Title	Petrography of selected pottery vessels from Hellenistic 'En Gev : an analysis of previously unexamined pottery sherds
Sub Title	エン・ゲヴ遺跡から出土したヘレニズム時代土器片の胎土分析結果から
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Publisher	三田史学会
Publication year	2022
Jtitle	史学 (The historical science). Vol.90, No.2/3 (2022. 5) ,p.150 (280)- 170 (300)
JaLC DOI	
Abstract	イスラエル国北部ガリラヤ湖東岸のエン・ゲヴ遺跡から出土した土器片の胎土分析結果を紹介する。対象としたのはヘレニズム時代の土器片10点とローマ時代の石灰窯の断片である。 当時、ガリラヤ湖の東西ではギリシア・ローマとユダヤの文化が拮抗していた。そうした中、エン・ゲヴは東岸地域を統治するギリシア・ローマ都市ヒッポスの港町であったと考えられている（Nun 1989）。その一方で、風や港と水運に適した立地条件を有するエン・ゲヴは、水陸双方において湖西地域との繋がりが想定される。こうした仮設を検証し、エン・ゲヴの社会・経済的役割や民族的位置づけを知るための糸口として今回の分析が行われた。分析の結果、エン・ゲヴの土器が湖の東西両地域産であり、ギリシア・ローマとユダヤの文化の境界に位置づけられること、また、石灰窯は地元の石灰岩由来と判明した。 This report focuses on the petrographic analysis of selected Hellenistic pottery sherds (third to mid-first cent. BCE) and a fragment of a lime kiln from the early Roman period (mid-first cent. BCE to 135 CE) that were discovered at 'En Gev, Israel. This study will allow us to understand the socioeconomic situation and ethnic makeup of this settlement through the ceramic and mortar production and consumption patterns in these periods. 'En Gev is located on the eastern shore of the Sea of Galilee, and it is thought to have been a port city associated with the Greco-Roman city of Hippos, which was located about 2 km to the east in the southern Golan region (Segal et al. 2014). During the Roman period, this region, including Hippos, was mainly inhabited by Gentiles with a small Jewish population. Hippos was built not only to control the region, but also to demonstrate its power to the western region of the Sea of Galilee, such as the city of Tiberias with a Jewish population. 'En Gev, believed to have belonged to Hippos, is thought to have had an economic connection with this western region via water transportation of the lake. This is a preliminary study with a limited number of fragments; however, the results of this petrographic analysis indicate that 'En Gev consumed ceramics from both the eastern and western regions of the Sea of Galilee, in addition to imports from the Mediterranean. These results demonstrate that 'En Gev was an intermediary settlement that was connected with both Greco-Roman and Jewish cultures.
Notes	研究ノート
Genre	Journal Article
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=AN00100104-20220500-0170

研究ノート

Petrography of Selected Pottery Vessels from Hellenistic ‘En Gev: An Analysis of Previously Unexamined Pottery Sherds

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イスラエル国北部ガリラヤ湖東岸のエン・ゲヴ遺跡から出土した土器片の胎土分析結果を紹介する。対象としたのはヘレニズム時代の土器片10点とローマ時代の石灰窯の断片である。

当時、ガリラヤ湖の東西ではギリシア・ローマとユダヤの文化が拮抗していた。そうした中、エン・ゲヴは東岸地域を統治するギリシア・ローマ都市ヒッポスの港町であったと考えられている（Nun 1989）。その一方で、風や港と水運に適した立地条件を有するエン・ゲヴは、水陸双方において湖西地域との繋がりが想定される。こうした仮設を検証し、エン・ゲヴの社会・経済的役割や民族的位置づけを知るための糸口として今回の分析が行われた。分析の結果、エン・ゲヴの土器が湖の東西両地域産であり、ギリシア・ローマとユダヤの文化の境界に位置づけられること、また、石灰窯は地元の石灰岩由来と判明した。

Abstract

This report focuses on the petrographic analysis of selected Hellenistic pottery sherds (third to mid-first cent. BCE) and a fragment of a lime kiln from the early Roman period (mid-first cent. BCE to 135 CE) that were discovered at ‘En Gev, Israel. This study will allow us to understand the socio-economic situation and ethnic makeup of this settlement through the ceramic and mortar production and consumption patterns in these periods.

‘En Gev is located on the eastern shore of the Sea of Galilee, and it is thought to have been a port city associated with the Greco-Roman city of Hippos, which was located about 2 km to the east in the southern Golan region (Segal et al. 2014). During the Roman period, this region, including Hippos, was mainly inhabited by Gentiles with a small Jewish population. Hippos was built not only to control the region, but also to demonstrate its power to the western region of the Sea of Galilee, such as the city of Tiberias with a Jewish population. ‘En Gev, believed to have belonged to Hippos, is thought to have had an economic connection with this western region via water transportation of the lake.

This is a preliminary study with a limited number of fragments; however, the results of this petrographic analysis indicate that ‘En Gev consumed ceramics from both the eastern and western regions of the Sea of Galilee, in addition to imports from the Mediterranean. These results demonstrate that ‘En Gev was an intermediary settlement that was connected with both Greco-Roman and Jewish cultures.

Keywords: Petrography analysis, Tel ‘En Gev, Hellenistic pottery

1. Background

This study explores Jewish-Gentile socioeconomic relations in the region of the Sea of Galilee in the Hellenistic (third to mid-first cent. BCE) and Roman (mid-first cent. BCE to 135 CE) periods through ceramics from the site of ‘En Gev.

‘En Gev is located on the eastern shore of the Sea of Galilee, and is believed to have been a port city belonging to the Greco-Roman city of Hippos, which was located about 2 km to the east in the southern Golan region (Segal et al. 2014, Eisenberg 2018). During the Roman period, this region, including Hippos, was primarily inhabited by Gentiles with a small Jewish population. Hippos was built not only to control the region, but also as a demonstration of power to regions west of the Sea of Galilee, such as the city of Tiberias, which had a Jewish population. ‘En Gev is believed to have had economic relations with this western region via water transportation through the lake.

Numerous archaeological studies have recently been conducted in these regions on ceramics corresponding to the Hellenistic and early Roman periods (e.g. Meyers and Meyers 2013; Aviam 2014; Finsy and Strange 2015; Leibner 2006, 2009, 2019), including some involving petrographic analysis (e.g. Adan-Bayewitz and Wieder 1992; Adan-Bayewitz 1993; Wieder and Adan-Bayewitz 1999; Osband 2014; Avshalom-Gorni and Shapiro 2015). Many of these studies have explored the socioeconomic relations between these Jewish and Gentile communities. Some studies have attempted to describe the ceramic production regions to understand the Jewish-Gentile interaction during the Roman period (Berlin 1997, 2005; Magen and Peleg 2007). This relationship is one of the topics to be studied at ʻEn Gev; specifically, the pattern of pottery consumption at ʻEn Gev might provide insights into the social and economic aspects of ethnicity at the site during the transitional period between the Hellenistic and Roman periods.

We were restricted to studying only 10 pieces, as access to materials kept in Israel was limited due to COVID-19*. However, the petrographic analysis of these pieces was sufficient to offer insight into pottery consumption at ʻEn Gev.

Tel ʻEn Gev is located in Kibbutz ʻEn Gev, on the eastern shore of the Sea of Galilee, in present-day northern Israel (Figures 1, 2). Two wadis (Naḥal ʻEn Gev [north] and Naḥal Susita [south]) extend to the lakeshore plain from the Golan Heights. The tel's height is *c.* 5 m, and it extends *c.* 250 m north-south and *c.* 120 m east-west. Most of it is now covered with modern kibbutz buildings.

Tel ʻEn Gev was first recognised in 1887 in the general survey of G. Schumacher (1888: 187). In 1961, a trial excavation was conducted by B. Mazar, A. Biran, M. Dothan, and I. Dunayevsky (Mazar et al. 1964). Thereafter, several excavation seasons were conducted by expedition teams from several Japanese universities and Tel Aviv University, under Professor Moshe Kochavi (Kochavi 1989, 1993, 1996, 1998) from 1990–1992 and 1998–2004 (Tsukimoto et al. 2009), and then by Keio University under Professor

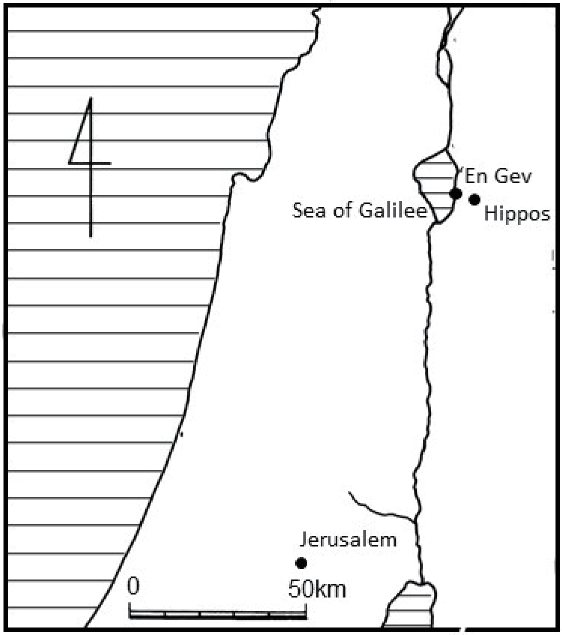


Figure 1　Location of ‘En Gev and Hippos

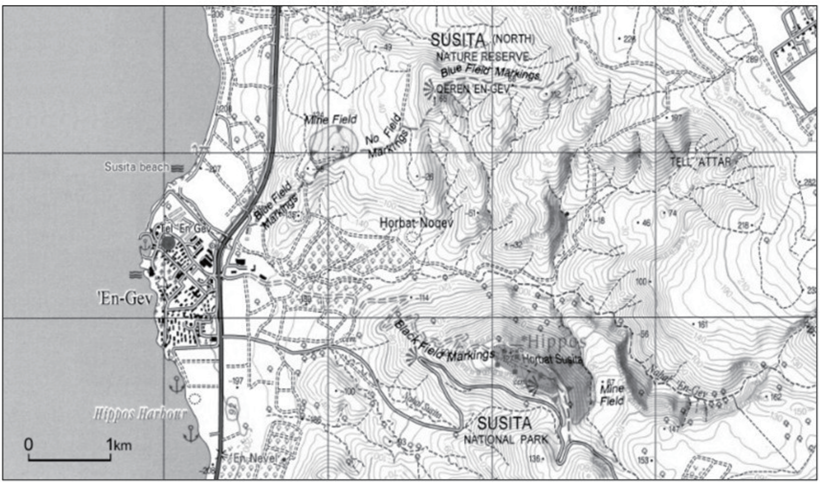


Figure 2　Geological map of the vicinity（Modified from Survey of lsrael 2000）

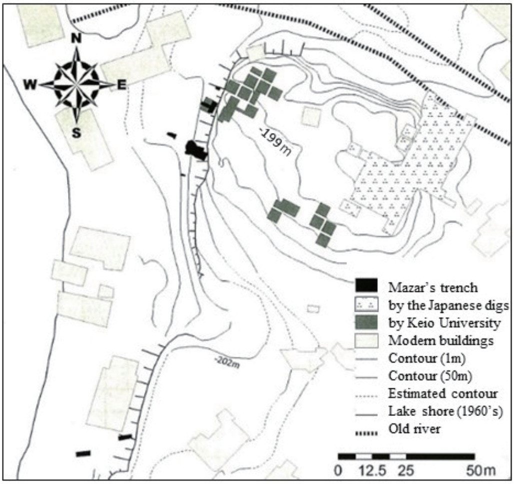


Figure 3 Location of the excavated areas.
(Modified from Sugimoto, D. T. & H. Kansha (eds.) 2016: Figure 1.2-6)

D. T. Sugimoto from 2009-2011 (Sugimoto and Kansha 2010, 2016; the English report is in press) (Figure 3). During these excavation seasons, remains ranging from the Iron Age to the Roman period were discovered. Makino, one of the authors of this paper, was in charge of classifying and documenting the pottery finds (Makino 2009, 2011, 2016).

After the Iron Age, at least three strata of occupation—from the Persian to the Roman periods—were recognised in the western section of the excavated area on the top of the tel at 'En Gev. The Persian occupation was represented by several pits that yielded sherds from transportation jars and other vessels. The Hellenistic stratum revealed a small village. Sherds derived from daily use vessels, mainly kitchen wares, such as bowls, plates, cooking pots, kraters, jars, jugs, and juglets. The uppermost stratum, containing the Roman material, was preserved very poorly, mainly due to erosion and modern construction. Part of a drainage structure and two lime kilns (North L 374, South L 360) were discovered (Hino 2002, 2009) in this stratum. The lime kilns were used to heat limestone to produce lime plaster for building mortar and for use as a stabiliser in mud renders and floors. They were often constructed in close proximity to waterways. This was partly because the mortar was heavy and more easily transported via waterways, and partly because the mortar production emitted dust containing a high concentration of toxins such as alkali metals, halogens, and sulphur, which made the area unsuitable for settlements. ‘En Gev was well situated for these purposes.

2. Samples and methodology

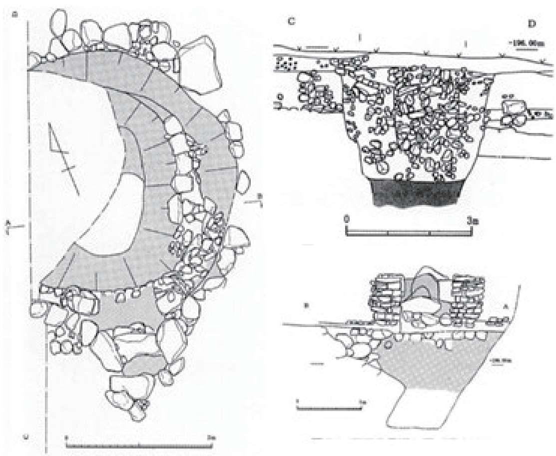
Ten pottery sherds of the Hellenistic period (third to first cent. BCE) discovered during the three excavation seasons by Keio University were chosen from the typical daily use pottery of this period; they include an incurved rim bowl, jar, fish plate, and lids (or bowls) (Table 1). Since these fragments were sliced during the section preparations for analysis, they were chosen from undrawn sherds discovered from fill and topsoil.

A fragment of one of the lime kilns of the Roman period—the southern one (L 360) (dated between 50 BCE and 110 CE by C14, Kobayashi and Nagatomo 2009)—is also included in this analysis (Figure 4). The mortar produced at ‘En Gev was likely used for buildings in Hippos and perhaps other neighbouring cities. The petrography analysis, thus, might elucidate regional consumption patterns as well during the transition from the end of the Hellenistic period to the Roman period. The results offer basic information for comparative analysis with plaster from Hippos, to be conducted in the near future.

The sherds were examined under a petrographic (polarising) microscope according to standard procedures (Orton et al. 1993: 236–239). The following parameters were defined: optical properties of the matrix; composition and approximate amount of silt-size material; definition of the rock, mineral, and other sand-sized, non-plastic inclusions; their granulometry, that is, the size, shape, and sorting of the grains; and their frequency. The firing temperature was estimated according to the mineral changes (Rice 1987: 80–110). Clay turns to ceramic at a temperature greater than 600°C; clay minerals in the sherd start to change their optical properties at

Photo No.	Material type	Locus Basket	Locus Category	Sample No.	Petrographic Group	Provenance
1	Bowl rim	711 6354	Fill	1	1	‘En Gev
2	Lid/Bowl	647 6142-3	Fill	3	1	‘En Gev
3	Body fragment	665 6179-1	Pit	5	1	‘En Gev
4	Body fragment	665 6179-2	Pit	6	1	‘En Gev
5	Lime Kiln wall	360 1105	Lime kiln	11	1a	Can be from the site vicinity
6	Bowl rim	718 6350-3	Fill	8	2	Tiberias
7	Jar rim	640 6100-2	Top soil	2	3	Galilee
8	Lid/Bowl	647 6142-2	Fill	4	4	Uncertain, regional
9	Body fragment	718 6350-5	Fill	10	4	Uncertain, regional
10	Fish plate base	665 6179-3	Pit	7	5	Cilicia/Cyprus
11	Bowl rim	718 6350-4	Fill	9	6	Cyprus, Turkey, Greek islands, or Aegean

Table 1　Inventory of the examined samples



a　　　　　b

Figure 4　Lime kiln founded at ‘En Gev（a: plan, b: sections）
（Tsukimoto, A., S. Hasegawa, & T. Onozuka（eds.）2009: Figure 5.2–5.4）

650°–700°C; and at temperatures greater than 800°C clay minerals turn isotropic and milky (a process termed vitrification); full vitrification is reached at temperatures of approximately 950–1000°C. Limestone and calcite begin to decompose at 700°–750°C, resulting in a chalky substance that appears cryptocrystalline and milky. At 900°C, carbonate material disappears, leaving voids. The observed petrographic data were compared to the geological and pedological settings of the site and its vicinity, using geological and soil maps, and to the data obtained by Shapiro within the framework of the numerous development surveys. This interpretation of the results was supported by those of recent petrographic analyses (Shapiro in prep. a–d).

The examined samples were divided into six petrographic groups. Descriptions of their mineral composition are provided below. The groups are presented in the order of their distance from ʻEn Gev, with local and proximate provenance first, followed by vessels produced in distant venues.

3. Results of the petrographic analysis

Group 1 (ʻEn Gev)

Samples 1, 3, 5, and 6 appear to represent local ʻEn Gev pottery production. They have a calcareous clay matrix containing *c*. 3% of basalt-derived silt followed by sporadic silty quartz (a very small quantity compared to that in pottery of Tiberias origin). Sand-sized, non-plastic inclusions compose *c*. 15–25% of the sherds' volume and, most likely, represent a deliberate addition by potters, because local clays and marls do not contain sand. Generally, they are composed of quartz; limestone decomposed to chalk during the firing; eroded basalt and basalt-derived minerals, dominantly phenocrysts of olivine/iddingsite; and ferruginous shale, the quantity and quality of which slightly vary for each of the samples, probably representing different recipes/technological decisions. The descriptions for each sample are provided below, each starting with the dominant type of inclusion.

Sample 1 (Photo 1) contains *c*. 20% of 0.1–1 mm sub-rounded to rounded grains of limestone, 0.1–0.6 mm quartz and basalt, 0.3–1.0 mm lumps of ferruginous non-silty shale, 1 crystalline calcite, 1 phenocryst of ol-

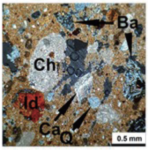


Photo. 1
Q = quartz, Li = limestone decomposed to chalk, Ba = basalt, Ca = crystalline calcite, Id = iddingsite.

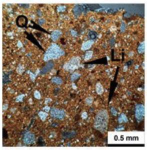


Photo. 2
Q = quartz, Li = limestone decomposed to chalk.

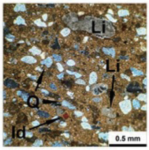


Photo. 3
Q = quartz, Li = limestone decomposed to chalk, Id = iddingsite.

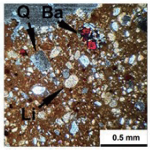


Photo. 4
Q = quartz, Li = limestone decomposed to chalk, Ba = basalt.

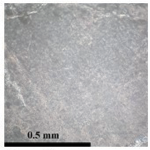


Photo. 5
Chalk.

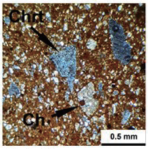


Photo. 6
Ch = chalk, Chrt = chert.

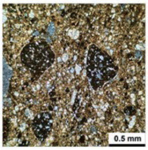


Photo. 7
Lumps of ferruginous silty soil in foraminiferous marl matrix.

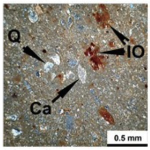


Photo. 8
Q = quartz, Ca = relict of calcareous inclusion, IO = iron oxide.

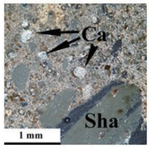


Photo. 9
Ca = relicts of rounded calcareous inclusions, apparent foraminifers, Sha = vitrified argillaceous shale.

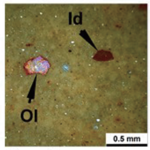


Photo. 10
Ol = olivine, Id = iddingsite.

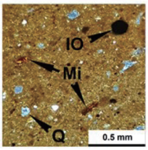


Photo. 11
Q = quartz, Mi = mica, IO = concentration of iron oxide.

Photos 1–11 Microphotograph of the thin section of samples. Cross-polarized light (CPL).

ivine partly altered to iddingsite, and 1 chlorite. Numerous hollows evidence possible organic matter added during temper (a typical practice for thick-walled pottery) and uncareful kneading, as some air bubbles remain in the clay. The coarseness of the inclusions and their orientation in the sherd suggest a hand-made technique.

Sample 3 (Photo 2) contains *c*. 15% of 0.1–0.6 mm sub-rounded to rounded quartz, 0.1–1.0 mm limestone, a few grains of basalt and iddingsite, and pellets of ferruginous shale. There are numerous small (0.1 mm) hollows and one large (3.0 mm) one.

Sample 5 (Photo 3) contains *c*. 20% of 0.1–0.5 mm (dominantly 0.2–0.3 mm) sub-rounded to rounded quartz, as well as rare limestone inclusions of the same size. There is one 0.3×1.0 mm rounded chalk fragment and a few 0.1 mm grains of iddingsite.

Sample 6 (Photo 4) contains *c*. 25% 0.1–0.5 mm limestone and silt to 0.1

mm chalk (as if the sieved chalk powder was added to the clay), as well as rare 0.1–0.5 mm sub-rounded to rounded quartz and sporadic basalt and iddingsite.

For samples 3, 5, and 6, most of the minute cracks within the sherds and inclusions are oriented parallel to the surfaces of the vessel, which is characteristic of the wheel-made vessels. For all the samples, the firing temperature is estimated at *c.* 750° C.

The possible sources of clay in the ‘En Gev vicinity are the Miocene Hordos Formation, cropping up *c.* 500 m to the east of the site, and the Upper-Eocene-Oligocene Fiq and Middle-Eocene Maresha Formations, outcrops of which are located *c.* 2 km to the east of the site along Naḥal ‘En Gev (Michelson 1978; Sneh 2008).

Concerning the sand-sized, non-plastic inclusions, most of the sedimentary rocks composing the slopes above ‘En Gev contain chalk. The Miocene ‘En Gev and Hordos Formations could have provided the quartz sand, and Miocene Lower the basalt for the eroded basalt and basalt-derived minerals. Most of the inclusions are sub-rounded to rounded, which is characteristic of sandstones for quartz and of wadi sand rolled by water stream for basalt and limestone, such as the sand of the Sea of Galilee coast, comprising aquatic shells.

Group 1a (The Chalk Sample)

Sample 11 (Photo 5) is homogeneous chalk, devoid of any traces of microfossils.

Group 2 (Tiberias)

Sample 8 (Photo 6) has a ‘dirty’ appearance in polarised light, representing a mix of light brown clay with an extremely high quantity (*c.* 50% of the volume) of silt to very fine sand-sized (<0.1 mm) grains of various rocks and minerals. They comprise, predominantly, round (single cells) to sub-rounded (debris) fragmentary foraminifers followed by lesser quantities of basalt-derived minerals, such as plagioclase (with its character twinning), olivine, partly or completely altered to iddingsite, opaque specks of iron oxides, and rare silty quartz (within the Eastern Mediterranean, the quartz silt is of an aeolian origin). The sand-sized, non-plastic inclusions are sporadic and comprise 0.2–0.6 mm sub-rounded grains of chalk, eroded basalt, quartz, and chert, apparently representing the natural components of the raw material. Firing temperature is estimated at *c*. 750–800°C.

The observed lithology is almost identical to that of the early Islamic pottery and kiln furniture recovered at Tiberias (Shapiro in preparation a), for which the Senonian-Paleocene Taqiye marl contaminated with the rock and mineral fragments derived from Pliocene-Pleistocene and Miocene and, apparently, the brown basaltic soils of the area, were suggested as raw material (Ravikovitch 1969; Sneh 2008; Bogoch and Sneh 2014).

The Taqiye marl outcrops are located *c*. 1.5 km to the north of Tel Rakat (Bogoch and Sneh 2014). The Pliocene-Pleistocene basalts along the western shore of the Sea of Galilee and the Miocene basalts of the limited outcrops to the south of Tiberias are strongly eroded and characterised by alteration of the olivine to iddingsite and high quantities of iron oxides in plagioclase groundmass (Williams-Thorpe et. al. 1991: 35). The brown basaltic soils (Ravikovitch 1969) covering the area could be contaminated with the Taqiye marl during the mining.

The cases in which the same source of clay had been used for pottery manufacture for hundreds and even thousands of years of human history are common for those considering the provenance of pottery (Glass et. al. 1993: 277–278; Shapiro 2012). Therefore, the discussed vessel was, most likely, manufactured at Tiberias or elsewhere along the western shore of the Sea of Galilee.

Group 3 (Galilee)

Sample 2 (Photo 7) has a calcareous marl matrix, containing numerous complete and fragmentary foraminifers, some quartz silt, minute specks of iron oxide, and crystalline calcite. The identifiable foraminifers, some of which appear fine and sand-sized (0.1–0.3 mm), are globigerinids and Heterohelix, which suggest Senonian-Paleocene Taqiye marl as possible raw material. Other sand-sized inclusions compose *c*. 7% of the sherd's volume and include 0.2–0.8 mm nodules of silty ferruginous soil and negatives of the organic matter that incinerated during the firing (voids, some with grey aureoles), and chalk (including biogenic). The nodules of the silty ferruginous clay/soil are, most probably, *terra rossa*—the dominant soil of Western and Upper Galilee. Apparently, the soil was admixed to the calcareous marl to increase its iron richness. It was added as dry powder, which caused hairline cracks around the soil nodules due to the difference in humidity between the wet clay and dry soil powder. Firing temperature is estimated at *c*. 700–750° C.

The observed lithology suggests an area with the neighbouring outcrops of both Taqiye marl and hard limestone, on top of the latter of which *terra rossa* originates. Adding the ferruginous soil to the calcareous clay/marl to improve the iron levels of the clay is a traditional practice in Galilee, which suggests the possible provenance of this vessel.

Comparison with previously examined pottery reveals that similar technology was used for the Bronze Age pottery from Kefar Vradim, Roman pottery from Karm e-Ras (modern Kafr Kana), and Chalcolithic pottery from Horbat Usha (Shapiro in preparation b, c, and d, respectively).

Group 4 (Uncertain, regional)

Samples 4 (Photo 8) and 10 (Photo 9) partly share their lithology. Both exhibit a strongly vitrified calcareous clay matrix, light greenish grey in polarised light, almost devoid of mineral silt, except for a few quartz grains and minute specks of iron oxide (black or very dark brown opaque) observed only in Sample 4. The sand-sized non-plastic inclusions compose *c*. 10% of the sherd's volume and comprise 0.1–0.3 mm rounded milky or cryptocrystalline calcareous bodies, which may be foraminifers, naturally present in some of the clays and marls in the region. Because the firing temperature was high enough for the decomposition of calcareous material (close to 900° C), only milky bodies and skeletons of those are observed. In Sample 4, the calcareous inclusions occur *c*. 5 times fewer of the same size rounded to sub-angular grains of quartz and concentrations of iron oxide. In Sample 10, there are elongated lumps of argillaceous shale, fully vitrified during the firing.

The most likely raw material for these vessels is foraminiferous marl (for instance, Taqiye marl). Such marls are common in the eastern Mediterranean, in general, and in the region (Bentor 1966: 72–73). The outcrop of Taqiye marl closest to the site, and the only one along the Sea of Galilee shoreline, is located at the western shore (Sneh 2008; Bogoch and Sneh 2014), and, very likely, was used by the potters of the Early Islamic Tiberias. At the same time, the petrographic examination of the Early Islamic pottery manufactured at Tiberias (Shapiro in preparation a) reveals a strong contamination of the foraminiferous marl with the basalt derived minerals (see Sample 8).

Therefore, the lithology observed for Samples 4 and 10 cannot be used to pinpoint the provenance of these vessels. At the same time, we can propose that these vessels were not transported very far.

Group 5 (Cilicia/Cyprus)

Sample 7 (Photo 10) has a completely vitrified clean clay matrix with fine dispersed iron oxide and sporadic angular silt size quartz. The sand-sized, non-plastic inclusions are represented by a few 0.05–0.1 mm grains of quartz and 0.2–0.3 mm opaque stones (apparent limonite), and 0.2–0.4 mm phenocrysts of olivine partly and completely altered to iddingsite. According to the optical properties of the clay, the firing temperature is estimated at *c*. 950–1000°C, the temperature at which the clay minerals are fully vitrified.

The appearance of the iddingsite grains greatly resembles those observed in the Roman clay sarcophagi, for which Cilician/Cypriot provenance was suggested (Shapiro 1997; Braekmans et al. 2020). Additionally, these sarcophagi were fired at *c*. 900–1000°C. Therefore, non-local and non-regional provenance is suggested.

An additional reason to consider non-local provenance is the presence of basalts all around the Sea of Galilee. Within the Miocene Lower basalt (outcrops located *c*. 1 km to the northeast of the modern ‘En Gev settlement), the olivine is mostly altered to iddingsite, but, in the case of basalt erosion, we cannot eliminate plagioclase grains. Furthermore, the basalt erosion provides significant quantities of iron oxide, which appears as numerous opaque silt and sand-size inclusions (not observed in the current thin section).

Group 6 (Cyprus, Turkey, Greek islands, or Aegean)

Sample 9 (Photo 11) has a partly vitrified micaceous and slightly calcareous matrix, containing sporadic quartz silt. The sand-sized inclusions are represented by a few laths of mica, 0.05–0.1 mm quartz, concentrations of iron oxide, 0.1–0.2 mm grains composed of quartz and mica (apparent rhyolite), and possible traces of some calcareous inclusions. Firing temperature is estimated at >900° C.

Mica and acid rocks are uncommon in the region (Sneh, Bartov and Rosensaft 1998); therefore, imported provenance was suggested, such as from Cyprus (Constantinou 1995), Turkey (web map), the Greek islands, or the Aegean (GIS map).

4. Current perspectives and further issues

This is a preliminary study conducted with only a few fragments. It is too early to draw any firm conclusions; however, the results of this petrographic analysis provide insight into the nature of the ceramic and mortar consumption patterns at Tel ‘En Gev. The ceramics’ production regions include both the local ‘En Gev (Group 1) and western Galilee regions (Group 2, 3, and perhaps 4), as well as imports from the Mediterranean (Group 5 and 6), while the material for mortar production was local.

The origin of the imports (Sample 7; Fish plate, Sample 9; Incurved rim bowl) demonstrates that there was a direct economic relationship between ‘En Gev and the Mediterranean world. Both fish plates (Sample 7, Group 5) and incurved rim bowls (Sample 9, Group 6) are hallmark objects of the Hellenistic period. Fish plates originated in Athens and southern Italy between the 5th and 4th centuries BCE; they first appeared in the Southern Levant around 400 BCE, and continued until around the 2nd century BCE., disappearing around 100 BCE (Gunneweg et al. 1983 108 Fig. 25-2). Incurved rim bowls (Sample 9, Group 6) were produced in Eastern

Cyprus between approximately 220 and 100 BCE (ibid. Fig. 25-1). Incurved rim bowls began to appear in the late 4th century BCE, decreased in number at the end of the 2nd century BCE, and became rare in the 1st century BCE. The results of the two ʻEn Gev samples, imported from Cilicia or Cyprus and from Eastern Cyprus, respectively, demonstrate that they follow these patterns.

The local products imply that ʻEn Gev pottery consumption (Group 1-4) was positioned between the Golan and Upper Galilee regions. Group 1 represents the local production around ʻEn Gev (Samples 1, 3, 5, and 6). In the middle of the first century BCE, pottery kilns were in use at ʻel-Jumeiza, near Gamla, in the Golan Heights (Berlin 421), but not yet at ʻEn Gev or in its vicinity. Since only the top of the tel was excavated at ʻEn Gev, a further survey might be needed in other parts of the tel. Group 2 (Sample 8, likely manufactured at Tiberias or elsewhere along the western shore of the Sea of Galilee) and Group 3 (Sample 2, Western and Upper Galilee) represent the western region of the Sea of Galilee; in this region, several pottery kiln centres have been discovered, such as Kafr Kana (Early Hellenistic period, 4th century BCE), Shikhin (mainly in the Roman and probably in the Late Hellenistic period), and Kfar Hananya (mainly in the Roman period, after the 1st century BCE). Groups 2 and 3 demonstrate that the local pottery consumption region around ʻEn Gev expanded further to the west.

Regarding the lime kiln fragment, the results indicate that it was used for the calcination of local limestone. Further comparative study must determine whether the quicklime produced at ʻEn Gev was brought and utilised only at Hippos or at other settlements around the Sea of Galilee as well.

We hope this research furthers our understanding of the cultural position of ʻEn Gev, and helps ascertain whether ʻEn Gev was essentially a settlement of Hellenistic-Roman culture or one of Jewish culture as well.

Acknowledgements

We appreciate the cooperation of D. T. Sugimoto, the director of the new excavation of ‘En Gev, for the use of the pottery sherds for analysis; Vladimir Lechem of the laboratory at the Zinman Institute of Archaeology of the University of Haifa for section preparation for slides; and Mr. Hino and Professor Kuwabara at Tenri University as one of the representatives of the former excavations, who kindly afforded Makino a fragment from the lime kiln for the present analysis.

This research was conducted as part of the collaborative research between the two ancient sites in this vicinity, ‘En Gev and Hippos (K. Makino as a representative of the Japan research team and M. Eisenberg as a representative of the Israel research team), supported by JSPS and ISF under the Japan-Israel Research Cooperative Program (JPJSBP120198406). We would like to thank Editage for English language editing.

*The research was conducted between the normal and COVID-19 terms. Makino’s plan to visit Israel for additional observation of the fragments in storage at ‘En Gev at the final stage was cancelled due to the travel restrictions. Because only Makino can access the material in storage, she accepts full responsibility for the lack of information and photos in this paper, and hopes that both will be fulfilled as soon as possible in the near future.

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