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The ceramics of Yughbī (Qatar), one of the earliest Islamic sites of the Gulf

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Summary

In this paper the results of the macroscopic and petrographic analysis of the ceramics of the site of Yughbī are presented. This site was excavated in 2018, during the final fieldwork campaign of The Crowded Desert Project. It is so far the earliest Islamic site known in Qatar and one of the earliest ones in the Gulf, and it features a very well contextualized ceramic assemblage of 697 sherds, most of which date to a period between AD 660s and 770s.

The ceramics of Yughbī have been studied both macroscopically and with petrographic microscopy. The combination of both analyses shows the presence of South Iraqi, Eastern Arabian, and Indian wares, but an almost total lack of Iranian wares. The comparison of connectivity profiles between the ceramics of Yughbī and those of other sites of the same period (late Sasanian and early Islamic) indicate a certain similarity with Ṣohār and, to a lesser extent, with Kush and Bushehr. The ceramic assemblage of Yughbī is much less similar to that of closer sites, such as Ṣīr Banī Yās, Sīrāf, or Bilād al-Qadīm.

Keywords: Qatar, Gulf archaeology, early Islamic archaeology, archaeological ceramics, ceramic petrography

Introduction

This paper offers some recent results of the analysis of ceramics recovered during the archaeological excavation of Yughbī, in north-western Qatar (Fig. 1), in the context of The Crowded Desert Project, developed between 2015 and 2019 as a collaboration between UCL Qatar, Qatar Museums and, since 2018, the University of Leicester (Carvajal López et al. 2016; 2017; 2018; 2020). These results can be combined with others that have been produced in the last few years and that are contributing to shape a landscape of ceramic studies in the Gulf that will be useful for provenance studies (Ashkanani 2014; Ashkanani & Kovar 2021; Blackman, Méry & Wright 1989; Carvajal López et al. 2019; Carvajal López, Guérin & Georgakopoulou 2022; Carvajal López, Priestman & Georgakopoulou 2023; Mason & Keall 1991; Méry 1991; 1995; 2000; Mynors 1983; Ownby 2014; Stremtan et al. 2012; Zampierin et al. 2024; Živković et al. 2019). The value of this information will be made clear in this paper, as it shows how a number of vessels can be identified as clearly foreign to the local and regional networks of the Gulf (or at the very least, that they were not made in the local or regional production centres and/or with techniques and raw materials associated to local or regional production).

Yughbī is an archaeological site in north-western Qatar. It is what remains of the activity of a nomadic group that underwent a process of sedentarization, resulting in a settlement of permanent houses where previously there had been only a (possibly) seasonal campsite. It was excavated in 2018, with four trenches that documented at least five buildings, although there are more unexcavated buildings, perhaps a total of ten. The excavations documented three phases of occupation, all dated with AMS radiocarbon analysis: Phase I (AD 530s to 660s), when the site, made of tents or temporary structures, was frequented by nomads; Phase II (AD 660s–770s), when most of the permanent buildings were erected and used; and Phase III (AD 760s–880s), when the site was abandoned but nonetheless frequented. Phase II was where almost the totality of the pottery was found. The contexts in which the pottery was found were predominantly levels of collapse, but floors or contexts of abandonment are also documented. This phase was dated by AMS radiocarbon dates to a range between AD 660s and 770s, in other words, matching the Umayyad period (AD 661–750) quite precisely. The ceramics of Yughbī, therefore, can be dated with great accuracy to a period of *c.*100 years (Carvajal López et al. 2020).

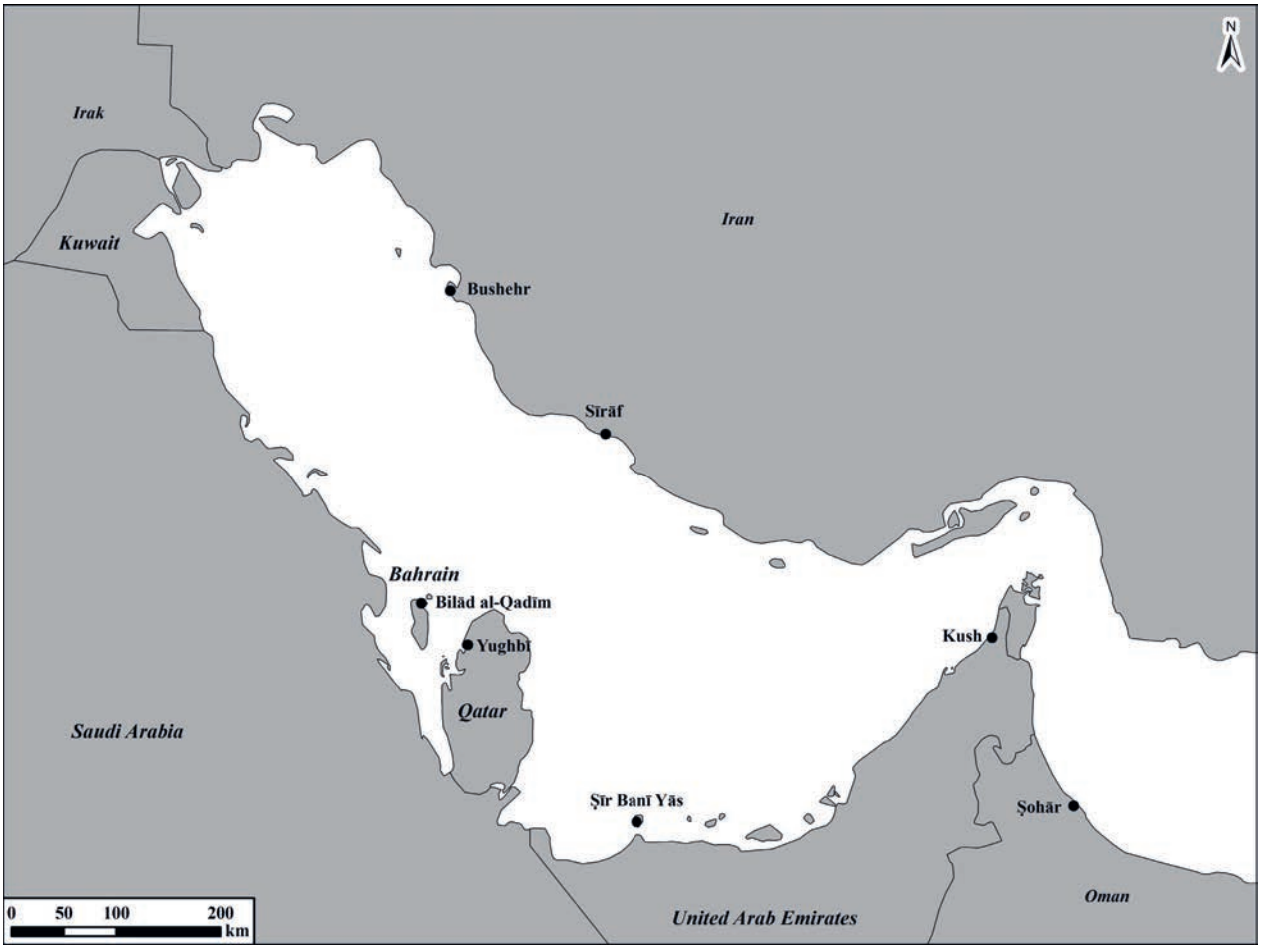

Figure 1. *A map showing the location of Yughbī and other sites mentioned in the text (map J. Rouco Collazo).*

Ceramic and petrographic analysis: methods and results

The assemblage of ceramics from Yughbī is very poorly conserved. There are few sherds (about 697 in total) and only a handful of them are diagnostic. Despite this, the assemblage is interesting for its stratigraphic contextualization and its historical significance, and therefore deserving of full investigation. A classification was attempted based on a macroscopic analysis of the wares. In this paper, the results of this classification (Fig. 2) are combined with the petrographic analysis and then compared with other studies in the Gulf and, where possible, with Seth Priestman's (2021a) Indian Ocean Pottery Classification (IOPC). For the petrographic analysis, a set of ninety-five sherds was selected from the main macroscopic categories and is therefore representative of the totality of the assemblage. The selection comprised a sufficient number of samples of each major macroscopic category to ensure that all the variability within the group was included. This number depends on the variability observed in the macroscopic analysis (the higher the variability, the higher the number) and on the availability of sherds (viable to make thin sections) for sampling, and it is therefore quite different for each category. The selected samples were prepared as thin sections and analysed at the laboratories of the School of Archaeology and Ancient

Macroscopic category	No. before corrections	IOPC Class(es)	Petrographic fabric
Turquoise-Glazed wares	14	TURQ.T	Fabric 5 (14)
	2	TURQ.YG	Fabric 6 (2)
Buff ware	33	Indeterminate	Fabric 3 (19)
			Fabric 8 (8)
			Fabric 1 (2)
			Fabric 5 (2)
			Loners (2)
Fine Sandy ware	19	Indeterminate	Fabric 3 (7)
			Fabric 1 (6)
			Fabric 4 (3)
			Fabric 8 (3)
Not assigned (Torpedo wares)	0	TORP.S and TRC	No sherds originally assigned, but corresponds to Fabric 4 after corrections
LINVES	4	LINVES	Fabric 7 (4)
ORGPINQ	13	Not applicable	Fabric 8 (10)
			Fabric 7 (2)
			Fabric 3 (1)
Tannūr-SBBW	8	SBBW?	Fabric 2 (6)
			Fabric 3 (1)
			Fabric 4 (1)
Other	2	FOPW	Loner (1)
		HARLIM family	Loner (1)

Figure 2. *The relation between macroscopic categories, IOPC Classes (as in Priestman 2021a) and petrographic fabrics discussed in this paper. All the figures included in the table are considered before applying the corrections discussed in Figures 7–9.*

ID	Macroscopic category	IOPC class	Fabric	ID	Macroscopic category	IOPC class	Fabric
YOG001	Buff ware	NA	8	YOG043	Fine Sandy ware	IND	1
YOG002	Buff ware	IND	3	YOG044	Fine Sandy ware	IND	1
YOG003	Buff ware	IND	3	YOG045	Fine Sandy ware	IND	1
YOG004	Buff ware	IND	3	YOG046	Fine Sandy ware	IND	3
YOG005	Buff ware	IND	3	YOG047	Other	HARLIM (rel.)	Loner
YOG006	Buff ware	NA	8	YOG048	Other	FOPW.1/2	Loner
YOG007	Buff ware	IND	3	YOG049	LINVES	LINVES	7
YOG008	Buff ware	IND	3	YOG050	LINVES	LINVES	7
YOG009	Buff ware	IND	3	YOG051	LINVES	LINVES	7 (rel.)

ID	Macroscopic category	IOPC class	Fabric	ID	Macroscopic category	IOPC class	Fabric
YOG010	Buff ware	IND	3	YOG052	LINVES	LINVES	7
YOG011	Buff ware	IND	3	YOG053	ORGPINQ	LINVES	7
YOG012	Buff ware	IND	3	YOG054	ORGPINQ	NA	8
YOG013	Buff ware	IND	3	YOG055	ORGPINQ	NA	8
YOG014	Buff ware	NA	8	YOG056	ORGPINQ	NA	8
YOG015	Buff ware	NA	8	YOG057	ORGPINQ	NA	8
YOG016	Buff ware	NA	8	YOG058	ORGPINQ	NA	8
YOG017	Buff ware	IND	3	YOG059	ORGPINQ	NA	8 (rel.)
YOG018	Buff ware	TURQ.T	5	YOG060	ORGPINQ	NA	8
YOG019	Buff ware	TURQ.T	5 (rel.)	YOG061	ORGPINQ	NA	8
YOG020	Buff ware	IND	3	YOG062	ORGPINQ	IND	3
YOG021	Buff ware	IND	3	YOG063	ORGPINQ	LINVES	7 (rel.)
YOG022	Buff ware	NA	8	YOG064	ORGPINQ	NA	8
YOG023	Buff ware	IND	3	YOG065	ORGPINQ	NA	8
YOG024	Buff ware	NA	8	YOG072	*Tannūr*-SBBW	IND	3
YOG025	Buff ware	NA	8	YOG073	*Tannūr*-SBBW	SBBW?	2
YOG026	Buff ware	IND	3	YOG074	*Tannūr*-SBBW	SBBW?	2
YOG027	Buff ware	IND	3	YOG075	*Tannūr*-SBBW	SBBW?	2
YOG066	Buff ware	IND	3	YOG076	*Tannūr*-SBBW	SBBW?	2
YOG067	Buff ware	IND	1	YOG077	*Tannūr*-SBBW	SBBW?	2
YOG068	Buff ware	HARLIM (rel.)	Loner	YOG078	*Tannūr*-SBBW	SBBW?	2
YOG069	Buff ware	IND	3	YOG079	*Tannūr*-SBBW	TORP.S/TRC	4
YOG070	Buff ware	IND	1	YOG080	Turquoise Glazed	TURQ.T	5
YOG071	Buff ware	HARLIM (rel.)	Loner	YOG081	Turquoise Glazed	TURQ.T	5
YOG028	Fine Sandy Ware	TORP.S/TRC	4	YOG082	Turquoise Glazed	TURQ.T	5
YOG029	Fine Sandy Ware	IND	1	YOG083	Turquoise Glazed	TURQ.T	5
YOG030	Fine Sandy Ware	IND	1	YOG084	Turquoise Glazed	TURQ.T	5
YOG031	Fine Sandy Ware	IND	1	YOG085	Turquoise Glazed	TURQ.T	5
YOG032	Fine Sandy Ware	NA	8	YOG086	Turquoise Glazed	TURQ.YG	6
YOG033	Fine Sandy Ware	NA	8	YOG087	Turquoise Glazed	TURQ.T	5
YOG034	Fine Sandy Ware	NA	8	YOG088	Turquoise Glazed	TURQ.T	5
YOG035	Fine Sandy Ware	TORP.S/TRC	4	YOG089	Turquoise Glazed	TURQ.T	5
YOG036	Fine Sandy Ware	IND	3	YOG090	Turquoise Glazed	TURQ.T	5
YOG037	Fine Sandy Ware	IND	3	YOG091	Turquoise Glazed	TURQ.T	5
YOG038	Fine Sandy Ware	TORP.S/TRC	4	YOG092	Turquoise Glazed	TURQ.T	5
YOG039	Fine Sandy Ware	IND	3	YOG093	Turquoise Glazed	TURQ.YG	6
YOG040	Fine Sandy Ware	IND	3	YOG094	Turquoise Glazed	TURQ.T	5
YOG041	Fine Sandy Ware	IND	3	YOG095	Turquoise Glazed	TURQ.T	5
YOG042	Fine Sandy Ware	IND	3				

Figure 3. *A list of samples from Yughbī and their attributions. The IOPC classes are extracted from Priestman 2021a; IND = Indeterminate; rel. = related.*

Fabric number and name (and sub-fabrics)	Textural characteristics	Main inclusions	Technological implications
Fabric 1: Tempered with quartzitic sand	Low porosity (3–10%) and very abundant inclusions (20–40%). Poorly sorted, non-aligned inclusions, weakly unimodal (coarse and fine fractions seem to have slightly different characteristics).	Rounded monocrystalline quartz (Predominant; <1.2 mm). Other inclusions in the coarse and fine fractions include fossiliferous limestone (Few to Very Few), polycrystalline quartz (Few to Very Few), clay pellets and calci-mudstone pellets (Few to Absent) rounded feldspar and serpentinite (Rare to Very Rare) and muscovite laths (Very Rare).	The matrix is clearly different from the main inclusions, which suggests sand tempering. There is very little optical activity, so the estimated firing temperature would have been high, between 850 and 1000°C.
Fabric 2: Layered fabric tempered with quartzitic sand **(SBBW?)**	Abundant porosity (10–30%) and moderate inclusions (10–20%). Well sorted, roughly aligned inclusions, unimodal.	Rounded monocrystalline quartz (Predominant; <1.2 mm), Clay Pellets (Common to Few; <1.4 mm). Other inclusions in the coarse and fine fractions include fossiliferous limestone (Few to Very Few), polycrystalline quartz (Very Few), feldspar and serpentinite (Rare) and mica, siltstone and granitoids (Very Rare).	The matrix is clearly different from the main inclusions, which suggests sand tempering. The layered and open porosity and the longitudinal clay whirls aligned with the margins suggest that the body was structured with layers of clay that did not always stick together. There is abundant optical activity, so the estimated firing temperature would have been low, under 900°C.
Fabric 3: Calcareous fabric with quartzitic sand and oolites	Low to moderate porosity (3–15%) and abundant inclusions (20–30%). Moderately sorted, non-aligned inclusions, weakly unimodal (coarse and fine fractions seem to have slightly different characteristics).	Monocrystalline quartz (Dominant; <1.2 mm), fossiliferous limestone (Dominant to Few; <4 mm), calci-mudstone pellets (Dominant to Few; <2 mm). Other inclusions in the coarse and fine fractions include serpentinite (Few), polycrystalline quartz and plagioclase (Very Few), euhedral epidote (Very Rare), and chert (Frequent in the fine fraction only).	Similar to Fabric 1, but sand tempering is not as clear. Similar estimated firing temperature to Fabric 1, for the same reasons.
Fabric 4: Fine Sandy Fabric with quartz, oolites, and serpentinite **(TORP.S or TRC)**	Low porosity (1–5%) and high number of inclusions (30–40%). Well sorted, poorly aligned inclusions, strongly unimodal.	Monocrystalline quartz (Dominant; <0.6 mm), micritic limestone (Dominant; <0.4 mm); serpentinite (Frequent–Few; <1.4 mm), polycrystalline quartz (Common–Few; <0.8 mm). Other inclusions in the coarse and fine fractions include granitoids (Few), amphibole (Very Few), and shale (Rare). There is Frequent to Common mudstone in the fine fraction only.	This fabric seems to be the result of an elaborated clay recipe, probably including a careful selection and grinding of components. The firing is very homogeneous. Similar estimated firing temperature to Fabric 1, for the same reasons.
Fabric 5: Fine fabric with angular grains of quartz and serpentinite **(TURQ.T)**	Low porosity (3–7%) and low to moderate inclusions (5–20%, mostly 10%). Moderately well sorted, poorly aligned inclusions, strongly unimodal.	Monocrystalline quartz (Predominant–Frequent; <0.3 mm), serpentinite and mudstones (Frequent; <0.3 mm); fossiliferous limestone and birefringent intermediate mafic minerals (Common–Few; <0.3 mm). There is also granitoids (Few), feldspar (Very Few), and biotite and chert (Rare) in the coarse and fine fractions.	This fabric is very similar to Fabric 4, but the mineral component is slightly different. Similar estimated firing temperature to Fabric 1, for the same reasons.

Fabric number and name (and sub-fabrics)	Textural characteristics	Main inclusions	Technological implications
Fabric 6: Coarse fabric with angular grains of quartz and serpentinite **(TURQ.YG)**	Low porosity (3–5%) and moderate inclusions (20%). Moderately well sorted, poorly aligned inclusions, strongly unimodal.	Monocrystalline quartz (Dominant; <0.4 mm), serpentinite (Dominant; <0.8 mm), mudstone (Frequent; <0.2 mm), siltstone (Common; <0.8 mm). There is also fossiliferous limestone and chert (Very Few) in the coarse and fine fractions, and Common polycrystalline quartz in the fine fraction only.	Like Fabric 5, this fabric is very similar to Fabric 4, but the mineral component is slightly different. It also differs from Fabric 5 itself, suggesting a different provenance. Similar estimated firing temperature to Fabric 1, for the same reasons.
Fabric 7: Fine fabric with organic inclusions in a quartzitic matrix **(LINVES)**	Moderate porosity (10–20%) and abundant inclusions (20–30%). Moderately well sorted, poorly aligned inclusions, unimodal.	Monocrystalline quartz (Dominant; <0.6 mm), fossiliferous limestone (Frequent; <0.2 mm), siltstone (Common; <0.8 mm), clay pellets (Frequent; <0.3 mm), calci-mudstone pellets and granitoids (Common; <0.8 mm), serpentinite (Common to Rare; <0.3 mm). There is also plagioclase (Few), amphibole (Very Few), clay pellets with evaporitic rocks (Few to Absent), grog, pyroxene and muscovite (Very Rare) in the coarse and fine fractions.	There is some elaboration in the clay recipe, as revealed by the addition of vegetal inclusions and even grog, although this is very scarce. There is some variation in the type of igneous rocks and in the amount of vegetal temper, so there seems to be some representation of different processes of clay preparation. The conservation of calcite and the abundant optical activity suggest that the fabric was fired to a moderate to high equivalent temperature (750–900°C).
Fabric 8: Fine fabric with wackes and mudstone over a quartzitic matrix **(ORGPINQ)**	Low porosity (3–7%) and very abundant inclusions (40–50%). Moderately well sorted, non-aligned inclusions, unimodal size distribution.	Monocrystalline quartz (Dominant; <1 mm), wackes to mud rocks (Frequent; <4 mm), calci-mudstone pellets (Common to Absent; <2.4 mm). There is also micritic limestone and orthoclase (Few), serpentinite, mica laths and granitoids (Very Few), and plagioclase (Very Rare) in the coarse and fine fractions.	The addition of temper is possible, although not very clear. The fabric was fired to a wide range of equivalent temperature (above 700 and up to 900°C).

Figure 4. *A description of petrographic fabrics identified in the assemblage studied in this paper.*

History of the University of Leicester.[1] The analysis of the thin sections was undertaken with a petrographic microscope Axio Scope 5 POL of Zeiss, following the methodology established by Ian Whitbread (1995: 365–396; 2001) and Patrick Quinn (2013). After analysis, the thin sections were classified in a total of eight fabric groups[2] and four loners (see Figs 3 & 4). The fabrics will be discussed below in relation to the main ware categories, which are listed in the order of their abundance (in terms of raw counts of sherd numbers) in the assemblage of the excavation.

[1] I wish to thank Sarah Morriss and Judith López Aceves, who contributed to the preparation of thin sections at different stages of the process.

[2] Among the count of these eight fabrics, four related samples have been included to simplify the count. Related samples are cases that do not fit exactly within the parameters established for the fabrics but which are closer to them than to any other group. The four related samples (indicated in Fig. 3) are related to Fabrics 5 (one), 7 (two), and 8 (one). The description of the related samples will be presented in more detail in future publications.

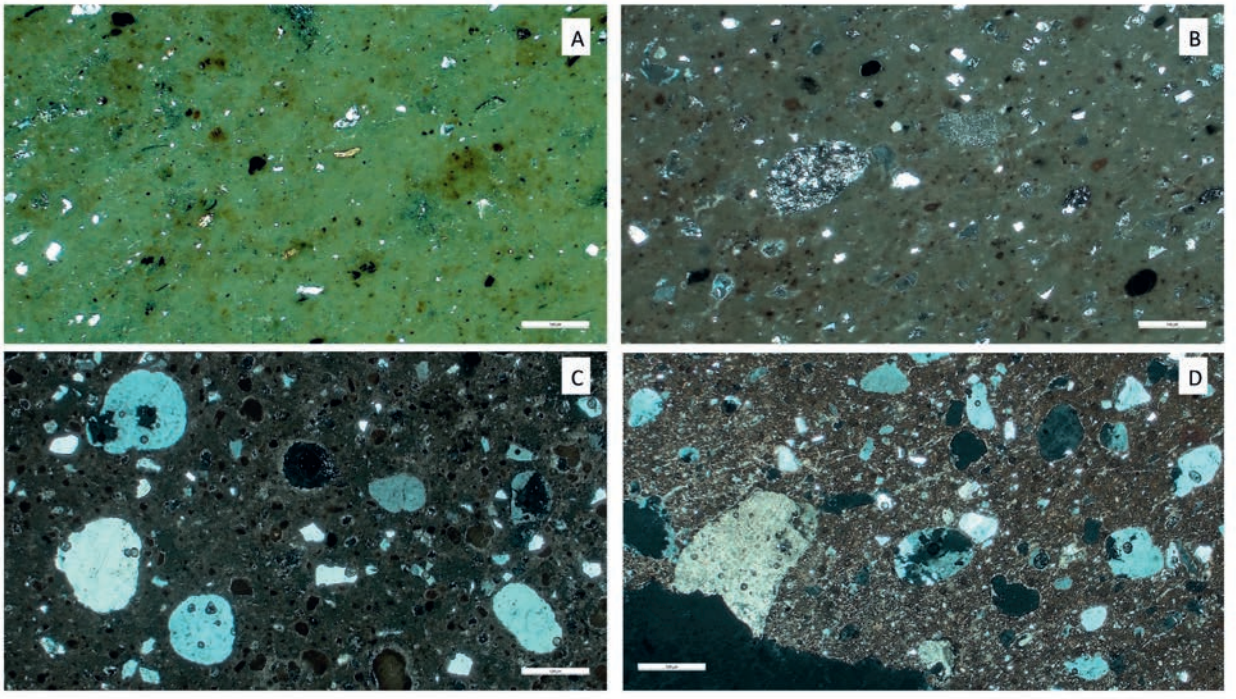

Figure 5. *A. Fabric 5 in XP, showing fine inclusions of quarzitic rocks and other birefringent minerals over a generally homogeneous matrix;* **B.** *Fabric 6 in XP, very similar to Fabric 5, but showing larger grains of serpentinite as well;* **C.** *Fabric 3 in XP, showing abundant grains of quartz (the larger are rounded, the smaller more angular) and calci-mudstones over a calcareous matrix;* **D.** *Fabric 1 in XP, showing grains of mono- and polycrystalline quartz over a non-calcareous matrix. Two grains of fossiliferous limestone can be seen near the surface. All scales are 500 µm (= 0.5 mm).*

Turquoise-Glazed wares

The first group of sherds to consider is the one related to the Turquoise-Glazed wares. This category is easily distinguished thanks to its glaze, or remains of glaze, and it is represented by several diagnostic sherds of the seventh and eighth centuries, in particular several large transport jars with chain ridge decorations, several carinated bowls (with the characteristic Form 72, an indicator of the eighth century, as noted in Kennet 2004: 35–37, 132) (Fig. 5). The analysis shows that Fabrics 5 and 6, with the same composition but with different degrees of coarseness, are related to these sherds. Fabric 5 is a *Fine fabric with angular grains of quartz and serpentinite* (Fig. 5/A) and Fabric 6 is a *Coarse fabric with angular grains of quartz and serpentinite* (Fig. 5/B). The difference between Fabrics 5 and 6 is also consistent with Priestman's IOPC, where two classes are identified: TURQ.T would correspond to Fabric 5 and TURQ.YG to Fabric 6 (Priestman 2021a: 90–91). In total, sixteen sherds of Turquoise-Glazed vessels from Yughbī were analysed, and only two could be ascribed to Fabric 6 (the rest are all Fabric 5). The two sherds of Fabric 6 belonged to large jars. It could be argued that this fabric is be more suitable to produce these large vessels, because larger bulky inclusions like those featured by Fabric 6 increase the 'toughness' or the resistance to the propagation of cracks in the vessels as well as increase the porosity of the fabric and reduce its overall weight (Müller et al. 2010; 2015). However, the analysis shows that Fabric 5 has also been used in large jars and the differences between fabrics, therefore, are not necessarily based on the shape of the vessel.[3] Different fabrics may reflect a range of quarries

[3] In fact, Fabric 5, with less abundant and smaller-size inclusions, would have more *strength*, that is, more resistance to the initiation of new cracks (Müller et al. 2010; 2015).

of raw materials with slight variations, and this may or may not correspond to variations in the workshops. It is quite well established that the Turquoise-Glazed classes come from southern Iraq, and Basra has been established as one possible production centre (Mason & Keall 1991; Hill, Speakman & Glascock 2004). The southern Iraqi provenance seems beyond doubt, but it may be too soon to ascribe fabrics to more specific locations, because this research shows that the southern Iraqi fabrics are varied and more information is still needed.

Buff wares and Fine Sandy wares

The next most abundant group of sherds from Yughbī corresponds to utilitarian unglazed wares that include shapes such as jars, bottles, juglets, and bowls.[4] For the purposes of the petrographic analysis, these sherds were classified into two macroscopic groups: Buff wares and Fine Sandy wares. It is difficult to establish a clear separation between the two groups because the colour and the fineness/coarseness of the sand can vary even within the same shape, but ultimately there seems to be a clear distinction between the Buff wares, with different levels of coarseness, and the Fine Sandy fabrics, with colours that range between pale pink and orange or red, sometimes with paler surfaces. It is important to note that this macroscopic classification did not match the petrographic classification very precisely, thus illustrating the difficulty of establishing compositional differences among these heterogeneous but similar wares at the level of petrology and mineralogy. However, some useful conclusions can be extracted.

One of the most abundant fabrics in the two macroscopic groups is Fabric 3: *Calcareous fabric*, probably tempered with quarzitic sand and oolites (Fig. 5/C). Of the thirty-three Buff sherds analysed, nineteen belong to Fabric 3. Nineteen Fine Sandy sherds were analysed and seven of them belong to the same Fabric 3. Fabric 3 has been more rarely classified in other categories described below (ORGPINQ, one sherd, and *Tannūr*-SBBW, one sherd). This fabric has a very similar matrix to that of the Turquoise-Glazed Fabrics 5 and 6, but its composition, in particular its rounded grains of quartz and intermediate to mafic rocks, is slightly different. This composition is similar to two fabrics identified in Murwab (Carvajal López, Guérin & Georgakopoulou 2022: Fabrics 3 and 4) that probably came from the area between southern Iraq and Kuwait, where the aeolian deposits produce these readily available rounded sands.

The rest of the sherds attributed to the macroscopic groups of Buff and Fine Sandy wares fall within Fabrics 1, 4, or 8. Fabric 8 is the next most abundant but will be discussed later because, due to its characteristics, it is better understood after the discussion of Fabric 7, as explained below. The next most commonly found fabric is Fabric 1: *Tempered with quarzitic sand* (Fig. 5/D), identified in six of the nineteen sherds classified as Fine Sandy ware and in two of the thirty-three identified as Buff ware. This is a bright red fabric, sometimes with pale yellow or buff surfaces, which tends to crumble quite easily if not well fired. Most of the sherds of Fabric 1 are clearly documented in Phase II of the occupation of Yughbī, but the most characteristic example of this fabric is the large jar that was discovered in Phase III corresponding to the Abbasid period. The provenance of Fabric 1, however, is not clear: its inclusions are not entirely different from the fabrics from southern Iraq, but the calcium content in the matrix and in the inclusions is a lot lower, and the use of rounded sand as temper is much clearer (see Fig. 4). Not many other diagnostic sherds are conserved in Fabric 1, but the few that have been documented are very similar to the forms associated to Fabric 3. Since the forms seem to be the same as those of Fabric 3, it seems that Fabric 1 is the result of a clay recipe that aimed to reproduce the texture of the former, so this may be a more local or regional fabric inspired by the shapes and fabrics from southern Iraq. The question of what the terms 'local' or 'regional' mean in this context, however, is difficult to answer. There is no evidence of pottery production in Qatar so far, so it is likely that this fabric may come from a region in Bahrain or eastern Arabia.

The next fabric in terms of abundance among the Buff and Fine Sandy wares is Fabric 4: *Fine sandy with quartz, oolites and serpentinite* (Fig. 6/A), which is very characteristic and easily recognisable in petrography: it is the fabric of the Torpedo jars (TORP.S in the IOPC; see Priestman 2021a: 41–42), dominated by angular inclusions of quarzitic and intermediate to mafic minerals and oolites (also documented in Carvajal López,

[4] An attempt was made to ascribe Buff wares and Fine Sandy wares to IOPC classes, but this led to an ineffectual profusion of many different categories with minimal differences.

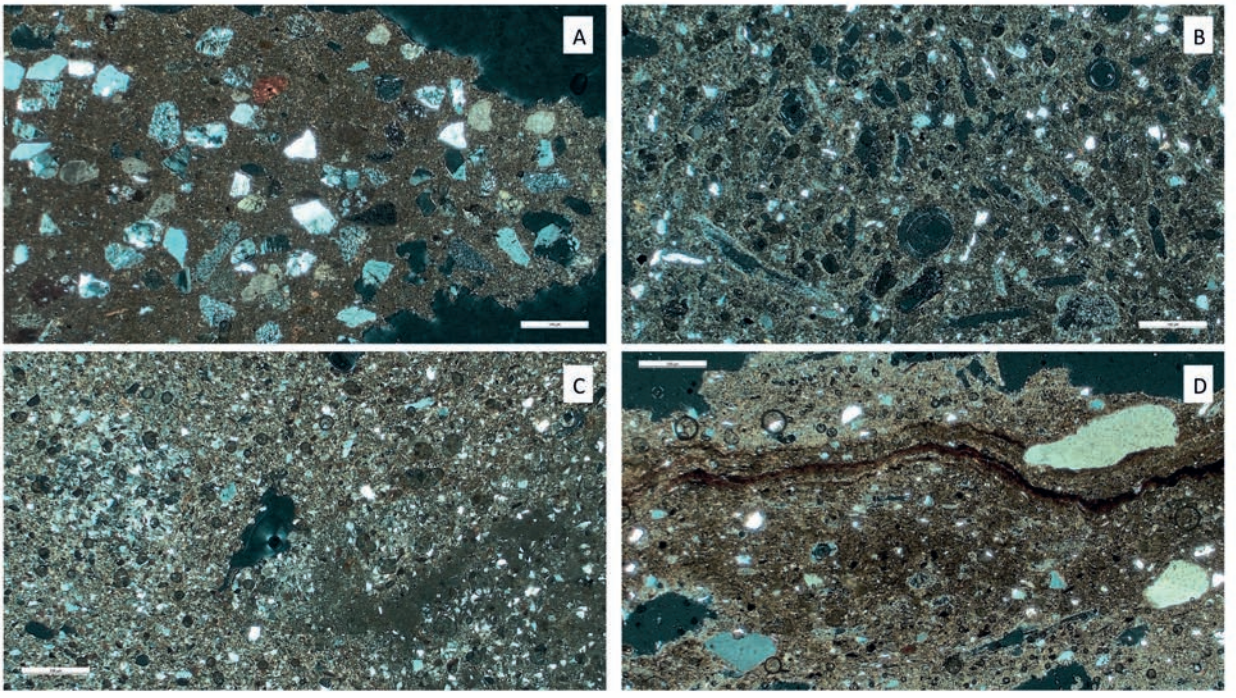

Figure 6. *A. Fabric 4 in XP, showing angular fragments of serpentinite, monocrystalline quartz, and other rocks over a non-calcareous matrix;* **B.** *Fabric 7 in XP, showing abundant elongated pores left by the combustion of vegetal inclusions, as well as mudstones over a quartz-rich matrix;* **C.** *Fabric 8 in XP, showing two wackes (the one on the left richer in quartz, the one of the right richer in clay) over a quartz-rich matrix;* **D.** *Fabric 2 in XP, showing a longitudinal clay whirl on the top and several elongate pores at the bottom of the image. All features and rocks are oriented in the same direction, suggesting a layered structure. All scales are 500 µm (= 0.5 mm).*

Priestman & Georgakopoulou 2023: Fabric 4). Interestingly, the sherds of this fabric do not show bitumen, one of the more easily identifiable features of the Torpedo jars class, and for this reason the macroscopic inspection classified them as Fine Sandy ware (three samples out of the nineteen of this group). One additional sherd of this fabric shows soot marks, and for that reason was classified as a type of kitchenware (*Tannūr*-SBBW). The lack of bitumen and the fire marks allow us to classify these sherds in the IOPC's TRC (Torpedo-related class), which is the same fabric as the Torpedo jars applied to other shapes (Priestman 2021a: 44–45). The Torpedo fabric seems to be the result of an elaborate clay recipe that could include the crushing of inclusions until they reach a desired size. Priestman (2021a: 42, 45) considers that they come from southern Iraq or south-west Iran, and their petrological and mineralogical composition is certainly consistent with that possibility.

Exotic wares: LINVES and ORGPINQ

The next two groups are considered exotic from the perspective of Priestman (2021b: 175), in the sense that they are considered to come from outside the Gulf (East Africa, South Asia, or East Asia). The first is not very abundant at Yughbī (four sherds in total), but very easily recognisable according to its IOPC description: the class of Large Indian Storage Jars, or LINVES, which has a very characteristic slipped surface, chalky texture, and light weight. All the sherds of this class belong to Fabric 7. In addition, two sherds of what was considered ORGPINQ are also members of this fabric. Fabric 7: *Fine fabric with organic inclusions over a quarzitic matrix* (Fig. 6/B) features characteristic planar voids of vegetal origin. Although it is too soon to offer a clear identification, they could be associated with rice husks. Tomber, Cartwright and Gupta identified this type of inclusion in Roman and

late Roman ceramic jars made in the region of Gujarat, India (2011). Daniele Zampierin also detected this type of inclusion in two of the petrographic fabrics that he studied in two archaeological sites in Dhofar: Rice-Tempered Fabric and the Basalt-Rich Fabric (Zampierin et al. 2024: 17–22, 42–43), that he believes come from the Deccan basin of India (2024: 42–43). In a personal communication about Fabric 7, Zampierin suggests the author of this paper should exercise caution about the identification of rice husks as the origin of the voids in the fabric, but agrees with their association with vegetal inclusions in general and suggests that Fabric 7 could be very similar to his own Basalt-Rich group.[5] Even if the question of the identification of the rice husks must be kept open, the macroscopic and microscopic features of the LINVES class-Fabric 7 support the idea of an Indian provenance.

The next group of sherds and fabric are more easily identified after having considered Fabric 7. The macroscopic group under consideration has been called ORGPINQ, inspired by the IOPC's ORGPIN (Priestman 2021a: 27), but with a different background (ORGPIN was considered by Priestman to be a local Omani ware, ORGPINQ was originally proposed as a local or regional Qatari or Eastern Arabian ware, although its petrographic analysis suggests otherwise). ORGPINQ is a group of orange to red wares, sometimes with buff surfaces, and with characteristic organic inclusions. Most of the ORGPINQ sherds (ten out of thirteen) fall within Fabric 8: *Fine Fabric with wackes and mudstone over a quartzitic matrix* (Fig. 6/C). Fabric 8 is also abundant among the sherds classified as Buff ware (eight out of thirty-three) and Fine Sandy ware (three out of nineteen). This is a very rare fabric for the Gulf and, in fact, the only fabric to which it seems close is Fabric 7, although there is no evidence of vegetal tempering. It is also similar to Zampierin's Medium and Large Inclusions fabric (Zampierin et al. 2024: 22, 43–44), which he suggests could come from South India (2024: 43–44).[6] Fabric 8 seems also similar to Sophie Méry's Petrographic Group G, which she clearly considers characteristic of Indus ceramics (2000: 38–39, 75, pl. 6/3–6). This all suggests that Fabric 8 could be considered another product from India. Caution is needed before we can ascribe a provenance to this fabric with certainty, but at least it is very clear that Fabric 8-ORGPINQ does not have its origin in the Upper Gulf. This is remarkable for a group of ceramics that is so abundant in the assemblage of Yughbī.

Tannūr-SBBW ware

The final group of wares to consider in this overview is also interesting because of the questions it raises. It is a group of sherds that have been clearly subjected to strong thermal stress. Eight sherds were originally classified in this group, but the petrographic analysis showed that two of them are better considered as members of Fabrics 3 (Buff or Fine Sandy ware) and 4 (Torpedo-related class). The rest of these sherds belong to Fabric 2: *Layered Fabric tempered with quarzitic sand* (Fig. 6/D), which has proved to be quite enigmatic. Two possible identifications, reflected in the denomination of the macroscopic group, are considered. One is that they are fragments of vessels of Soft Black Burnished Ware, SBBW in the IOPC (Priestman 2021a: 82–83). However, the complete lack of diagnostic sherds of this class and their poor state of preservation opens another possible alternative identification: they could be *tanānīr* (sing. *tannūr*) built in the floor of the houses of Yughbī. In support of the first possible identification is the fact that the fabric characteristics are very consistent with the description of SBBW in the IOPC, and the fact that none of the sherds of the group was found attached to the floor of the houses (as one would expect of a *tannūr*). In support of their identification as fragments of *tanānīr*, however, there is firstly the fact that their state of preservation is extremely poor, without any diagnostic part and secondly, the petrographic analysis shows that the fabric of most sherds is structured in different layers (as shown by the distribution of pores and textural features), as one would expect from a *tannūr*. Interestingly, if Fabric 2 corresponds to SBBW, its place of provenance would be Gujarat, in the Deccan basin (India), one of the likeliest places of provenance of Fabric 7. The two Fabrics, 2 and 7, do not show strong similarities, but that is not a reason to rule out anything as different types of ceramic can come from the same region. Instead, the *tannūr* hypothesis would

[5] The author wishes to thank D. Zampierin for providing him with a copy of his paper before it was published and for his kind and prompt replies to the author's questions about Fabrics 7 and 8.

[6] Again, I wish to convey my thanks to D. Zampierin for this suggestion.

mean that the clay for the manufacture of Fabric 2 was collected near Yughbī, in Qatar, and that would allow us to characterize a ceramic fabric from Qatar for the first time. Chemical analysis will offer more light on this question, which must remain open for the present.

Loners in the petrographic classification

Although loners are usually not considered significant for analysis, it is worth considering them in this case to end this review. Of the ninety-five samples studied, four samples were considered loners. After analysis, it is clear that the four loners are very different from the rest of the wares analysed in this study, but they can be recognised as fabrics made in Iran, probably near Sīrāf. One of them has been identified as a member of one of the Fine Orange Painted Ware classes of the IOPC (FOPW.1 and FOPW.2; Priestman 2021a: 59–62), whereas the other three, although different from each other, can be considered members of the IOPC family: HARLIM (Hard Lime-Spalled wares); CREAC (cream-coloured wares); and REBROS (Red-Brown Slipped wares). Interestingly, this family of IOPC classes was very abundant in the assemblages of Murwab, Bushehr, and Sīrāf (cf. Carvajal López, Guérin & Georgakopoulou 2022: Fabrics 5 to 10; Carvajal López, Priestman & Georgakopoulou 2023: Fabrics 1 to 3).[7] In contrast, Iranian wares are almost absent from Yughbī.

Wares quantification in Yughbī

The near absence of Iranian wares in Yughbī points to an interesting difference from the patterns of distribution of ceramics in the early Islamic Gulf as they are known, where the Iranian wares usually have a very strong presence. To consider this in more detail it is necessary to have a better understanding of the way in which the assemblage of Yughbī is structured, and that requires careful quantification of the different classes and categories to determine their provenance distributions as accurately as possible. Quantification of ceramics, especially of such a fragmented and poorly conserved assemblage, is complex and was undertaken by sherd count, because diagnostic sherds are very scarce. The petrographic analysis, which offers deeper insights into the mineralogy and petrology of the fabrics of the sherds, provides clarification about the attribution of sherds to particular wares. Since this particular petrographic sample was selected among the totality of the sherds from Yughbī, it can be considered representative of the whole assemblage. Therefore, as a way to approach a distribution of wares that takes into account all the information presented in this paper, the quantification of the ceramics of Yughbī has been corrected together with the finds of the petrographic analysis. Both distributions of wares, uncorrected and corrected, are presented in Figure 7.

The percentages in Figure 7 have been calculated as follows: the ceramic categories documented above have been slightly simplified for easier comparison and Fabrics and Macroscopic Groups (IOPC classes when possible) have been matched together (see Fig. 8). To simplify, Buff ware and Fine Sandy ware have been merged into a new category, Generic Eastern Arabian Unglazed Ware, whereas all the Turquoise-Glazed wares (TURQ.G and TURQ.YG) have been counted together. Similarly, Fabrics 1 and 3 have been merged and Fabrics 5 and 6 have been counted together. A quantification with the simplified categories has been produced (Fig. 7/A) and the same quantification is offered with corrections (Fig. 7/B). The corrected percentages are calculated from figures that emerge from the addition or subtraction of terms calculated from the mismatches between Petrographic Fabrics and Macroscopic Categories in the sample of the ninety-five sherds studied, as follows:

$$A' = A - a/A \times 100 + b/B \times 100 + c/C \times 100...$$

Where A' is the corrected figure of a ware, A is the uncorrected figure (the subset of the 95 sherds of the sample estimated to belong to the ware prior to the petrographic analysis); a is a subset of A containing the number of sherds that the petrographic analysis showed belong to a different ware, B and C are subsets of the ninety-five sherds of the sample estimated to belong to wares different from A; and b and c are respectively subsets of B and C containing the numbers of sherds that the petrographic analysis showed belong to A.

For example, the macroscopic category of Generic Eastern Arabian/South Iraqi Unglazed Ware corresponds to Fabrics 1+3, but the fabric analysis of the sample

[7] Although no precise quantifications have been published from any of these sites, all the selections of materials feature Iranian wares prominently, usually as the most abundant group.

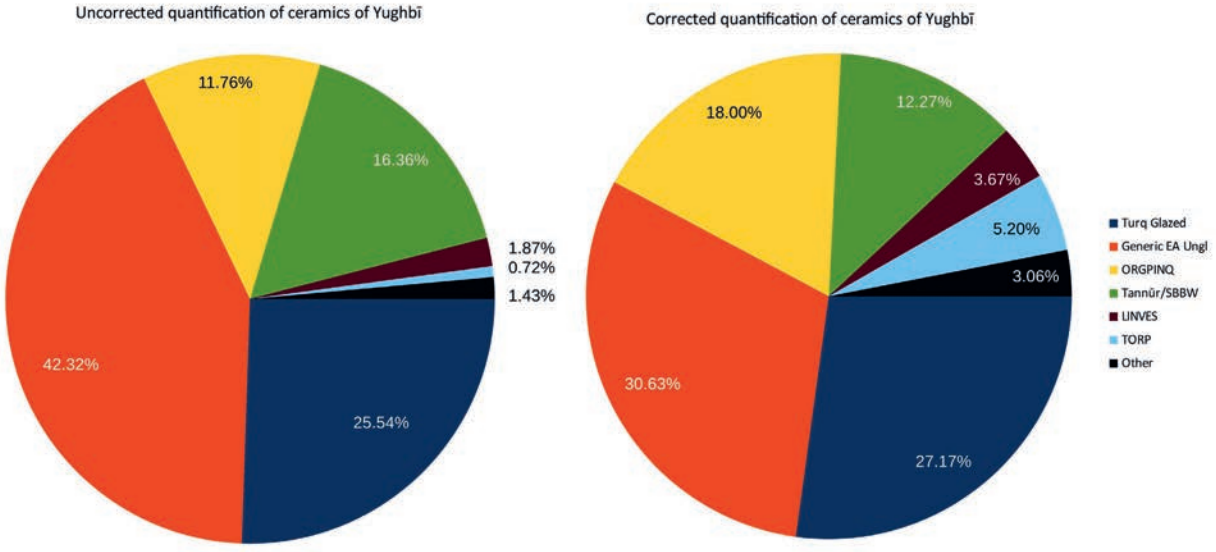

Figure 7. *Quantification of wares in Yughbī, uncorrected (A) and corrected (B) (refer to text for details).*

Quantification category	Macroscopic category/ies	IOPC class(es)	Petrographic fabric(s)	Estimated no. (out of 95)	Corrected no. (out of 95)
Generic Eastern Arabian/ South Iraqi Unglazed ware	Buff ware and Fine Sandy ware	Indeterminate	Fabrics 1 and 3	52	36
Turquoise-Glazed wares	Turquoise-Glazed wares	TURQ.T and TURQ.YG	Fabrics 5 and 6	16	18
ORGPINQ	ORGPINQ	Indeterminate	Fabric 8	13	21
Torpedo wares	Not assigned	TORP.S and TRC	Fabric 4	0	4
LINVES	LINVES	LINVES	Fabric 7	4	6
Tannūr-SBBW	*Tannūr*-SBBW	SBBW?	Fabric 2	8	6
Other	Other	FOPW and HARLIM family	Loners	2	4

Figure 8. *The relation between quantification categories and the rest of the macroscopic categories, IOPC classes, and petrographic fabrics included in the text.*

of ninety-five sherds showed that a total of eighteen sherds of the thirty-three initially classified as Generic Eastern Arabian/South Iraqi Unglazed Ware belong to other categories (11 to Fabric 8 or ORGPINQ, 2 to Fabric 5 or Turquoise-Glazed, 3 to Fabric 4 or Torpedo Jars, and 2 loners); and two sherds initially classified in other categories (1 as an ORGPINQ and 1 as a *Tannūr*/SBBW) actually correspond to Fabric 3 (which is equivalent to the Generic Eastern Arabian/South Iraqi Unglazed Ware). The correction therefore includes a negative

Quantification category	Total no. before correction	Losses in correction (in sample of 95)	Negative correction	Gains in correction (in sample of 95)	Positive corrections	Corrected figure
Generic Eastern Arabian/South Iraqi Unglazed ware	295 (42.32%)	18	-18/52	1 from ORGPINQ	+1/13	213.46 (30.63%)
				1 from *Tannūr*-SBBW	+1/8	
Turquoise-Glazed ware	178 (25.54%)	0	NA	2 from Buff ware	+2/52	189.36 (27.17%)
ORGPINQ	82 (11.76%)	3	-3/13	8 from Buff ware	+11/52	125.48 (18%)
				3 from Fine Sandy ware		
Torpedo wares	5 (0.72%)	0	NA	3 from Fine Sandy ware	+3/52	36.24 (5.2%)
				1 from *Tannūr*-SBBW	+1/8	
LINVES	13 (1.87%)	0	NA	2 from ORGPINQ	+2/13	25.61 (3.67%)
Tannūr-SBBW	114 (16.36%)	2	-2/8	0	NA	85.5 (12.27%)
Other	10 (1.43%)	0	NA	2 from Buff ware	+2/52	21.35 (3.06%)

Figure 9. *Quantification of sherds and corrected quantification based on samples of petrographic study.*

operator (loss for the sherds that should be assigned to other categories: -18/52) and two positive operators (two additions for the numbers of ORGPINQ and *Tannūr*-SBBW in the sample of 95 sherds that were found to belong to Fabric 3: +1/13 and +1/8). The terms of correction of each category are calculated and included in Figure 9.

The corrected quantification of ceramics from Yughbī provides interesting modifications to the percentages of all wares. First of all, the ranking of more to less abundant wares is very similar, but there is an important difference in the third and fourth positions: they are occupied respectively by the *Tannūr*/SBBW wares and ORGPINQ in the uncorrected quantification, but the positions are inverted in the corrected quantification, showing more abundance of ORGPINQ. The corrected quantification, in general, also shows a more relevant presence of the minoritarian groups LINVES, Others, and especially TORP wares, which were much scarcer in the uncorrected quantification. Although it is impossible to determine which one of the two quantifications is closer to what the 'living' distribution of wares would have been, the corrected quantification seems to be more accurate in emphasizing the presence of groups that otherwise would escape attention. For this reason, I will use the corrected quantification in the comparisons that follow.

Comparisons of Yughbī's profile of connectivity

The comparisons that the ceramic assemblage of Yughbī allows for are limited, given its poor preservation and its scarcity in wares. However, the quantification of the wares allows us to compare the profile of connectivity of the site with other contemporaneous places in the Gulf.

Sites and dating (CP)	Most abundant category	Second most abundant category	Third most abundant category	Others
Bushehr (CP1)	Iranian wares (LISV, HARLIM, CLINKY, REBROS)	TURQ (Iraq)	Indian ceramics (IRPW, HARMIC, BUFRAB, INCOP, IRAB, SBBW)	Abundant TORP (Iraq)
Kush (CP1, CP2 and CP3)	TURQ (Iraq)	CLINKY and HARLIM (Iran) (only diagnostics quantified, so maybe more)	Indian ceramics (BRISAN, HARMIC, BUFRAB, INCOP, IRAB, SBBW)	Iraqi ceramics (TORP and other classes)
Yughbī (CP2)	**Generic Unglazed (Eastern Arabia or Southern Iraq)**	**TURQ (Iraq)**	**ORGPINQ (India?)**	**Other Indian (LINVES) and Iraqi (TORP) wares, one unclear (*Tannūr*/SBBW), very few Iranian**
Ṣīr Banī Yās (CP2)	HARLIM (Iran)	Local CW (Iraq? Upper Gulf?)	TORP (Iraq)	TURQ, only 1% Indian
Ṣohār (CP2)	Indian ceramics (IRPW, BRISAN HARMIC, BUFRAB, INCOP, LINVES, SBBW)	ORGPIN (Oman)	TURQ (Iraq)	Few TORP, almost no Iranian wares
Ṣohār (CP3)	ORGPIN (Oman)	Indian ceramics (IRPW, HARMIC, BUFRAB, INCOP, LINVES, SBBW)	White Iraqi wares	Abundant TURQ, few TORP, almost no Iranian wares
Sīrāf (CP3) (based on finds record cards)	TURQ (Iraq)	REBROS, HARLIM and CREAC (Iran)	TORP (Iraq)	Abundant other Iraqi, few Indian
Bilād al-Qadīm (CP3)	White Iraqi wares and local common wares	HARLIM and CREAC (Iran)	TURQ (Iraq)	Few TORP jars

Figure 10. *Comparison of connectivity profiles of different Sasanian and early Islamic sites in the Gulf based on the ceramic assemblages. CP1 = c.450–650; CP2 = c.650–750; CP3 = c.750–825. Except for the information from Yughbī presented in this paper, all the information is extracted from Priestman 2021b.*

In order to do so, I will compare the provenance of the most abundant groups in Yughbī and in several other sites (included in Fig. 1). The sites selected for comparison are taken from Priestman's *Ceramic Exchange and the Indian Ocean Economy (400–1275 AD)* (2021a; 2021b), which contains the best quantifications of ceramic assemblages in the Gulf for the period under consideration in this paper. Most (practically everything) in the ceramic Yughbī assemblage corresponds to Phase II, dated AD 660s to 770s, which matches well Priestman's Ceramic Period 2 (*c.* AD 650–750) (Priestman 2021b: 43–45). However, to enlarge the scope of this study, comparisons have also been made with assemblages that date from Ceramic Periods 1 (*c.*450–650) and 3 (*c.*750–825) as well (respectively Priestman 2021b: 40–43 and 45–47). To make the comparisons valuable, the classes used by Priestman have been conflated in categories similar to those used in this study. The results can be seen in Figure 10.

On the basis of this comparison, it is interesting to note that Yughbī seems to have more in common with Ṣohār than with any of the other sites in terms

of the abundance of Indian and Turquoise wares and the lack of Iranian wares. Kush shows a similar profile, but with the exception that it shows an exceptionally high number of Iranian wares. Bushehr shows a similar profile to Kush, but with even more abundant Iranian wares. The more distant comparisons are paradoxically those with sites that are closer to Yughbī in distance: Ṣīr Banī Yās, Sīrāf, and Bilād al-Qadīm. These proportions are difficult to explain in Qatar. They seem to be related to a community of people who had more links with the wider Indian Ocean, perhaps via Oman, than with any of the settlements around them. This does not mean that they were disconnected from the Gulf, as the amount of Iraqi wares shows, but the near lack of Iranian wares is surprising. It is possible that this is due not so much to a question of Yughbī being connected with Iran than of Iran not producing many ceramics for export in the period *c*.650–750. After all, the mid-seventh to mid-eighth century was a very chaotic period in Iran, immediately after the Islamic conquest of Fars (which probably finished in the second half of the 640s; see Whitcomb 1986: 221) and during the anti-caliphate of Qatarī ibn al Fujā'a (Levi Della Vida 1997). However, the question remains unanswered, as this does not explain why Iranian wares are so abundant in Ṣīr Banī Yās and Kush, sites with phases from the same chronology as Phase II of Yughbī. There appears to be a difference in the distribution of Iranian and Indian wares of the period between the mid-seventh and the mid-eighth centuries that is not yet understood.

Conclusion

Research on the ceramics of Yughbī has offered an in-depth analysis of a very interesting and, to a certain extent, unexpected group of ceramics. Most of these ceramics come from Iraq and include a very high proportion of Turquoise-glazed ceramics, but a relatively important number of them seem to come from outside the Gulf, possibly from India. The only other known site that has a similar profile of connectivity is Ṣohār in Oman. Interestingly, the sites that we know closer to Qatar all show very different profiles of connectivity. This is therefore noteworthy not only for Yughbī itself, but also because it provides a map of connections in the Gulf that does not fail to surprise when considered in detail.

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