Facem 1 www.facem.at 06-12-2020

FLAVIO FERLITO*

New fabrics of the production centre of Himera

Introduction

The present research builds upon findings from the previous publication[1] of a selection of 22 samples presumably produced in the region of Himera[2] and taken from ceramic objects excavated during the 2009 excavations in the western necropolis of Himera.[3] Within the frame of this earlier archaeological study, several fabrics of coarse wares, fine wares, opus doliare and ceramic building materials have been discussed. Apart from the fabrics HIM-REG-C-5 to HIM-REG-C-7, on the basis of combined archaeological and archaeometric research, all of these fabrics can now be reliably attributed to the production site of Himera: petrographical analysis[4] have been undertaken on seven samples of coarse wares and dolia selected from this previously published assemblage. Furthermore, sixteen samples of transport amphorae unearthed in the necropolis of Himera of supposed local fabric[5] have been submitted to petrographical and chemical analysis. As a result, all of these samples were compatible with the raw materials of the "Terravecchia Formation"[6] used for local pottery production.[7]

In total, nine fabrics have been newly defined: two of transport amphorae (HIM-A-1 and HIM-A-2); three of coarse ware (HIM-C-1, HIM-C-2 and HIM-C-3); one of opus doliare (HIM-OD-1); two of ceramic building materials (HIM-CBM-1 and HIM-CBM-2); and, one of glazed ware (HIM-G-1).

* Institut für Klassische Archäologie, Universität Wien.

1 This assemblage has been published within the first edition of FACEM: Trapichler 2011.

2 The selection has been operated by the excavator S. Vassallo on the basis of his long experience with pottery of supposed local origin.

3 For a recent overview of the bibliography of the necropolis of Himera, see Vassallo 2018.

4 Thin-section petrography at the polarizing microscope and chemical analysis (ICP-MS and ICP/OES) have been conducted by G. Montana (DiSTem, University of Palermo) and L. Randazzo (DiBEST, Università della Calabria), see Montana et al. 2020.

5 For the first identification of a local amphorae production at Himera, see Bechtold et al. 2019.
For the full discussion of the issue related to the production of western Greek amphorae series in Himera, see Bechtold 2020.

6 Montana et al. 2011, 67-73, 98-100, 125-27, 157.

7 For previous archaeometric research on the raw materials used at Himera and the attribution of the class of kylikes Iato K480 to the Dorian-Chalcidian colony, see Alaimo, et al. 1999; Montana et al. 2009, 105: group II.

Fabric Descriptions

1. Transport Amphorae

Two amphorae fabrics[8] have been identified: the coarser HIM-A-1 and the finer HIM-A-2. In total, 36 samples have been attributed to local amphorae production: 13 to HIM-A-1 and 23 to HIM-A-2. Among these, 16 samples have been archaeometrically investigated: five for HIM-A-1 and eleven for HIM-A-2.

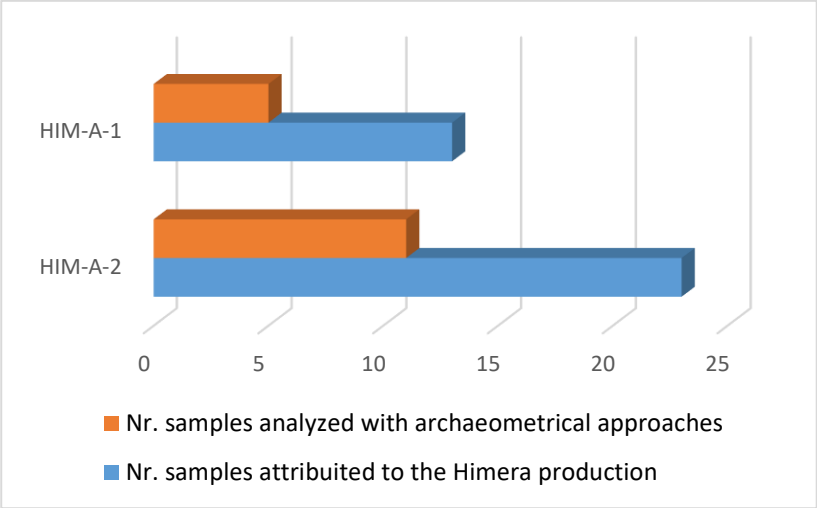

Fig. 1. Quantitative distribution of samples attributed to the production of Himera on the basis of archaeological (blue) and archaeometrical (orange) methods.

HIM-A-1

Ref. M 179/158 (M 179/150, M 179/160, M 179/166)

The colour of the matrix is reddish-brown-reddish to light brown (Munsell 7.5 YR 5/4 and 6/4). To the naked eye, the clay appears to be quite compact with well-distributed, small or medium-sized inclusions of white or white-yellowish colour.

Voids are quite infrequent and generally take the form of vughies or holes, rather than channels, chambers or spongies. Their size varies from 0.04 mm to 0.60-70 mm. The texture is coarse with a high concentration of temper, intentional and unintentional, generally from a minimum of 0.04 mm to a maximum of 0.48 mm. The matrix is mainly composed of a carbonatic component which makes difficult the distinction between the inclusions of the matrix and the added temper. The carbonatic component consists more frequently of white or white-yellowish inclusions of very spherical/well rounded-rounded-subrounded-angular or subspherical/subrounded shapes, sized 0.04/0.48 mm, exceptionally around 0.87 mm; a frequent concentration of white-yellowish micritic clots[9] of very spherical/well rounded-rounded-subangular, spherical/angular-subangular or subspherical/subrounded-angular shape, with rare cases of subelongate shape. The fabric also presents inclusions of quartz, in general infrequent, with an exception made for M179/166 (fig. 2.d) with a more evident quartz component. Quartz particles are greyish or whitish, transparent and small-medium sized (0.08/0.32-40 mm), of very spherical-spherical/rounded-subrounded or, in some cases, angular-subangular shape. In some cases, and because of its tiny size, the quartz cannot be

[8] For a preliminary description of these two fabrics (published in Italian) see Bechtold et al. 2019, 15-17.

[9] See Cau Ontiveros et al. 2002, 11-12: formations of secondary calcite, caused by high firing temperatures. This new term indicates the “dissolved carbonate grains” used for the descriptions in FACEM.

recognized under the microscope (M179/150, fig. 2.a). Furthermore, we find sporadically or rarely reddish-orange grains of spherical/well rounded-rounded, subspherical/subrounded or, rarely, elongate/rounded shape, sized 0.08/48 mm (rarely). Finally, in some samples, black-reddish inclusions (iron oxide concretions?) of spherical/angular shapes have been distinguished.

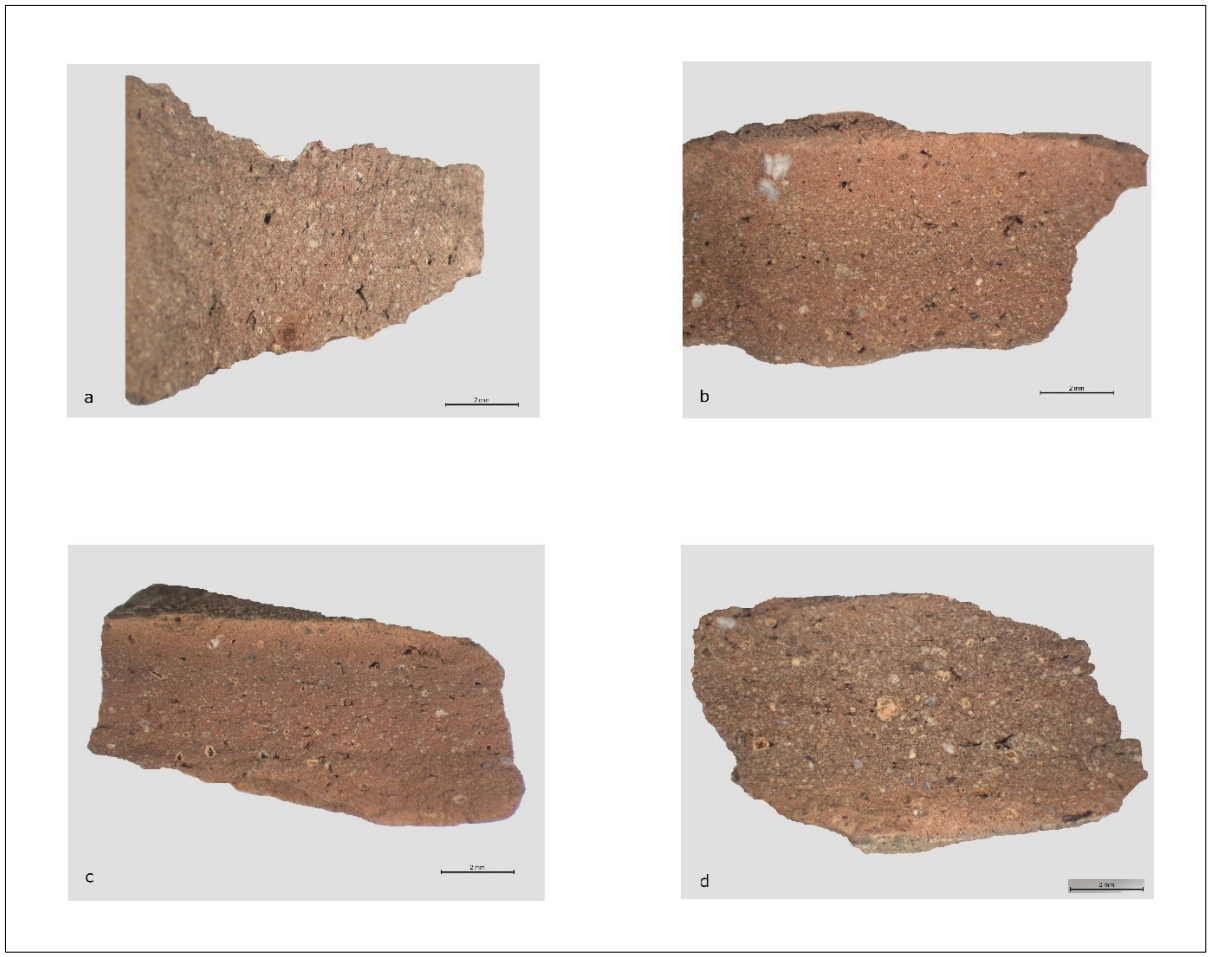

Fig. 2. Microphotos 8x: **a.** M 179/150; **b.** M 179/158; **c.** M 179/160; **d.** M 179/166.

HIM-A-2

Ref. M 179/159 (M 179/161, M 179/163, M 179/230, M 179/327)

This fabric is similar to HIM-A-1 both for compactness and composition, but of a finer texture. In fact, the main difference consists of a minor quantity of temper. The colour of the matrix is brown-reddish-yellowish with slight chromatic variants (Munsell 5 YR 5/4, 5/6, 6/4, 6/6, 6/8). To the naked eye, the fabric appears to be very fine and depurated with sporadic, small particles of whitish-yellowish colour and a certain number of voids (for example M179/230, fig. 3.d, and M179/234, fig. 3.e). Under the microscope, the quantity of voids varies from frequent to infrequent, like 179/163 (fig. 3.c), with a more compact matrix. In general, voids are vughy-, channel- and hole- shaped, sporadically chamber-, sponge- or vescicular-shaped. The size varies between 0.04/0.60-90 or 1.59 mm, considering the length of the channels.

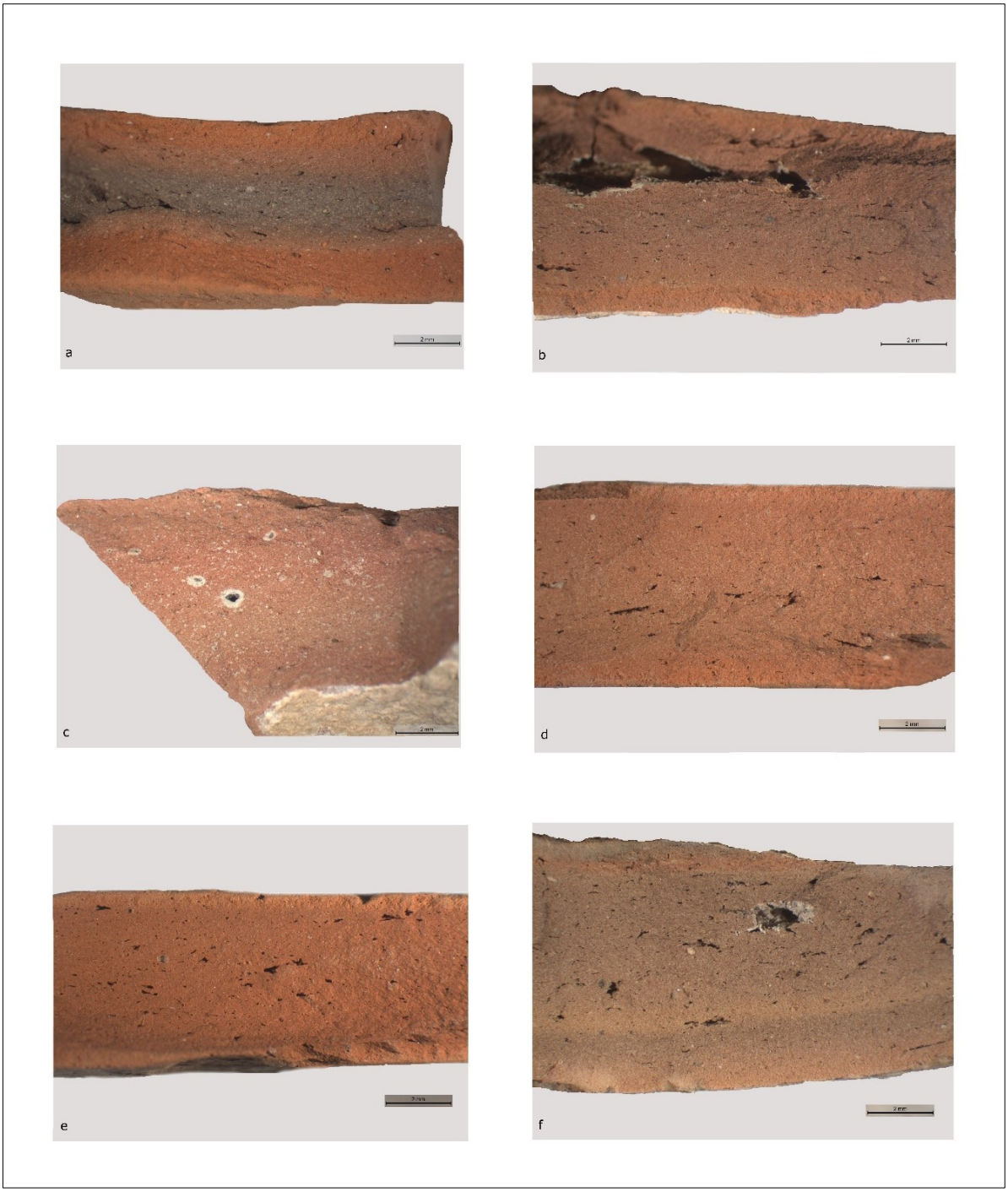

Fig. 3. Microphotos 8x: **a.** M 179/159; **b.** M 179/161; **c.** M 179/163; **d.** M 179/230; **e.** M 179/234; **f.** M 179/327.

Despite the lower quantity of temper, the rarely-present inclusions are larger in comparison to HIM-A-1 (0.04/0.60-1.20 mm). The most significant characteristic is the matrix' carbonatic component. Also in this case, the calcium carbonate shows two variants: frequent or infrequent, whitish grains of very spherical/rounded-subrounded-subangular, spherical/subangular-rounded or elongate/rounded-subangular shape of variable size (0.04/0.24-1.19 mm); whitish-yellowish micritic clots of spherical-subspherical/rounded-subrounded-subangular (rare) or sporadic elongate/rounded shape are frequent (0.04-0.40 mm). The presence of quartz of subspherical/subrounded-subangular-angular shape and of small-medium size (from 0.12/0.20-40 mm) has been observed only in two samples (M179/161, M179/327, fig. 3.b, f). Reddish inclusions are sporadic (0.04/0.40-50 mm, rarely)

and of subspherical/rounded-subrounded shape. Blackish particles of ovoidal/rounded-subrounded shape (0.08/0.20 mm) are rare. The matrix appears to be more micaceous than HIM-A-1; the finest sample of HIM-A-2 is M179/230 (fig. 3.d), characterised by inclusions sized between 0.04/0.16 mm.

2. Coarse Wares

The denomination of three new coarse ware fabrics (HIM-C-1 to C-3) is the result of the combined, archaeometric-archaeological research mentioned above, applied to the previous fabrics HIM-REG-C-1 to C-4.[10] The major difference between the three groups is the temper: HIM-C-1 shows a major presence of quartz, HIM-C-2 a higher concentration of calcium carbonate and HIM-C-3 the presence of big dark inclusions.

HIM-C-1

Ref. M 111/13 (M 111/6, M 111/10)

The colour of the matrix varies between brown/pinkish/reddish and reddish/yellow tones (Munsell 10 YR 6/4 or 7.5 YR 6/3, 6/6). To the naked eye, the clay appears rather fine and depurated with sporadic, small or medium-sized inclusions of yellowish colour.
Under the microscope, voids appear to be infrequent-frequent, mostly in form of vughies and channels, sized between 0.04/1.00 mm. The presence of channels can be frequent like in M 111/10 (fig. 4.a) or sporadic like in M 111/13 (fig. 4.b).
The texture of freshly broken sections is quite granular, the matrix is rather carbonatic and the distribution of temper is unsorted. In general, the size of the inclusions varies from 0.02-04 to 0.50 or 1.50 mm (sporadically). The main characteristic of HIM-C-1 is the predominance of quartz that appears in the form of whitish-light grey-transparent inclusions of subelongate/subrounded-subangular or spherical/rounded-subangular shape, and of small and medium-large size (0.02-04/1.00 mm). Mica is frequent, small-sized (0.03 mm) and spherical/angular-shaped with the typical “shiny” aspect. The carbonate component is mainly part of the matrix and shows two variants: infrequent or frequent (M 111/10) whitish-yellowish, small or medium-sized inclusions (0.06/1.00 mm) of spherical-subspherical/rounded shape or a very frequent concentration of whitish-yellowish, small-sized (0.03/0.20 mm) micritic clots mostly of very spherical-spherical-subelongate/well rounded-rounded shape. Finally, the fabric shows a sporadic/infrequent presence of two types of spherical/rounded inclusions of iron (0.03/0.15 mm), of brownish-black and/or reddish-brownish colour.

[10] Trapichler 2011.

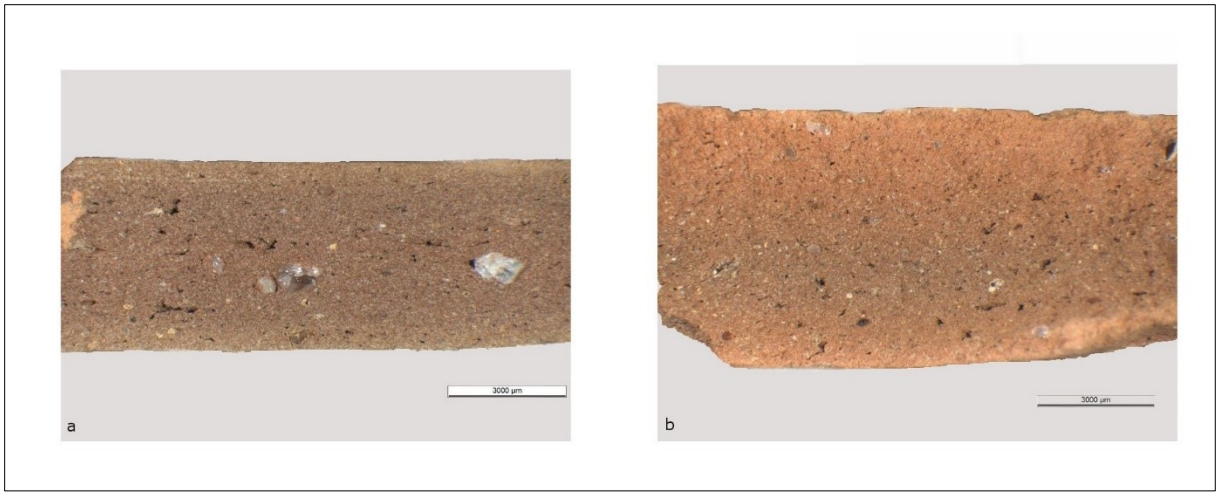

Fig. 4. Microphotos 8x: **a.** M 111/10; **b.** M 111/13.

HIM-C-2

Ref. M 111/11 (M 111/5, M 111/8, M 111/16, M 111/17, M 111/26)

The most important characteristic of this fabric is the absence of high quantities of quartz. The colour of the matrix is light or dark brown with different shades from brownish-pinkish-reddish to reddish-yellow (Munsell 5 YR 5/3, 6/6 or 7.5 YR 5/4, 6/4, 6/6, 7/4). To the naked eye, the fabric appears to be quite coarse with a notable number of small particles of whitish/yellowish colour. Under the microscope, voids are mostly vughy- and channel-shaped (0.04/1.00-2.00 mm).

The texture of the present fabric resembles HIM-C-1 (M 111/11, fig. 5.c). Size of inclusions varies from 0.02 to 0.75-2.00mm (sporadically). The calcium carbonate is sometimes more predominant than in HIM-C-1, but its presence varies from high concentrations, like in M 111/11 (fig. 5.c), to lower ones, like in M 111/26 (fig. 5.d), the latter of which also appears to be more depurated. It manifests spherical-subelongate/rounded inclusions of white or whitish-yellowish colour and are variable sized (0.04-06/0.60-1.00 mm). The majority of the samples shows frequent micritic clots of whitish-yellowish colour and spherical-subelongate/rounded shape (0.03/0.15-50 mm). Quartz is infrequent and small-sized (0.02-020 mm), generally spherical/angular-subangular-shaped and of whitish-greyish-transparent colour. Mica is frequent, small, with a shiny aspect and of spherical/angular shape. Finally, there is an infrequent presence of black or red iron oxide concretions of spherical-subspherical-subelongate/rounded shape (0.03-0.30 mm).

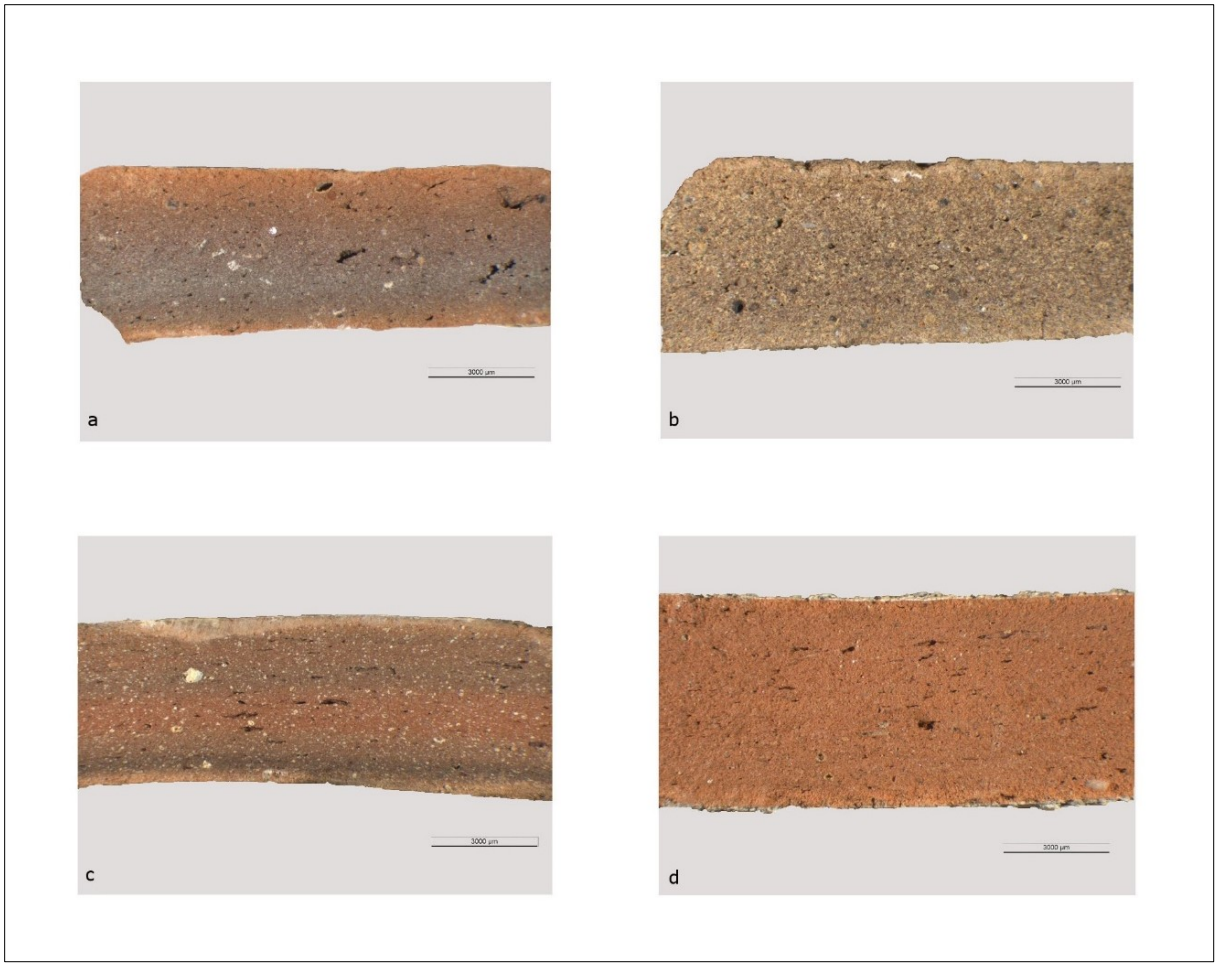

Fig. 5. Microphotos 8x: **a.** M 111/5; **b.** M 111/6; **c.** M 111/11; **d.** M 111/26.

HIM-C-3
Ref. M 111/14

This fabric is represented by only one sample and shows the same characterics as the previous fabrics. The main difference consists of the presence of large, dark grey inclusions (iron oxide concretions?) of subspherical/rounded-subrounded shape (0.30-2.00 mm). In addition to more, small-sized (0.02-4 mm) iron inclusions of reddish-brownish colour and spherical/rounded shape. The carbonatic component appears to be frequent or very frequent quantity: whitish-yellowish, small-sized (0.09/0.15 mm), spherical/rounded inclusions, and whitish-yellowish, very small-sized (0.03/0.06 mm), spherical-subelongate/rounded micritic clots.

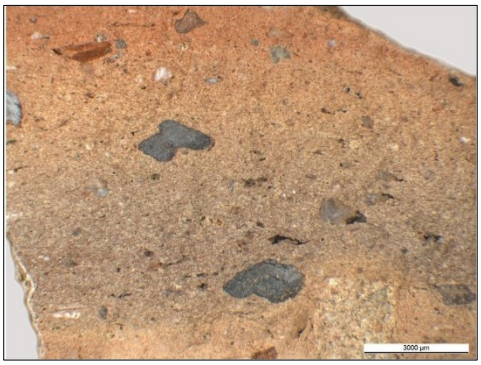

Fig. 6. Microphoto 8x: M 111/14

3. Opus Doliare
This fabric is the result of the combined, archaeometric-archaeological research mentioned above, applied to the previous fabrics HIM-REG-OD-1, OD-2 and OD-3.

HIM-OD-1
Ref. M 111/21 (M 111/20, M 111/22, M 111/23)

The colour of the matrix appears to be brownish-pinkish or reddish-yellow, with some different tones (Munsell 5 YR 6/6, 7.5 YR 6/6, 6/7). To the naked eye, the fabric is coarse or very coarse, with brown, big-sized inclusions and some whitish, medium- sized particles.
The texture of freshly broken sections can be granular or irregular, the matrix is quite carbonatic with unsorted temper.
The matrix is rather compact and voids are not very frequent, mostly vughy- or channel-shaped (0.02/1.00-1.20 mm). The fabric presents a notable amount of temper of various origin and different sizes: from small to big (0.02/2.00 mm). The greyish-transparent quartz component is not very frequent and generally spherical/angular-shaped, (0.06/0.60 mm). Mica is frequent or infrequent, very small (0.03 mm), of spherical/angular shape and usually of shiny aspect. White grains of calcium carbonate of subspherical/rounded shape are frequently attested and show variable sizes (0.03/0.60-2.00). Micritic clots cannot be observed in all of the samples; generally, they appear to be frequent, whitish-yellowish and of spherical-subelongate/rounded-subrounded shape (0.03/0.24 mm). This fabric also presents a frequent quantity of light red, large (0.60/2.00 mm) inclusions of unidentified nature and spherical/angular-subangular shape. Iron oxide concretions are frequent and show two different colours: brownish/black or reddish/brownish of spherical-subspherical-subelongate/rounded shape (0.03-06/0.60-1.00 (singular) mm). Finally, in some cases, the presence of greyish inclusions of subspherical/angular shape (0.60/1.50-2.00 mm) can be noted.

Fig. 7. Microphotos 8x: **a.** M 111/20; **b.** M 111/21; **c.** M 111/22; **d.** M 111/23.

4. Ceramic Building Material

The fabrics HIM-CBM are formed by two samples taken from kalypters (M 112/2, M 112/3) and one sample chipped from a well enclosure (M 111/19). They correspond to the previous fabric HIM-REG-CBM-1.

HIM-CBM-1

Ref. M 112/2 (M 111/19)

The colour of the matrix appears of brownish-reddish or pinkish tones (Munsell 7.5YR7/4 and 5 YR 6/6). To the naked eye, the fabric is coarse with large and inclusions of reddish-brown or white colour. The texture of freshly-broken sections is granular and irregular; the matrix is quite carbonatic and temper distribution is unsorted. Voids are frequent, mostly vughy- and channel-shaped and of different sizes (0.04/0.50-79 mm). Some very large caves can be noted. The temper-size varies from a minimum of 0.03-06 to a maximum of 2.00-2.50-3.00 mm. Quartz is frequent, spherical/angular-shaped and of whitish-greyish-transparent colour (0.15/0.60 mm). Spherical/angular, small (0.03/0.09 mm) mica particles of a typical shiny aspect are frequent. Calcium carbonate, generally part of the matrix, shows two variants: frequent, white-yellowish, spherical-subspherical/rounded inclusions of different size (0.06/1.00 mm) or very frequent, white-yellowish, small-sized (0.03/0.15 mm) micritic clots of spherical/rounded shape. Iron oxide concretions are frequent-infrequent and consist of spherical-elongate/rounded and medium-large (0.06/0.30-2.00 mm) particles of reddish-brown or brownish-black colour. Furthermore, light red, very large (0.15/3.00 mm) inclusions of subspherical/angular shape (for example in M 111/19, fig. 8.a) and of unidentified nature are frequent. Finally, there is a sporadic presence of greyish, big-sized (0.60/2.50 mm) inclusions (for example in M 112/2, fig. 8.b) of subspherical/rounded shape.

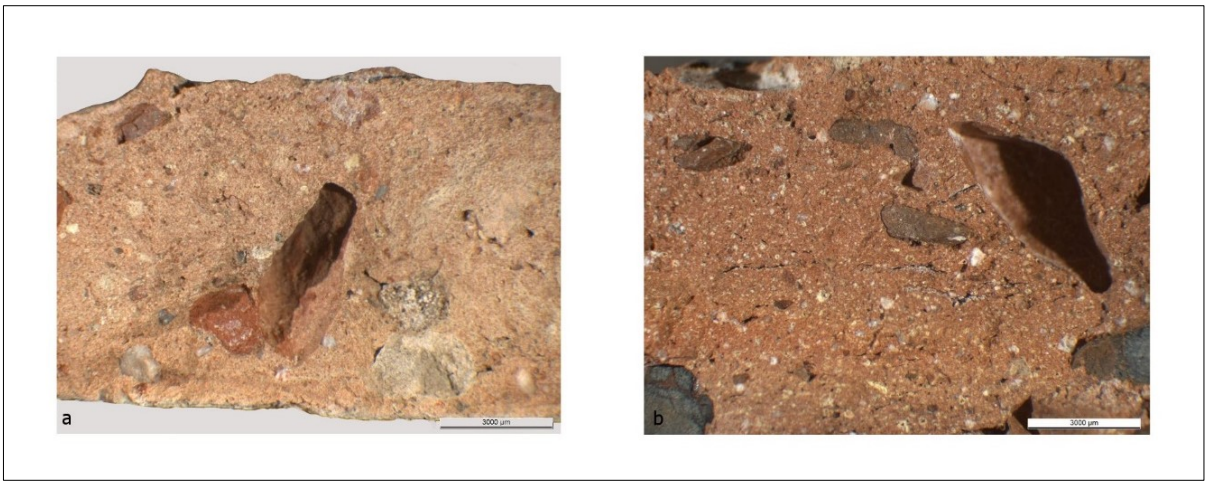

Fig. 8. Microphotos 8x: **a.** M 111/19; **b.** M 112/2.

HIM-CBM-2
Ref. M 112/3

In comparison to CBM-1, the main characteristic of the present HIM-CBM-2 consists of a higher percentage of big-sized calcium carbonate and a lower amount of smaller-sized inclusions. The colour of the matrix is dark brown (Munsell 2.5 YR 4/2). To the naked eye, the fabric appears to be coarse and granular with many medium- and small-sized, yellowish-whitish particles and some large, dark inclusions. Vughy- or channel-shaped voids are quite frequent (0.04 to 0.40 mm).

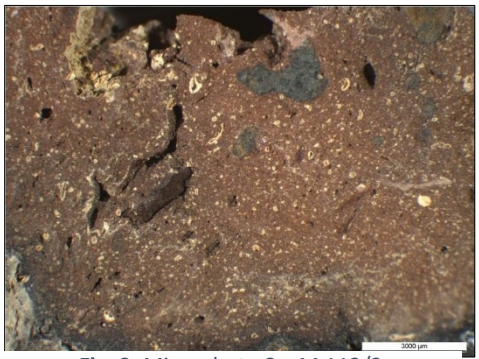
Fig. 9. Microphoto 8x: M 112/3

The characteristics of texture, matrix and temper distribution are quite similar to HIM-CBM-1: inclusions are generally sized between 0.02-03/2.00 mm. Quartz is infrequent, very small (0.03 mm), of spherical/angular shape and of whitish-greyish-transparent colour. Mica is quite frequent, very small-sized (0.03 mm) and of spherical/angular shape. The carbonate component appears to be generally part of the matrix and consists of an infrequent presence of white-orangish, spherical/rounded and small-medium-sized grains (0.15/0.60 mm) and a very frequent concentration of micritic clots. They appear mostly of spherical-subspherical/rounded-subrounded shape and of whitish-yellowish colour (0.03/2.00 mm). Finally, frequent, red iron oxide concretions of reddish/brownish or dark red colour of spherical/rounded shape and variably sized (0.06/1.00 mm) and frequent, large (0.60/2.00 mm) grey inclusions of subspherical/rounded shape have been noted.

5. Glazed Ware
The denomination of this fabric is the result of the combined, archaeometric-archaeological research mentioned above, applied to the previous fabrics HIM-REG-G-1 and G-2.

HIM-G-1
Ref. M 110/2 (M 110/1, M 110/4)

The colour of the matrix is brown or reddish-yellow with some greyish tones (Munsell 7.5 YR 5/2, 5/3, 6/6). To the naked eye, the fabric appears to be fine and depurated with no visible temper, or, in some cases, with a very few, small-sized inclusions of white colour.
Voids are quite frequent, mostly vughy- and channel-shaped, with some chambers. Their size varies from 0.04 to 0.50-1.00 mm, exceptionally around 3.00 mm.
The texture is fine or granular with a carbonatic matrix, temper distribution is mostly unsorted, and temper-size is generally small (0.02/0.30 mm). The finest sample is M 110/4 (fig. 10.c), while, M 110/1 (fig. 10.a) and M 110/2 (fig. 10.b) show a major concentration of calcium carbonate of infrequent, white, spherical/well rounded, small grains (0.02-03/0.60 mm). Micritic clots are very frequent, whitish-yellowish, spherical/well rounded-rounded and of variable size (0.02-04/0.16-1.00 mm). Mica is not visible in all of the samples and appears to be infrequent, shiny, subelongate/angular and very small-sized (0.01-04 mm). Whitish-greyish-transparent quartz can be frequent (M 110/2-4, fig. 10.b-c) or infrequent (M 110/1, fig. 10.a) and of spherical-subelongate/angular shape (0.08/0.16-30 mm). Sporadic/infrequent

is the presence of some reddish iron oxide concretions of spherical/subangular shape (0.08 mm) and of blackish spherical/rounded, very small (0.03 mm) inclusions.

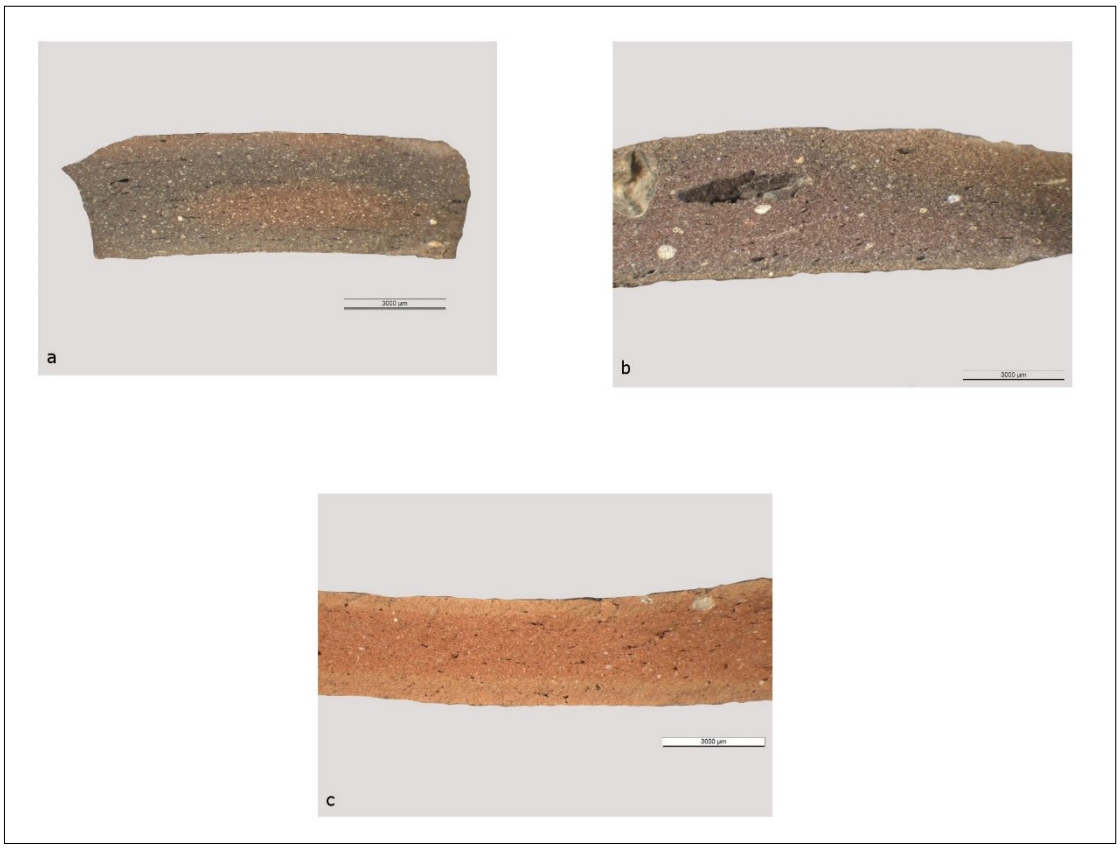

Fig. 10. Microphotos 8x: **a.** M 110/1; **b.** M 110/2; **c.** M 110/4.

References

Alaimo, R., R. Giarrusso, and G. Montana. 1999. “Primi dati archeometrici sulle coppe tipo ´lato K480`.” In *Colle Madore. Un caso di ellenizzazione in terra sicana*, edited by S. Vassallo, 273-82. Palermo: Nuova Graficadue.

Bechtold, B., S. Vassallo, and F. Ferlito. 2019. “La produzione delle anfore greco-occidentali di Himera: uno studio sulla loro identificazione.” In *Notiziario Archeologico della Soprintendenza di Palermo*, 51, https://www.regione.sicilia.it/beniculturali/dirbenicult/NotiziarioArcheoPalermo.html.

Bechtold, B. 2020. “Western Greek amphorae produced at Himera.” In FACEM (version December/06/2020) (http://www.facem.at/project-papers.php).

Cau Ontiveros, M.A., P.M. Day, and G. Montana. 2002. “Secondary calcite in archaeological ceramics: evaluation of aliteration and contamination processes by thin section study.” In *5th European Meeting on Ancient Ceramic – EMAC (Athens 1999). Modern Trends in Scientific Studies on Ancient Ceramics*, edited by V. Kilikoglou, A. Hein, and Y. Maniatis, 9-18. BAR International Series 1011. Oxford.

Montana, G., I. Iliopoulos, V. Tardo, and C. Greco. 2009. “Petrographic and Geochemical Characterization of Archaic-Hellenistic Tableware Production at Solunto, Sicily.” *Geoarchaeology: An International Journal,* Vol. 24, No. 1: 86-110.

Montana, G., A.M. Polito, and A. Sulli. 2011. *Le «argille ceramiche» della Sicilia occidentale e centrale*. Enna: IlionBooks Ed.

Montana, G., L. Randazzo, and B. Bechtold. 2020. ”The Beginning of Western Greek Amphorae Production in Western Sicily: Archaeometric and Archaeological Studies on 6th-5th centuries BCE Amphorae Manufactured in Himera.” In *Minerals* 10,762.

Trapichler, M. 2011. “Fabrics of Himera.” In FACEM (version 06/06/2011) (http://www.facem.at/project-papers.php)

Vassallo, S. 2018. “Bibliografia ragionata sulle necropoli di Himera.” In *Notiziario Archeologico della Soprintendenza di Palermo*, 30, https://www.regione.sicilia.it/beniculturali/dirbenicult/NotiziarioArcheoPalermo.html

This article should be cited as F. Ferlito, “New fabrics of the production centre of Himera“. In FACEM (version December/06/2020) (http://www.facem.at/project-papers.php)