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*Beginning and development of pottery use in Upper Mesopotamia in the light of Sumaki Höyük data.* 2021. PhD Thesis, Istanbul University.

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The aim of this PhD thesis is to understand the beginning and development process of the use of pottery in Upper Mesopotamia by evaluating existing hypotheses and revealing new data gathered from Sumaki Höyük, located in the lower valley of Garzan, one of the major tributaries of the Tigris River. Over the last two decades, research has provided new insights on the beginning of pottery production and more information about the onset of the Pottery Neolithic (PN) in Southwest Asia. In this context, there are several key research questions on which this thesis focuses:

1. Is the *Early Mineral Tempered Pottery* at Sumaki at the beginning of the 7<sup>th</sup> millennium BCE locally produced or imported? What are the technological and typological similarities and differences between Sumaki Höyük and the contemporary *Early Mineral Tempered Pottery* assemblages?
2. What is the *chaîne opératoire* of the *Early Mineral Tempered Pottery*? Did the technology of these vessels change during the 7<sup>th</sup> millennium BCE?
3. What is the function of the initial pottery of Southwest Asia? What are the outcomes of the typological and organic residue analyses conducted for Sumaki pottery in relation to the subsistence and diet of the Neolithic settlers from the site?
4. To what extent do the changes in typological features of mineral tempered pottery in the 7<sup>th</sup> millennium BCE testify to regional traditions

and cultural boundaries?

5. What is the relationship between the plant tempered and *Early Mineral Tempered Pottery*? Is it possible to define a “transition” between the two?

The initial pottery of the Neolithic appeared in several settlements in Upper Mesopotamia and the Northern Levant at the start of the 7<sup>th</sup> millennium BCE (Fig. 1). The early PN settlements are generally just above the virgin soil and are attested independently from the Pre-Pottery Neolithic (PPN), which is culturally significantly different. However, the first PN at Akarçay Tepe, Tell Seker al-Aheimar and Tell Sabi Abyad demonstrates continuity from the PPN concerning architecture and chipped stones. The *Early Mineral Tempered Pottery* emerged as a new element in these settlements in the first half of the 7<sup>th</sup> millennium BCE. It seems that pottery technology was developed by other societies simultaneously and circulated in Upper Mesopotamia and the Northern Levant, while the PPN tradition continued in some parts of Southwest Asia. Despite the variability in evidence regarding settlement patterns or chipped stone assemblages, the initial pottery of Southwest Asia appears to be relatively homogenous on a number of sites and exhibits similar features. These pottery assemblages consist of mineral-tempered, hole-mouth shaped, burnished, mostly dark-surfaced vessels with lugs close to the mouth on both sides. In the second quarter of the millennium, pottery production increased, followed by the emergence of plant-tempered pottery after c. 6500 BCE. The plant tempered pottery spread throughout Southwest Asia and symbolises diversification of ware types which go in line with the appearance of regional traditions (Bader and Le Mière 2013).

The results of this research are based on the study of 42.484 pottery sherds (10.246 mineral tempered and 32.184 plant tempered) deriving from different layers of

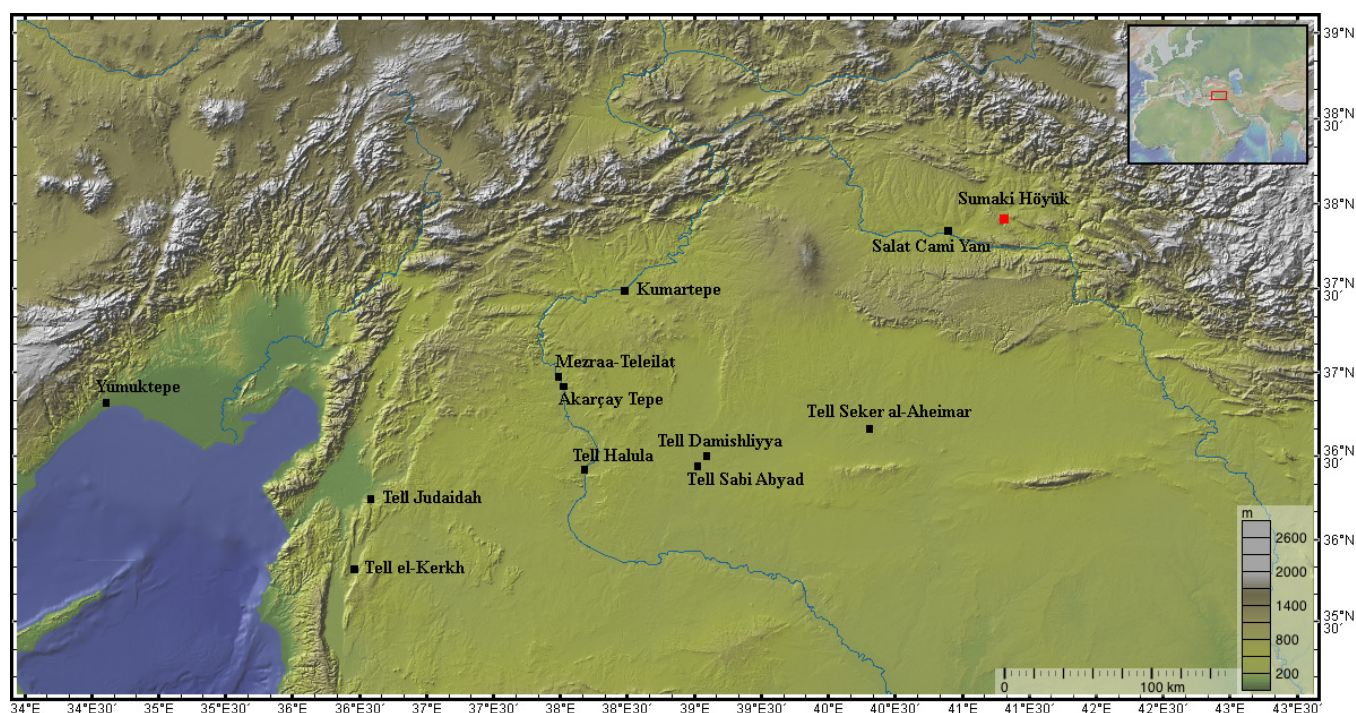


Fig. 1 Map of Early Mineral Tempered Pottery sites. (Map: Gündüzalp 2018: Fig.1)



Fig. 2 Hole-mouth wares and boxes of Early Mineral Tempered Pottery from Sumaki Höyük. Scale 10cm. (Photo: S. Gündüzalp, Sumaki Höyük Excavation Archive)

Sumaki, dating between 7327-7036 to 6350-6200/6150 BCE. Sumaki Höyük was excavated in a wide area (2.180m<sup>2</sup> in total), thus enabling a large pottery sample study (Fig. 2). In this context, Sumaki Höyük provides significant evidence for understanding the early stages of pottery production. The earliest settlement phase (N7) shows that pottery was produced in large quantities even from the initial stages of the technology, in opposition to earlier convictions. The second result is that the initial pottery did not only consist of hole-mouth shaped vessels. Boxes, which are found only at Sumaki straight from the start of the occupation, prove that different pots were probably used for particular purposes (not only for cooking) from the beginning of pottery production (Gündüzalp 2018). According to organic residue analyses, the hole-mouth pots were used for cooking or food preparation although in all likelihood these pots were multi-purpose.

There were notable changes in settlement patterns, small finds, and other cultural elements of Sumaki Höyük during the 7<sup>th</sup> millennium BCE (Erim-Özdoğan and Sarıaltun 2018). Nevertheless, there was no substantial change in the *Early Mineral Tempered Pottery* during the first half of the millennium. Bearing this in mind and regarding contemporary settlements in Upper Mesopotamia and the Northern Levant, it is possible to suggest that pottery was a valuable invention for Neolithic societies with different subsistence strategies and settlement patterns.

The mineral temper in its paste is one of the significant features of the initial pottery of Southwest Asia. Despite differences between the Early PN settlements, Neolithic people preferred mostly volcanic minerals as temper, and depending on geographical conditions and mineral sources, calcite, grit, sand, and other minerals

were used intensively. Regardless of which mineral was added to the paste, minerals with a low coefficient of expansion or close to clay minerals have always been preferred. The most commonly used mineral at Sumaki Höyük is basalt. Volcanic carbonate and calcite, albeit at a low rate, were also added to paste from the first settlement phase. Plant temper was never used in the first half of the 7<sup>th</sup> millennium BCE in the *Early Mineral Tempered Pottery*. A few sherds with plant temper were found from the beginning of the second half of the millennium, but it was always added together with basalt. Thus, it is not possible to talk about a gradual transition in the use of temper (from mineral to plant) at Sumaki Höyük. The preliminary P-EDXRF analyses of basalt temper in the sherds and the nearest basalt sources (located approximately 3km away from the mound) show close similarities. WDXRF analyses conducted on a part of the Sumaki assemblage underline the differences in trace element composition between Sumaki and other Upper Mesopotamian Early PN settlements (Gündüzalp *et al.* in prep.). These results emphasize the local production of the *Early Mineral Tempered Pottery* of Sumaki. XRD analyses point out the similar mineralogical character of the assemblage. The mineralogical analyses also show that the Neolithic pottery of Sumaki Höyük was fired probably in a bonfire, between 600-750 °C, and the firing process might have been swift.

The size and paste composition of the hole-mouth vessels and boxes did not change much during the initial stage of production. From phase N3 onwards (dating to 6534-6368 cal BCE), or in other words, after plant tempered pottery emerged in different regions of Southwest Asia, pots with everted rims and necks appeared in the *Early Mineral Tempered Pottery* group

at Sumaki in small quantities, and the boxes disappeared. In the following phase N2-N1, plant tempered Proto-Hassuna pottery was the dominant group at Sumaki, while *Early Mineral Tempered Pottery* was still in use in small numbers in the last quarter of the 7<sup>th</sup> millennium BCE. As a result, there was no transition from the *Early Mineral Tempered Pottery* to Proto-Hassuna. The Proto-Hassuna tradition did not wholly replace mineral tempered pottery, but one can suggest that plant tempered pottery had affected former mineral tempered traditions in the second half of the 7<sup>th</sup> millennium BCE.

The latest settlement layers of Sumaki Höyük contain vast quantities of Proto-Hassuna pottery. The paste components, temper choice, building and firing techniques of Proto-Hassuna pottery are considerably different to the initial mineral tempered pots. The most remarkable change lies in the amount produced; in about two hundred years, three times more plant tempered pottery was produced than mineral tempered pots were produced in over seven hundred years. With the Proto-Hassuna, the types of vessels also diversified, and specific vessels were produced for different purposes. The assemblage is similar to contemporary settlements (e.g., Yarim Tepe I, Tell Sotto, Umm Dabaghiyah, Tell Kashkashok, Salat Cami Yanı) in Upper Mesopotamia, especially those situated in the Upper Tigris Valley. According to general characteristics, the Sumaki assemblage of plant tempered wares can be defined as typical Proto-Hassuna pottery. However, as with all Proto-Hassuna settlements, the plant tempered pottery of Sumaki Höyük has distinctive features. Among the assemblage, the oval or straight bowls (which have straight and shallow or elliptic bodies) and husking-tray like vessels that may have been used for cooking are noteworthy (Fig. 3). There are no lugs, handles or firing clouds on the vessels, so these were not placed directly on the fire. These observations indicate that it was not only the choice of temper and vessel form that changed with the Proto-Hassuna pottery, but also food preparation and cooking practices.

To sum up, the thesis focuses on the first thousand years of pottery production in Southwest Asia using data gathered from Sumaki Höyük. This framework was studied using a reasonably large sample that provided a better understanding of the initial stages of pottery production and was mainly focused on the study of technological and typological variability within the assemblage. Chemical, mineralogical and organic residue analyses hint at the origin and *chaîne*



Fig. 3 Straight and oval wares of Proto-Hassuna Pottery from Sumaki Höyük. Scale 20cm. (Photo: S. Gündüzalp, Sumaki Höyük Excavation Archive)

*opératoire* of the mineral and plant tempered pottery. The pottery assemblage of Sumaki Höyük has provided a new element for addressing the beginning of pottery production and cultural changes during the 7<sup>th</sup> millennium BCE.

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