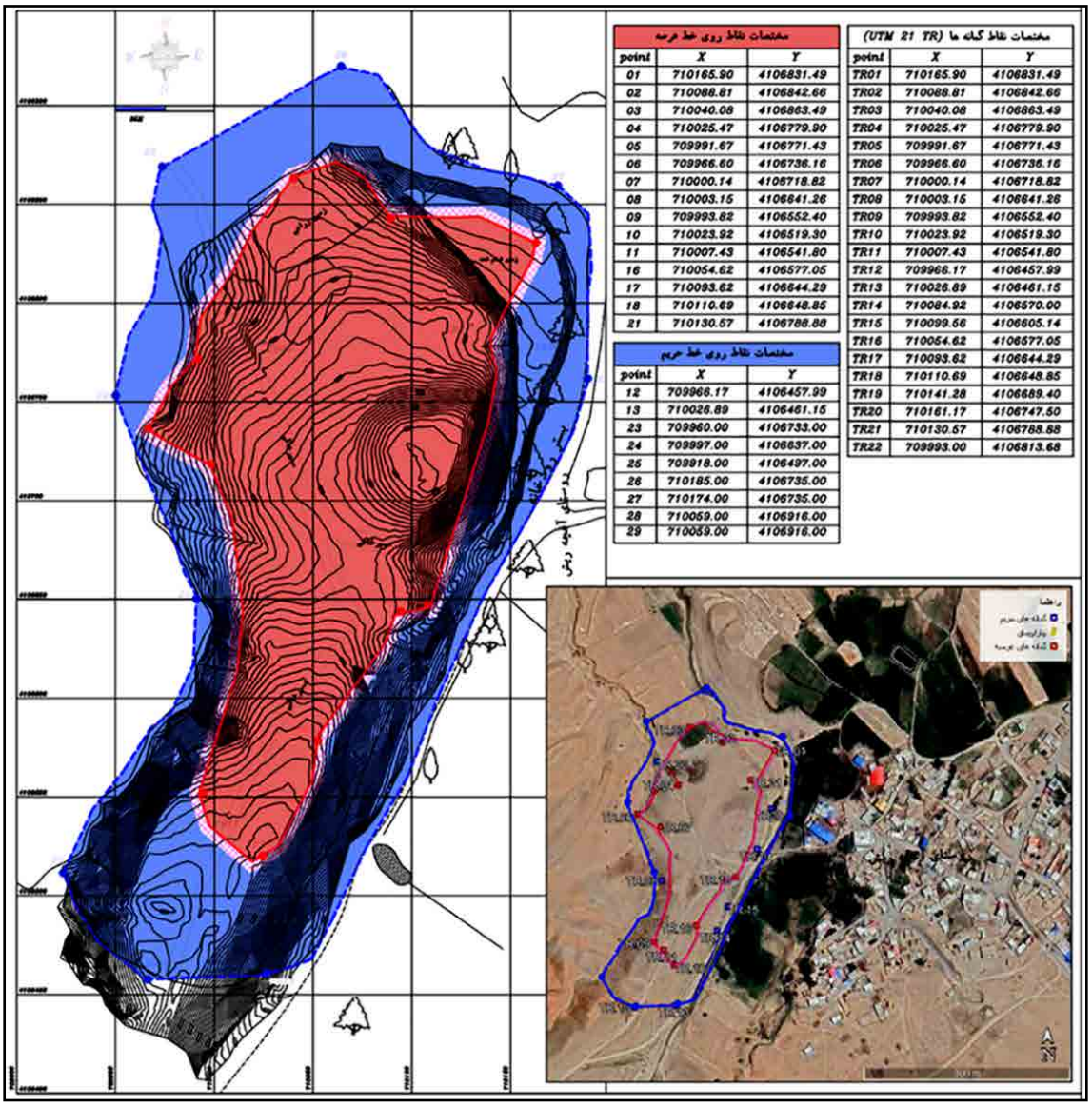


Fig. 1: The location of the south of northwest Iran, where many important east-to-west routes, including the Silk Road, have passed through its territory (Naumann, 1976: 7).



Fig. 2: The location of Aghcheh Rish site and early capitals of the Mongols (Waksman & Kazempour, 2025: 15).

16th centuries) and were also centers of pottery production, including Takht-i Suleiman. The Aghcheh Rish site, situated west of the present-day village of Aghcheh Rish (Charoymagh County, Eastern Azerbaijan Province) (Fig. 3), lies at the intersection of northwest Iran, central Iran, and the Caucasus and Anatolia. Its proximity to key historical sites, such as Takht-i Suleiman[1] (south), Maragheh[2] (west), Agh Kand[3] (east), and Ujan[4] (north), underscores its importance in the production and distribution of Sgraffito pottery during the 9th–14th centuries.



مختصات نقاط روی خط حرمه

point	X	Y
01	710165.90	4106831.49
02	710088.81	4106842.66
03	710040.08	4106863.49
04	710025.47	4106779.90
05	709991.67	4106771.43
06	709966.60	4106736.16
07	710000.14	4106718.82
08	710003.15	4106641.26
09	709993.82	4106552.40
10	710023.92	4106519.30
11	710007.43	4106541.80
16	710054.62	4106577.05
17	710093.62	4106644.29
18	710110.69	4106648.85
21	710130.57	4106788.88

مختصات نقاط روی خط حریم

point	X	Y
12	709966.17	4106457.99
13	710026.89	4106461.15
23	709960.00	4106733.00
24	709997.00	4106637.00
25	709918.00	4106497.00
26	710185.00	4106735.00
27	710174.00	4106735.00
28	710059.00	4106916.00
29	710059.00	4106916.00

مختصات نقاط گمانه ها (UTM 21 TR)

point	X	Y
TR01	710165.90	4106831.49
TR02	710088.81	4106842.66
TR03	710040.08	4106863.49
TR04	710025.47	4106779.90
TR05	709991.67	4106771.43
TR06	709966.60	4106736.16
TR07	710000.14	4106718.82
TR08	710003.15	4106641.26
TR09	709993.82	4106552.40
TR10	710023.92	4106519.30
TR11	710007.43	4106541.80
TR12	709966.17	4106457.99
TR13	710026.89	4106461.15
TR14	710084.92	4106570.00
TR15	710099.56	4106605.14
TR16	710054.62	4106577.05
TR17	710093.62	4106644.29
TR18	710110.69	4106648.85
TR19	710141.28	4106689.40
TR20	710161.17	4106747.50
TR21	710130.57	4106788.88
TR22	709993.00	4106813.68

Fig. 3: The topography of the Aghcheh Rish site and its location to the west of the present-day Aghcheh Rish village (Kazempour, 2023: 78).

4. Typology of the Sgraffito Wares at the Aghcheh Rish Site

Sgraffito ware was very popular and widespread across almost all of the Middle East. In subsequent periods, several versions were developed in Iran and Central Asia, and later during the Mamluk era in Egypt (Bongianino, 2014) Sgraffito was continuously manufactured in both Iran and Central Asia up until the Mongol invasion, after which its production ceased. Several types

of Sgraffito were produced in Iran and can be divided into the following groups: simple Sgraffito over a colored ground slip coated with a clear, colorless glaze; the green-painted so-called Amol group; the carved or Champlevé vessels; and the so-called Aghkand ware (Fehervari, 2000: 81). A white engobe covers the inner surface of the bowl and stops just below the exterior rim. The design was incised into the engobe and filled with green, yellow, and purple glazes. The incised lines prevented the colored glazes from running into adjacent areas. The most obvious prototype for Sgraffito wares is metalwork. Many earlier examples feature motifs almost identical to those seen on metal objects (Atil, 1973: 49). These vessels were made on a wheel and shaped from a ceramic mass composed of fine-grained clayey material slightly rich in carbonate. The body also contains fragments of quartz, potassic feldspar minerals, and volcanic rocks.

4-1. Style I: Incised Decoration under Glaze (Simple Sgraffito)

From the 9th century CE onward, the production of sgraffito ware became common throughout the eastern Islamic world, particularly in Iran (Horton, 1996; Whitehouse, 1974; Vroom, 2005). Between the 9th and 14th centuries, the manufacture of sgraffito pottery in Islamic regions such as Iran[1], Iraq, Egypt, and the Levant—as well as in Christian areas such as Anatolia and Greece[6]—attests to the widespread distribution of this technique (Figs. 4-5). Due to its lower cost compared to other ceramic types (such as lusterware), it gained popularity among different social strata (Lane, 1973). Archaeological findings from Samarra indicate the large-scale production of this pottery in Iraq, and it is probable that a significant portion of such wares was distributed from Samarra. Some scholars, however, believe that this style was influenced by Central Asian and Sasanian pottery traditions and reached full development in Iraq (Allan & Robert, 1987). Sgraffito motifs in Iran and Iraq were often simple yet expressive, employing decorative elements such as spirals, blooming flowers, and geometric lines. At the site of Aqche Rish, a considerable portion of the pottery assemblage belongs to the category of incised decoration under a transparent glaze (simple sgraffito). These wares were decorated using a lead glaze and the technique of scratching designs onto a white slip layer, producing patterns through simple engraving (Vroom, 2005: 176; Kennet, 2004: 34). The forms were mostly small utilitarian vessels for everyday use—such as bowls, cups, beakers, and shallow plates. This change may indicate a shift in consumption patterns and dining or serving practices during this period, which were based on pastoralism (Vroom, 2014). The large quantity of animal bones recovered from the cultural layers of Aqche Rish also points to a livelihood based on animal husbandry. The glazes used for this type of pottery generally ranged in color from green, turquoise-blue, and buff to, more rarely, dark brown. At Aqche Rish, brown-glazed vessels were found in cultural layers dated to the 9th–10th centuries CE (Fig. 6). These seem to have been influenced by Chinese pottery traditions of the 8th–9th centuries CE. Brown-glazed ceramics were imported into Islamic lands—including Basra, Siraf, and Samarra—during the 9th century but were soon imitated by Muslim craftsmen, who adopted this glaze for use on incised-decoration wares. At Aqche Rish, many of the simple sgraffito wares feature a turquoise-green glaze. During glazing, due to poor control, the glaze often ran and accumulated

more thickly in certain parts of the vessels, particularly on the base and outer body. They were produced on a slow potter's wheel, with a buff-colored body. The exterior surfaces often display pores, and cracks in certain areas suggest that either the clay used was of poor quality or firing temperatures were not properly controlled. The temper used was mineral (sand and quartz), and proper firing was sometimes achieved. The decorative motifs are mainly geometric—parallel lines, intersecting lines, zigzags, and concentric circles being the most common (Fig. 7). To create these patterns, the vessel surface was first coated with a thin layer of slip, and then designs were incised into a red-bodied ware covered with a thin lead glaze. In some cases, black pigment was applied to the incised surface, enhancing the clarity of the design beneath the transparent glaze. Alongside geometric motifs, abstract and simplified vegetal patterns also appear, such as gently curved branches ending in a leaf—among the most common plant designs at Aqche Rish. Based on fabric analysis and comparison with published examples, much of the simple sgraffito pottery from Aqche Rish was produced locally, with some vessels supplied by other workshops. Their similarity to types found at Siraf, Gorgan, Shahr-e Belqis, Nishapur, Sirjan, and Susa supports this assumption (Stein, 1932: 90–91). Unlike some later sgraffito examples that feature human and animal motifs (such as vessels from later Byzantine Anatolia), the simple types from Aqche Rish contain no depictions of humans or animals. This absence likely reflects cultural–religious restrictions or the lack of direct connections with production centers influenced by Byzantine or Mediterranean art (Waksman et al., 2017; Kennet, 2004: 34), where human and animal motifs were common.



Fig. 4: Earthenware covered with a white slip with incised decoration under a transparent green glaze (Style I), Iran (Nishapur), 10th century (Watson, 2020: 140, Fig. 73).



Fig. 5: Bowl, simple Sgrafiato, under green glaze (Style I), Iran, 11th-12th century (Fehervari, 2000:84, No.84).

4-2. Style II: Incised Splashed Sgraffito

The transfer of pottery technologies through trade routes and diplomatic gifts led to the merging of the splashed-glaze technique with underglaze incised decoration, resulting in the creation of a new style by Muslim artisans in the 10th century CE, known as incised ware with splashed glaze,



Fig. 6: Earthenware covered with a white slip with incised decoration under a transparent green and brown glaze (Style I), Iran (Aghcheh Rish site) (Kazempour, 2020: 70).

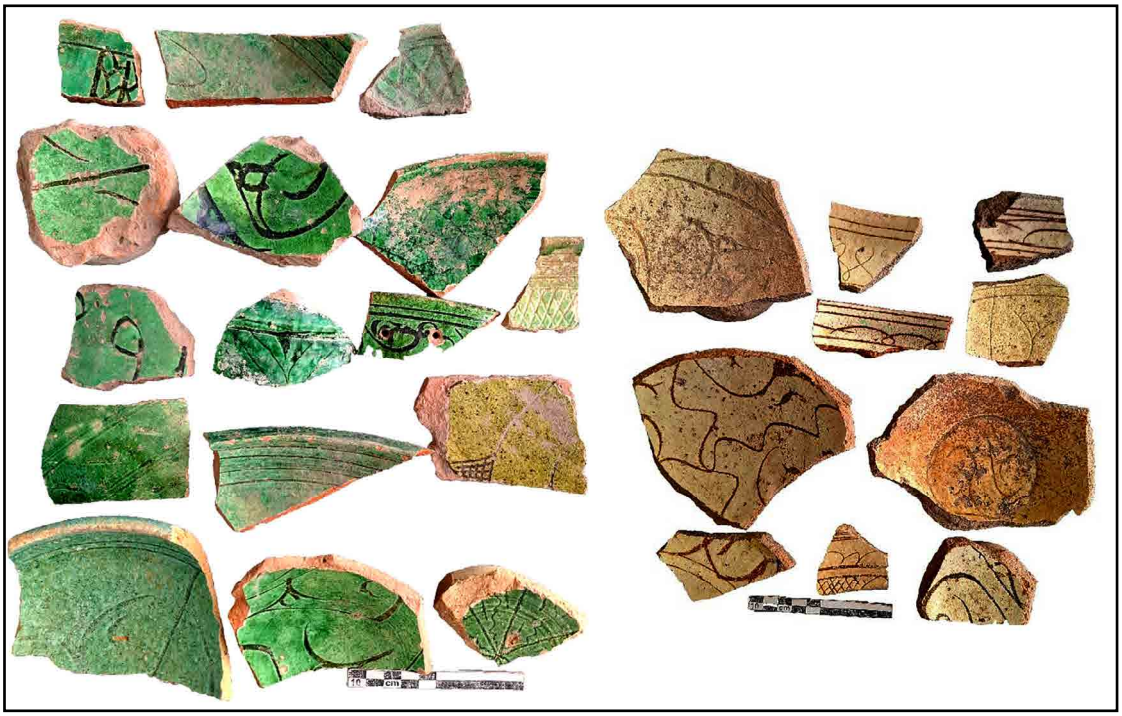


Fig. 7: Pottery with insiced decoration under transparent green glaze (Kazempour, 2020: 98).

or the so-called "Samarra style". Understanding the origin and the reasons for the popularity of this type of decoration in that period requires a broad view of the cultural, artistic, and regional as well as interregional trade networks of the time. In the 9th century CE, the settlement of Chinese artists in the court of the Abbasid caliphs coincided with the flourishing Tang dynasty in China (7th–10th centuries CE) (Fig. 8). Techniques such as splashed glaze entered the Islamic cultural sphere and were gradually localized by Iranian artisans, particularly in areas such as Nishapur, Ray, Jurgan, and other cities along the Silk Road (Karimi & Kiani, 1985: 21). Examples from Nishapur (Wilkinson, 1973: 256, Fig. 10), Fustat (Scanlon & Kubiak, 1989: 48), and Siraf (Rougeulle, 2005: 17) also indicate that cultural and commercial interactions between the Islamic world and China laid the groundwork for the formation of the Islamic splashed-glaze tradition. This tradition is especially recognized within the framework of the "Samarra Horizon" as a distinct artistic movement inspired by Chinese ceramics. In some cases, actual Chinese pieces may even have been imported, though more detailed technical studies are still required to confirm this (Wilkinson, 1973: 256–257).

On the other hand, the influence of this artistic tradition was not confined to the Abbasid Caliphate. Recent studies show that cultural centers in the South Caucasus, including cities such as Ani in Armenia, Shamkir in Azerbaijan, and Tbilisi in Georgia, produced in the 9th–10th centuries a type of glazed pottery with splashed-incised decoration strikingly similar to Islamic examples from centers such as Baghdad, Samarra, and Nishapur (Hubbert, 2024). This reflects the broad cultural influence of the Abbasid Caliphate in the Caucasus and, at the same time, highlights the role of ceramics as a tool for constructing individual and political identity in societies that were gradually emerging as independent kingdoms during this period. Culturally, just as in the Caucasus the use of splashed-glaze pottery was regarded as a symbol of social distinction and political identity (Hubbert, 2024), in the Islamic world these ceramics were also perceived as luxury objects with symbolic value, representing the social standing of their owners. This pottery was not confined to Islamic territories; within the Byzantine sphere of influence—especially in the Middle Byzantine period—it became a defining ceramic type. Based on examples from Aqche Rish, this style is very similar in form and decoration to simple sgraffito, with the difference that in this type vegetal motifs and pseudo-inscriptions were very common. Archaeological findings from Aqche Rish show a large quantity of glazed pottery with splashed decoration dating to the 10th–11th centuries CE, indicating the popularity of one of the most important ceramic decoration techniques in the Islamic world during this period. Most examples have green splashed glaze, although brown is also common. In terms of vessel forms, bowls, plates, and small jars are the most frequent. In glazing these vessels, the use of a single-color buff glaze was common, whereas in simple sgraffito green predominates (Fig. 9). Therefore, the splashed-glaze wares from Aqche Rish can be seen both as a reflection of East–West artistic interactions and as evidence of the active role of local elites in recreating and localizing imported styles. Overall, the origin of the splashed-glaze pottery from Aqche Rish should be sought in the connection between Chinese artistic traditions (particularly Tang sancai), the innovations of Iranian artisans, and the broad cultural

influence of the Abbasid Caliphate in the Caucasus and beyond. Within this framework, due to the geographical location of Aqche Rish, the site can be interpreted not merely as a consumer of imported artistic products, but as an active node in the network of cultural transmission from East Asia to the Caucasus and other parts of the Islamic world (Fig. 10).



Fig. 8: Pottery with insiced under glaze and splashed glaze, Tang daynasty, Chine 825-50 (Ming-liang, 2011: 165, Fig. 113).



Fig. 9: Pottery with insiced under glaze and splashed glaze, 9th century, Nishapur (Wilkinson, 1973).



Fig. 10: Incised splashed Ware (Style II), Iran, Aghcheh Rish site (Kazempour, 2020: 102).

4-3. Style III: Two Slip-Carved Vessels (Champlevé/Garrus)

This style consists of earthenware with incised and carved decoration through a white and green slip under a transparent glaze, dating from the 11th to 14th centuries. During this period, a type of ware known as Garrus was produced, characterized by surface carving. In this technique, slip was first applied to the pottery's surface, and once dried, ornaments were incised using sharp tools. The incised areas absorbed more glaze, resulting in darker borders around the motifs and giving the designs a semi-embossed appearance. The motifs on these vessels include plant, geometric, human, animal, and inscriptional designs. The central workshop for this pottery group was an area called Garrus, located in the south of northwest Iran (Grube, 1976) (Fig. 11). This area, named after the nomadic Garrus tribe, served as their winter camp and covered a significant part of southern northwest Iran. This pottery type is also known by the misnomer " Champlevé/ Garrus," a term that actually refers to a metalworking technique it seeks to imitate (Jenkins, 1983). The designs are carved from the white or colored ground slip, representing an evolution of sgraffito decoration. Instead of simply incising designs into the slip, larger areas were carved out, and the surface was then coated with a transparent glaze—usually green, yellow, or brown. On some pieces, the carved-out areas were painted in red or brown, creating a striking color contrast. In Iran, this pottery type was historically known as Guebri ("fire-worshippers") due to the assumption that it was created and used by Zoroastrians (Jenkins, 1983).

For some time, it was mistakenly believed to be pre-Islamic, specifically late Sasanian, because a few vessels featured fire-altars and Pahlavi inscriptions. However, it is now evident that these carved wares were produced during Islamic times, likely in the 12th and early 13th centuries. It is believed that these vessels were made in northwestern Iran, in the Garrus district or the triangle roughly formed by Hamadan, Kermanshah, and Zanjan. In one of her recent studies, Marilyn Jenkins proposed an earlier date for Champlevé/Garrus and Agh kand wares. Her dating is based on rich finds from a shipwreck excavated off the Turkish coast near Rhodes in 1977. The shipwreck yielded numerous coins, glass vessels, glass weights, and pottery, including 10 Champlevé/Garrus vessels. According to Jenkins, the decoration on these pieces closely resembles that of the late 10th or early 11th centuries. Apart from a few vessels with pre-Islamic motifs, the decoration of these wares commonly includes scrollwork, Kufic inscriptions, and figural representations (Fehervari, 2000: 87) (Figs. 12–13). This group of pottery is very common at the Age Cherish site, featuring green, brown, and yellow glazes. The scratched motifs typically include vegetal, geometric, and animal designs, with abstracted vegetal motifs being especially prevalent. Without any inscriptional elements, animal motifs—often mythical creatures—are also quite common. In terms of chronology, these wares were found in the upper layers above the simple sgraffito-type pottery (Fig. 14). Archaeometric studies indicate that Champlevé/Garrus -type pottery was not domestically produced at the Agcheh Rish site. Instead, while simple sgraffito pottery was locally made, Champlevé/Garrus -type pottery was imported from neighboring regions.

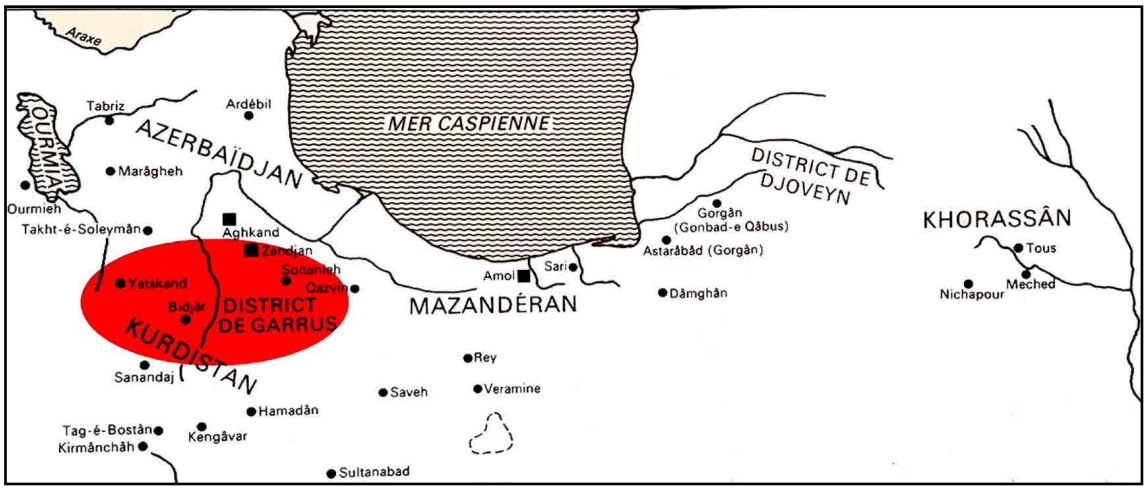


Fig. 11: The location of the Garrus region in the south of northwest Iran, where Garrus-type pottery (Style III) was produced between the 11th and 12th centuries CE (Soustile, 1985: 67).



Fig. 12: Champlevé/Garrus ware (Style III) from Shekh Tepeh Urmiye site (south of northwest Iran), 12th century (Iranian national Museum, 2024).



Fig. 13: Champlevé/Garrus ceramic ware (Style III), Body in terracotta with engraved designs, white slip painted brown under a yellowish, lead based glaze, North-west Iran, 12th century (Grube, 1976: 119, Fig.36).

4-4. Style IV: Bowls with Incised Decoration and Polychrome Glazing and Painting (Agh Kand)

During the medieval period, "the movement of skilled workers and goods generated new fashions, new market demands, and the manufacture of new products" (Burlot & Waksman, 2021). A well-known type of pottery is generally associated with the town of Aghkand, near Tabriz (Kazempour, 2023: 98) (Fig. 15). This type originates from a small village in Iranian Azerbaijan, where it is claimed that this variation of sgraffito was made. Unlike the earlier examples—except, perhaps, for some bichrome Amol ware—this type is colorful, painted in polychrome using yellow, brown, green, and occasionally brownish-red colors. The incised lines in the decoration serve the same purpose as copper wires in cloisonné metalwork, keeping the different colors separated in their designated areas. The majority of vessels are large plates or dishes, typically decorated with birds

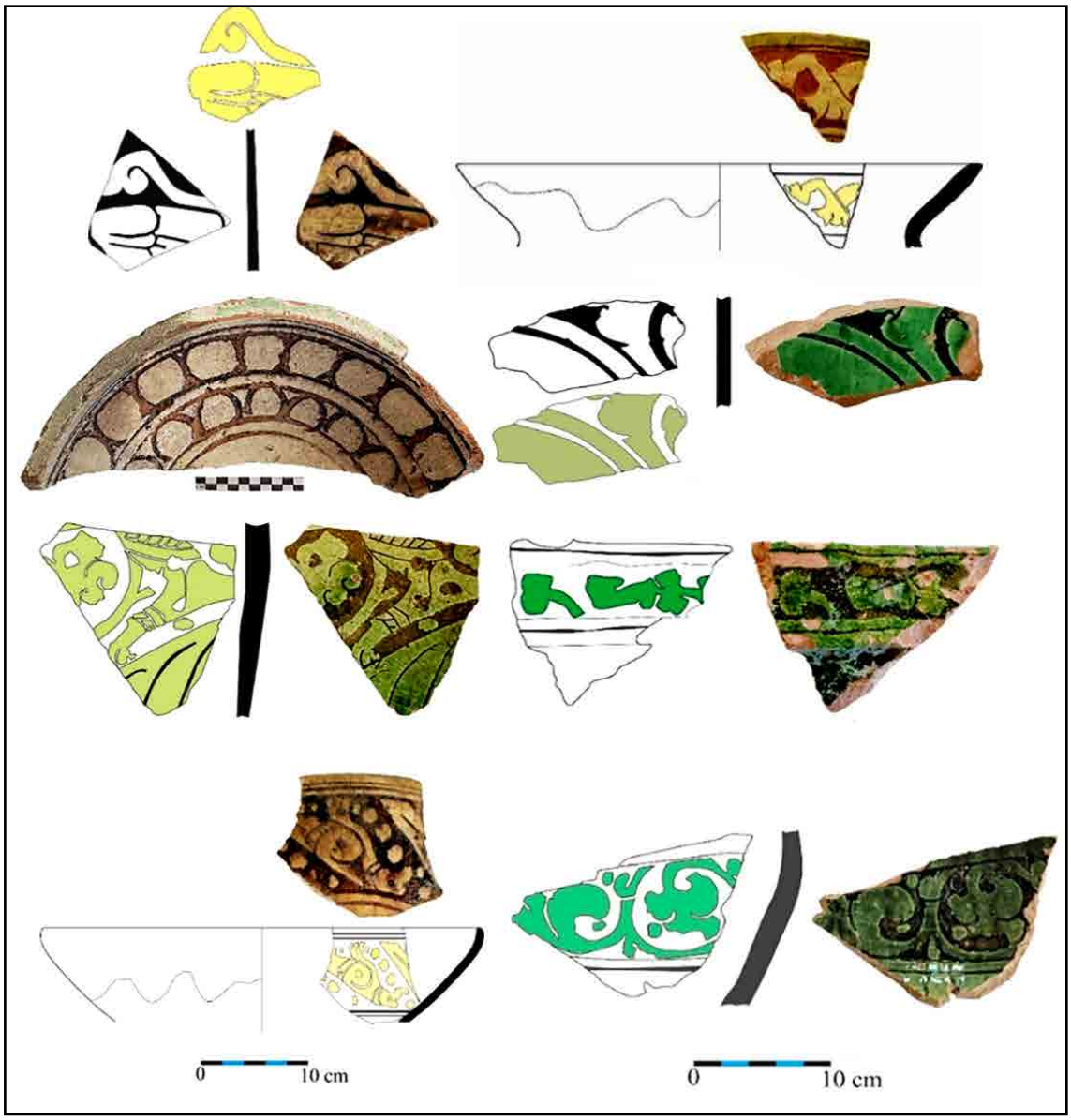


Fig. 14: Champlevé/Garrus ware (Style III) from Aghcheh Rish site (Kazempour, 2020: 134).

or animals. Among this group, there is a dated piece in the Islamic Museum in Berlin bearing the date 528 AH/1134 AD. Another bowl in the Louvre bears the signature of an artist, a certain Abu Taleb (Fehervari, 2000: 89). These vessels are decorated with designs engraved with a sharp tool through a heavy slip and colored with polychrome glazes that are carefully applied to specific features of the pattern—for example, brown for the bird, green for the floral scroll, and yellow for the background. This style represents another variety of the Muslim potters' repertoire, where polychrome designs are carried out with colored glazes on the surface rather than through underglaze painting. This antiquated technique links the ware to an earlier, pre-Seljuq tradition, even though a single dated piece in the Berlin Museum collection places it clearly in the twelfth century (Grube, 1976: 111). Incising through the pottery slip was one of the early and common techniques developed by Muslim potters during the 10th–14th centuries. The motifs often include

large birds and animals surrounded by plants and busy backgrounds, covering the base of the wares. In this technique, the glaze of the central and main motif contrasts with that of other parts of the dish, creating a form of demarcation around the motif and giving the dish a polychrome appearance. After firing, the pottery was glazed with different colors within the motifs, enhancing its visual appeal. The most common and characteristic form of Port Saint Symeon Ware consists of hemispherical bowls of standard size and shape, with a ledge rim, a slight ridge at the joint between the body and rim, and a low ring base. For decoration, potters used the sgraffito technique, incising the main motifs into the slip that covered the surface, then emphasizing these patterns with motifs painted in yellow-orange, brown, green, and sometimes dark purple. The entire decoration was covered with a transparent glaze. The iconography consists of floral, astrological, or heraldic patterns, human and animal figures, and fantastical creatures. This style reflects the influence of Seljuk, Mongol, Christian, and Islamic traditions, creating a unique multicultural decorative program, generally secular in nature. This made the pottery a commercial product accepted by a wide variety of consumers across different geographical and religious backgrounds (Burlot & Waksman, 2021). Unlike Garrus-type pottery, which is common at the Agcheh Rish site, Agh Kand pottery is rare. Some pieces were found only in the upper layers of the trenches

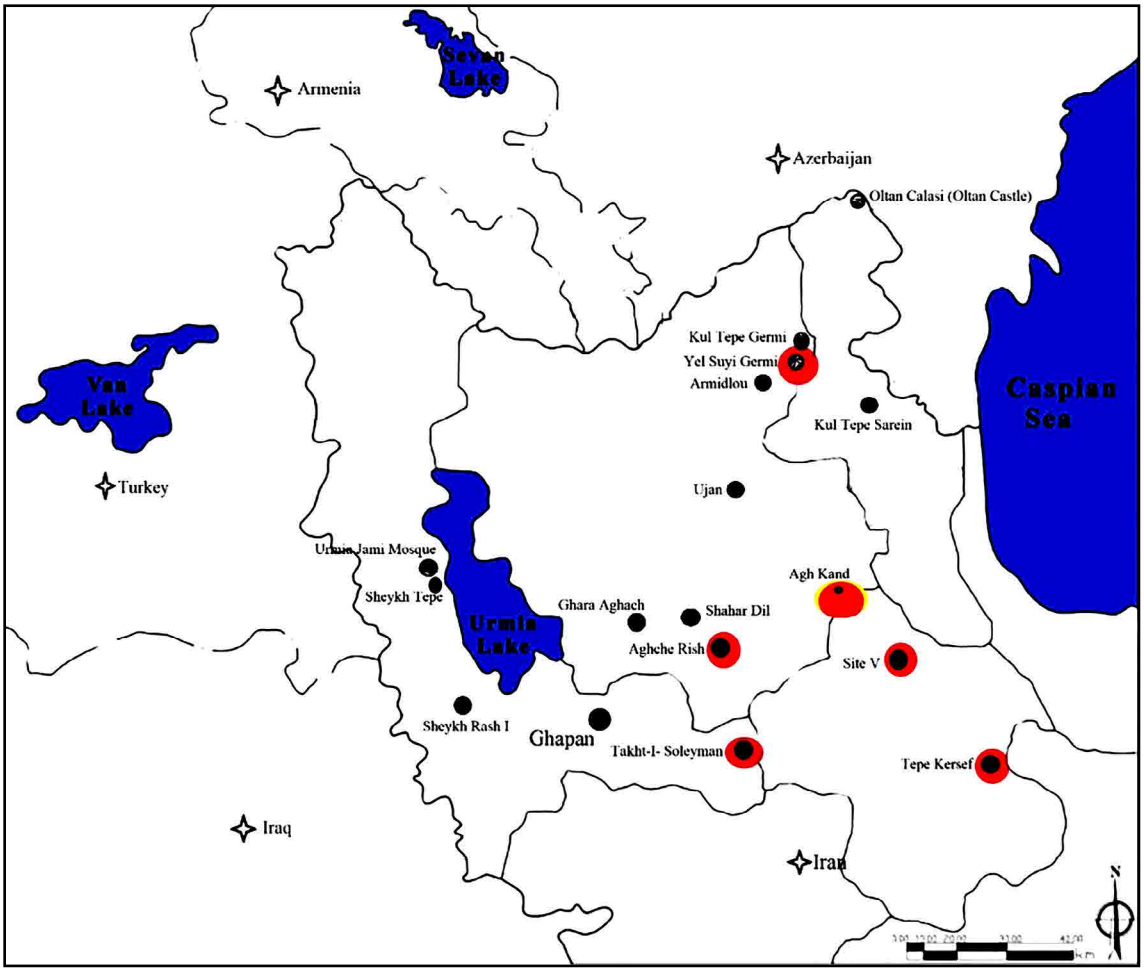


Fig. 15: The dispersion of the Agh kand type pottery (Style IV) in North West Iran and the location of the Agh kand region, where this type of pottery produced there between 11-14th centuries (Kazempour, 2024: 35).

or on the surface of the site. One piece even featured an inscription motif, which was uncommon in earlier types (Figs. 16-17). Archaeometric studies conducted on a piece of Agh Kand pottery from the Agcheh Rish site confirmed its local production. Despite its limited distribution at this site, the Agcheh Rish site was one of the centers of Agh Kand pottery production workshops. Chronologically, this type of pottery was found in the upper layers of the trenches (Fig. 18), representing the final evolutionary stage of sgraffito-type pottery.



Fig. 16: Agh kand type pottery (Style IV), Iran, 12th centuries (Soustile, 1985: 71).



Fig. 17: Agh kand type pottery (Style IV), Iran, 12th centuries (Grube, 2012: 22).



Fig. 18: Agh kand type pottery (Style IV), Iran, Aghcheh Rish site, 12th centuries (Kazempour, 2024: 30).

5. Aghcheh Rish Pottery Workshop Activity

there is a lack of detailed information about pottery kilns and equipment related to pottery-making in archaeological reports. Consequently, the number of excavated kilns that have been published is limited, and the examples do not represent all periods. Furthermore, most descriptions of known kilns are very brief. Joseph R. Caldwell is one of the few archaeologists in the field of Iranian archaeology who has paid close attention to this subject. Besides providing a detailed description of his excavated kiln, he made ethnographic observations in a pottery workshop in the bazaar of Kashan (see: Caldwell, 1967: 397). Similarly, Rudolf and Naumann, in their excavation at Takht-e Suleiman (1959), included observations on kilns (Fig. 19). During the fourth session of excavation at Siraf (10th century AD), the remains of thirty kilns were uncovered (Whitehouse, 1974: 15). Andrew Williamson's excavation at Sirjan (1970), Nishapur, Kashan (Bahrami, 1988), Jurjan (Mortezaei, 2002), Moshkouyeh (Nouri Shadmehani, 2019) also yielded significant findings (Allan & Roberts, 1987). Additionally, several Islamic cities, which served as the capitals of Iran during the early and middle Islamic periods, were centers for pottery workshops, including Neishabur, Jurjan (Mortezaei, 2002: 78) (Fig. 20), Ray, Sous, and Estakhr. At Sirjan (Amirhajloo & Sedighian, 2023), the study and analysis of materials found in one of the earliest Islamic glazed ceramics workshops, dating to the second half of the 9th century, revealed significant details about production methods. The findings included fritting vessels, kiln furniture, wasters, slags, and a glass chunk, shedding light on the materials and techniques used.



Fig. 19: Pottery kiln at Takht-e Suleiman (Naumann, 1976: 64).



Fig. 20: Remains of a pottery killn at Jurjan, excavated by Dr. Mohammad Yousef Kiani in 1974 (photo Geza Fehervari) (Fehervari, 2000: 41, Plate H).

5-1. Furnace

At the Aghcheh Rish site, where evidence of a furnace was observed, a trench was excavated. Trench 18 (Tr. 18) was strategically placed in the area where surface traces of burning and kiln-related structures were visible (southeast of the site). The excavation revealed evidence of a kiln, kiln bars, tripods, and a large quantity of pottery. In another trench (Tr. 04), located in the northwest of the site, two circular structures—each with a diameter of 30 cm—were discovered at a depth of -30 cm. These structures contained fired bodies and ash nearby. Fragments of sgraffito wares were found filling the structures (Figs. 21–23).



Fig. 21: Location of Aghcheh Rish pottery kiln (Kazempour, 2020: 87).

5-2. Kiln Bars

Kiln bars are essential equipment used in pottery kilns, and wherever they are found, they indicate the presence of a pottery workshop at that site. Kiln bars, mostly made of clay, are cylindrical and usually measure 2 to 4 cm in diameter. Potters used them inside kilns as supports for pottery during firing (Waksman, 2017: 45) (Fig. 24). It was expected that all Iranian historical capitals excavated



Fig. 22: Evidence of kiln at Aghcheh Rish (Kazempour, 2020: 86).



Fig. 23: Evidence of kiln at Tr.18 Aghcheh Rish (Kazempour, 2020: 88).

previously would show evidence of kiln bars. However, despite many important sites in Iran (Nishabur, Kashan, Ray, Jurjan, Sultanabad, etc.) being identified as pottery workshop centers, archaeological excavations have not typically uncovered kiln bars or other kiln-related equipment. at least, archaeological reports often do not highlight them. An exception is the archaeological excavations at Sirjan, conducted by Whitehouse in 1974 (Amirhajloo & Sedighian, 2023), where kiln bars were found and documented. Our knowledge has also been enriched by findings from sites in the Caucasus and the Golden Horde territories, where many such pieces of equipment were discovered and mentioned in archaeological reports and articles. The Aghcheh Rish site besides Middle Islamic period sites, including Jurjan (Mortezaei, 2002), Nishapur (Wilkinson, 1963), Kashan, Moshkouyeh (Nouri Shadmehani, 2019) and others is one of excavated site in Iran that has yielded kiln equipment and specialized pottery products. Not only is the site's surface filled with kiln bars, but these bars were also uncovered in two trenches (Tr. 18 and Tr. 20) during archaeological excavation. The kiln bars were located in areas showing evidence of kilns, heat exposure, and burns caused by kiln activity. All of the kiln bars are made of clay, with diameters varying from 3 to 6 cm (Figs. 25–26).



Fig. 24: Sirjan: Kiln Bars and a clay stopper found in Trench D (Allan & Roberts, 1987: 51. Plate 25).

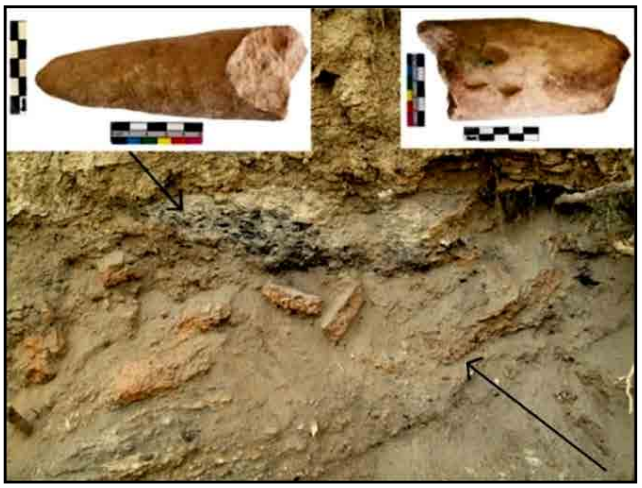


Fig. 25: Tr.18 of Aghcheh Rish site with evidence of the kiln structure as well as kiln bars (Kazempour, 2020: 80).

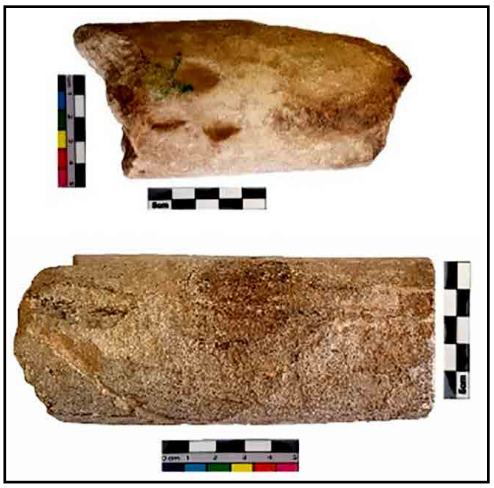


Fig. 26: Kiln bars found in Tr. 18 of Aghcheh Rish (Kazempour, 2020: 80).

5-3. Tripods

Tripods are essential equipment in pottery workshops and are used during the glazing stage (Fig. 30). Unlike in the Caucasus and Anatolia (Figs. 27–29), where archaeological reports frequently mention tripods, there are few reports of tripods in Iran. In the archaeological excavations at Sirjan a large number of tripods, along with workshop equipment and kiln bars, were found. At the Aghcheh Rish site, in Trench 18 (at a depth of -70 cm), tripods were discovered in an area that had been burned due to the heat from the furnace. On one of the three legs, there was a green glaze that had adhered during the glazing process (Figs. 30–31).

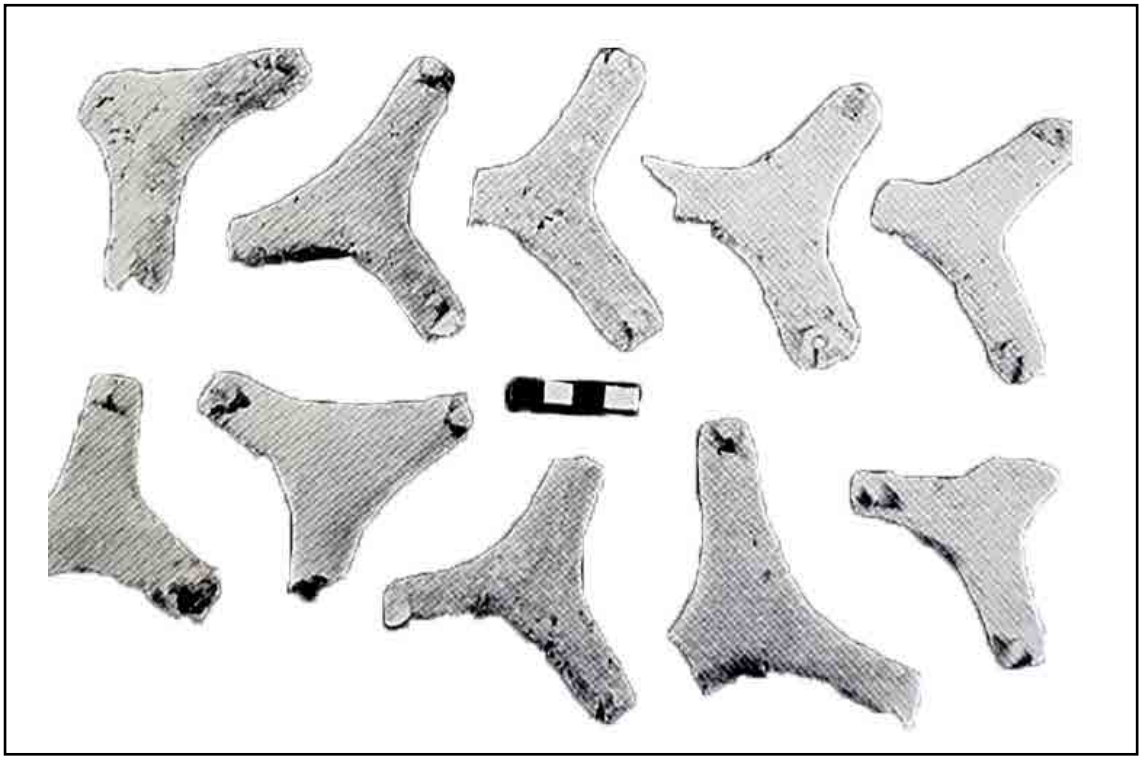


Fig. 27: Tripod from Krima (Golden horde) (Techenko, 2018:12).



Fig. 28: Tripod stilts (BZY901–902, from Ephesus (Waskman *et al.*, 2017: 667).

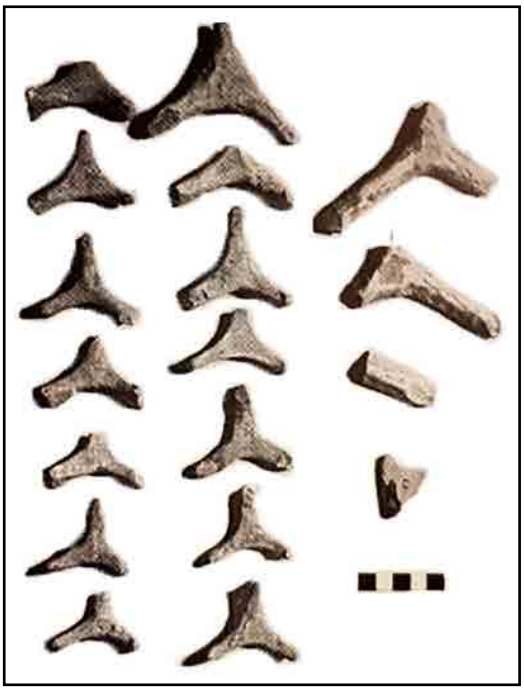


Fig. 29: Sirjan: example of the three types of pot-spacers found at Sirjan (Allan & Roberts, 1987: 51, Plate 24).



Fig. 30: Tripod from Tr. 18 Aghcheh Rish site (Kazempour, 2020: 77).

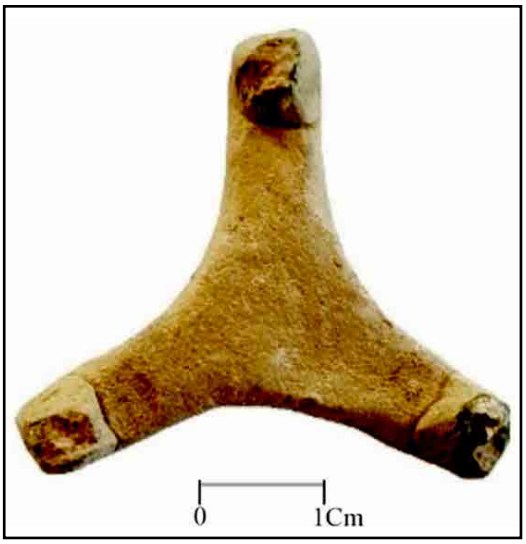


Fig. 31: Tripod funded from Tr.18 Aghcheh Rish site (Kazempour, 2020: 75).

6. Archaeometric Investigations of the Aghcheh Rish Samples

Kiln furniture—fragments of kiln rods, tripod stilts, and wasters—were found during the Aghcheh Rish excavations. These findings attest to the presence of a pottery workshop. Samples were taken for chemical analysis using WD-XRF at the Lyon laboratory and were used as local references to chemically define the pottery manufactured at Aghcheh Rish. Hierarchical clustering revealed two main groups:

• One group includes all the local references, which are identified as Aghcheh Rish production (Style V). The pottery samples consist of unglazed common wares, monochrome and polychrome sgraffito wares, and one example of Champlevé/Garrus ware.

• The second group is a very homogeneous group, distinct from the first, which includes other samples of Champlevé/Garrus wares (Style III), including all those of the Champlevé/Garrus type, as well as monochrome (Style I) and Agh Kand type (polychrome sgraffito) (Style IV) wares.

These results suggest that Champlevé/Garrus wares were imported to Aghcheh Rish from a site located in a geological context not very different from Aghcheh Rish, due to overall geochemical similarities (Waksman & Kazempour, 2025) (Fig.32).

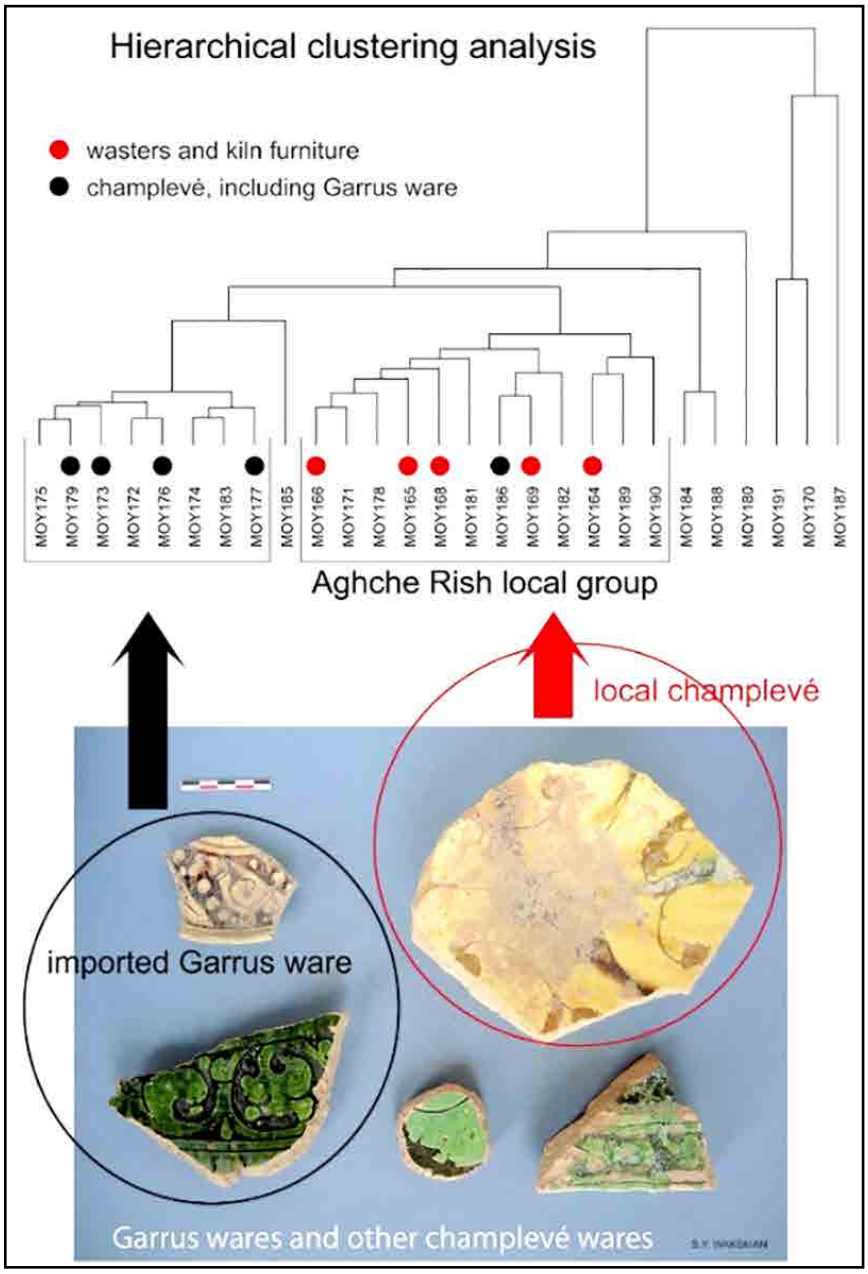
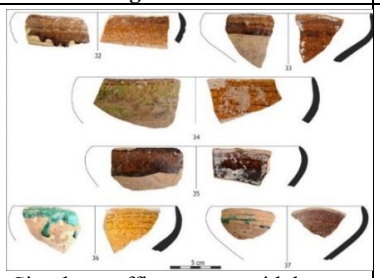
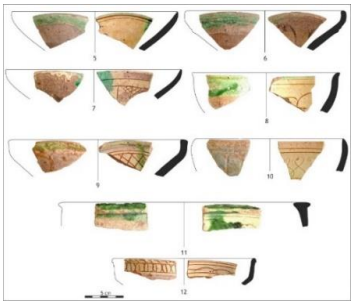
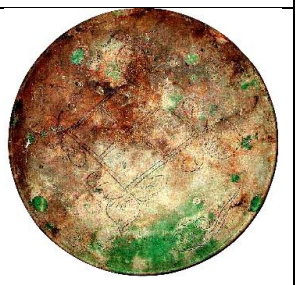
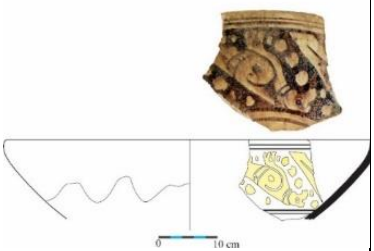


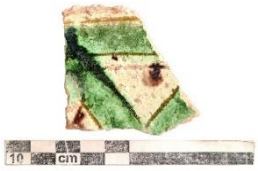
Fig. 32: Archaeometry study of the Agche Rish samples (Waksman & Kazempour, 2025).

7. Conclusion

Sgraffito-type pottery was produced for 500 years (from the 9th to 14th centuries) across a wide area of Islamic lands and was one of the most common types of pottery in that era. During archaeological excavations, large quantities have been found at Neishabur, Sirjan, Sus, Siraf, Istakhar, Takht-e Suleiman, and Sheikh Tepe Urmia, Anatolia, Egypt and Syria (Table 1). However, because the main focus in these excavations was not the study of sgraffito pottery, no information was provided regarding the presence of kilns and related equipment. The archaeological excavation at the Aghcheh Rish site is significant because its primary focus is on the production of sgraffito-type pottery, positioning this site as one of the pottery production centers. It also provides a chronology for four types of sgraffito pottery for the first time. In Trench No. 4, two round furnace structures were found along with several kiln bars. In Trench No. 18, a heated surface, a large amount of ash, and a brick structure with heavily heated bricks were discovered. Next to this structure, a tripod and a large number of sgraffito-type pottery were found, along with kiln bars. All these findings were located together, giving us a detailed understanding of the furnace structure and its related equipment. In addition to these findings, the stratigraphy of the site allowed for chronological analysis, revealing the sequence of production of different types of sgraffito pottery. Based on the stratigraphic studies, it was found that in the lower layers of the trenches (7th to 10th centuries CE), simple sgraffito pottery was more abundant, with very little Champlevé-type pottery. In the middle layers (10th to 12th centuries CE), Champlevé-type pottery was found in combination with splashed sgraffito-type pottery. In the upper layers, which are more recent (12th to 13th centuries CE), Agh Kand and Aghcheh Rish-type pottery are more abundant. Finally, to complete the archaeological studies, 25 pieces of Aghcheh Rish pottery were transferred to the laboratory at Lyon University in France for laboratory and archaeometric studies. Based on Dr. Waksman's research, it was found that the pottery from Aghcheh Rish can be divided into two groups: locally produced pottery and imported pottery. The archaeometric evidence emphasized the production of simple sgraffito pottery (first type), Aghcheh Rish-type pottery (fifth group), and Agh Kand (fourth group) in the region itself, while highlighting the importation of Champlevé/Garrus pottery. Considering the evidence of pottery kilns found in the area of Takht Suleiman and the discovery of a large number of Champlevé/Garrus -type pottery at Sheikh Tepe Urmia (which is located nearby in the southern part of the area), these two sites can be suggested as manufacturing centers for Champlevé/Garrus type pottery. Although some archaeologists have proposed the geographical area of Garrus for its production, these studies also showed that Agh Kand type pottery was a local product of this region, indicating that this area can be considered one of the workshop centers for the production of this type of pottery. Lastly, based on this study, a new type of sgraffito pottery has been added to the categories of Grobeh and Alan, called Aghcheh Rish. In terms of decoration technique, this pottery exhibits characteristics of both Garrus pottery and sprinkled glaze, and chronologically, it belongs to the 12th to 13th centuries. This type of pottery was found in the upper layers of the Aghcheh Rish area, alongside Agh Kand-type pottery, representing the final stage in the technical evolution of sgraffito-type pottery.

Table 1: Comparative study of Aghcheh Rish potteries (Authors, 2025).

Typology	Aghcheh Rish	Compared with	Compared with
Simple Sgraffito with green transparent glaze.	 Simple sgraffito pottery with brown transparent glaze, Aghcheh Rish (Kazempour, 2020: 96).	 Simple sgraffito pottery with brown transparent glaze, Siraf, 9th century (Whitehouse, 1974: 40).	 Simple sgraffito pottery with brown transparent glaze, Han district, Chine, 9th century (Wood, 1999: 170).
Simple Sgraffito with brown transparent glaze.	 Simple sgraffito pottery with green transparent glaze, Aghcheh Rish (Kazempour, 2020: 98).	 Simple sgraffito pottery with green transparent glaze, 10th century, Sirjan (Allan & Roberts, 1987: 240. B15).	 Simple sgraffito pottery with green transparent glaze, 10th century, Nishapur, (Watson, 2020: 140, Fig. 73).
Splashed Sgraffito	 Pottery with incised under glaze and splashed glaze, Aghcheh Rish (Kazempour, 2020: 100).	 Pottery with incised under glaze and splashed glaze, 9-10th centuries, (Wilkinson, 1973).	 Pottery with incised under glaze and splashed glaze, Chine, (Tang dynasty, 825-50) (Ming-liang, 2011: 165, fig. 113).
Champlevé (Garrus) type pottery	 Champleve (Garuus) technique, with mysical creatures motifs, Aghcheh Rish (Kazempour, 2020: 125).	 Champleve (Garuus) technique, with mysical creatures motifs, 12th century, Garuus district, North West Iran (Grube, 1976: 119, fig.36).	 Champleve (Garuus) technique, with mysical creatures motifs, middle bysans, 12-13th centuries (Panagopoulou et al., 2021: 4475).

Champlevé (Garrus) type pottery	 Champleve (Garuus) technique, with floural motifs (palmet), Aghcheh Rish (Kazempour, 2020: 120)	 Champleve (Garuus) technique, with floural motifs (palmet), 11-12th centuries, Nishapur (Watson, 2020: 154. Fig. 77).	 Champleve (Garuus) technique, with floural motifs (palmet), 11-12th centuries, Anatolia (Meriç, 2023: 420).
Polychrome Sgraffito (Agh Kand) type pottery	 Polychrome Sgraffito (Agh Kand type) pottery at Aghcheh Rish (Kazempour, 2020: 103).	 Polychrome Sgraffito (Agh Kand type) pottery at Ghale Yel Soui, Ardabil (Tahmasebi et al., 2023: 23)	 Polychrome Sgraffito as Anatolian Seljuk pottery tradition (Ceramics History of Anatolia, n.d.).

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Authors' Contribution

In this article, the first author was responsible for conducting the excavation, carrying out field surveys, and collecting and analyzing the data, while the second author contributed to the excavation and field surveys and was responsible for drafting and editing the manuscript.

Conflict of Interest

Authors declared no conflict of interest.

Endnote

1. Takht-e Soleymān (Throne of Solomon') or Adur Gushnasp, is an archaeological site in West Azerbaijan, Iran dating back to Sasanian Empire. The fortified site, which is located on a hill created by the outflow of a calcium-rich spring pond, was recognized as a World Heritage Site in July 2003. The citadel includes the remains of Adur Gushnasp, a Zoroastrianfire temple built during the Sassanid period and partially rebuilt (as a mosque) during the Ilkhanid period.

2. After the Mongol ruler Hulagu Khan (r. 1256–1265) had captured Baghdad in 1258, he established his residence in Maragheh. He also had an observatory built under the directorship of Nasir al-Din al-Tusi.

3. It was the center of production of Agh-Kand type pottery during the 10th to 14th centuries.

4. a new area that has recently been discovered and excavated is the city of Ujan, which has been selected and built as the summer capital of the Ilkhans due to its large meadows and also being located at the crossroads of Central Asia to Mesopotamia and northwest to the Central Plateau of Iran.

5. (e.g., Afrasiyab and Nishapur (Holakooei et al., 2019), Takht-e Soleyman (Kuntz, 2021), Ujan (Velayati et al., 2023), Aghcheh Rish (Waksman & Kazempour, 2025), Agh Kand (Kazempour, 2024), Yel Souyi (Tahmasebi et al., 2023), Siraf (Mason & Keall, 1991), Keresf Tappeh (Zifar et al., 2016) and etc.

6. Kinet Höyük (Burlot & Waksman, 2021; Blackman & Redford, 2005), Metropolis (Meriç, 2023), Aphrodisias (Öztaşkın, 2017), Sagalassos (Vionis et al., 2010), Gözlükule and Tarsūs (Bağcı, 2017), Ephesus and Çoban Kalesi (Vroom & van IJzendoorn, 2015), Istanbul (Böhlendorf-Arslan, 2013) and etc.

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چکیده

طی سده‌های ۱۰ تا ۱۴م.، سفالینه‌های نوع اسگرافیاتو در گستره‌ای وسیع، شامل: ایران، قفقاز، آناتولی و اروپای شرقی به‌طور گسترده رواج و توزیع داشته‌اند. براساس مطالعات گونه‌شناختی گروبه و آلن، این سنت سفالگری به پنج گروه اصلی تقسیم می‌شود: اسگرافیاتوی ساده، اسگرافیاتوی لعاب‌پاشیده، چامپلِوه/گَرّوس، آق‌کند و آمل. باوجود این طبقه‌بندی تثبیت‌شده، آگاهی ما از بسترهای واقعی تولید این سفالینه‌ها، شامل کارگاه‌ها، کوره‌ها، ابزارها و فرایندهای فنی، همچنان در حد فرضیه باقی‌مانده و بیشتر بر گزارش‌های تأییدنشدهٔ دلالان و عتیقه‌فروشان متکی بوده است. همچنین پیش از این، هیچ‌گونه بررسی باستان‌شناختی نظام‌مند و جامعی دربارهٔ محوطه‌های تولید این سفالینه‌ها انجام نشده بود. بدین‌ترتیب، این پژوهش در زمرهٔ نخستین پروژهٔ باستان‌شناختی در ایران به‌شمار می‌آید که به‌طور اختصاصی با هدف شناسایی و کاوش کارگاه‌های تولید سفالینه‌های اسگرافیاتو انجام شده است؛ پرسش‌های مهم پژوهش عبارتنداز: ۱) فناوری سفالگری اسگرافیاتو در طول پنج سده چگونه تحول و تکامل یافته است؟ ۲) کدام سبک‌ها بازتاب‌دهندهٔ مراحل اولیه‌تر این تحول و کدام‌یک بیانگر جدیدترین نوآوری‌های فنی در تولید بوده‌اند؟ بررسی‌های میدانی نگارندگان در سال ۲۰۱۵/۱۳۹۳م. در بخش جنوبی شمال‌غرب ایران، منجر به شناسایی بیش از ۲۰ محوطهٔ باستانی شد که در آن‌ها بقایای قابل‌توجهی از سفالینه‌های اسگرافیاتو به‌دست آمد. درمیان این محوطه‌ها، آغچه‌ریش برای انجام کاوش انتخاب شد؛ بر این‌اساس، پژوهش حاضر مبتنی‌بر تحلیل یافته‌های سفالینه‌های اسگرافیاتو حاصل از کاوش‌ها و بررسی‌های باستان‌شناختی محوطهٔ آغچه‌ریش بوده است. یافته‌های کاوش شامل چندین کورهٔ سفالگری، مقادیر قابل‌توجهی سفالینه‌های گَرّوس و آق‌کند، ساختارهای مسکونی، بناهای کارگاهی، ابزارهای مورداستفاده در پشتیبانی و چیدمان سفال در کوره، ازجمله پایه‌های میله‌ای و سه‌پایه‌ها (سدهٔ ۱۰ تا ۱۴م.)، دستبندهای شیشه‌ای، سکه‌های متعلق به سدهٔ ۱۰م.، گورها و یک گورستان تاریخی بوده است. نتایج پژوهش نشان می‌دهد وجود هم‌زمان عناصر مسکونی و صنعتی در این محوطه، اطلاعات ارزشمندی دربارهٔ سازمان‌دهی تولید سفالینه‌های اسگرافیاتو و نیز زندگی روزمرهٔ سفالگران و صنعتگران فراهم می‌کند. نتایج تحلیلی گونه‌شناختی و تفصیلی مجموعهٔ سفالینه‌ها، حاکی از مدیریت و انسجام کارگاه‌های تولید سفالِ محوطهٔ آغچه‌ریش در قرون ۱۰ تا ۱۴م. داشته است.

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