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ROMAN AND LATE ANTIQUE GLASS BOTTLES IN THE ADANA MUSEUM COLLECTION: AN EVALUATION OF TYPOLOGY AND PRODUCTION TECHNIQUES

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Abstract: This study examines the glass bottles in the Adana Museum collection, dated to the Roman and Late Antique periods, from typological, technical, and chronological perspectives. Dated between the 1st and 10th centuries AD, these examples reflect the formal diversity, technological development, and aesthetic approach of the Eastern Mediterranean glassmaking tradition. Within the scope of the study, the distribution of free-blowing and mould-blowing techniques within the collection was assessed; it was determined that mould-blowing is more prominent in the earlier phases, whereas free-blowing becomes more evident in the later phases.

The collection presents a wide typological range, including examples such as oinochoai, amphoriskoi, gutti, aryballoi, as well as bottles with spiral and zigzag decoration, ribbed forms, and long-necked and globular-bodied specimens. Comparative analyses indicate that a significant portion of the assemblage reflects Eastern Mediterranean glass-production traditions. However, the distinctive qualities observed in formal details and technical features indicate the presence of an active local glass-production tradition in the region of Cilicia. These findings demonstrate that the region was not merely an area of commercial distribution, but also a centre where production activities were maintained.

The data obtained indicate that Cilicia assumed a central role within Eastern Mediterranean glass production and trade networks throughout the Roman and Late Antique periods. The Adana Museum glass collection constitutes a significant representative assemblage documenting the technical and typological development of this process; the study offers new archaeological and typological assessments regarding Cilicia's position in the history of glassworking.

Keywords: *Adana, Cilicia, glass, Roman period, free-blowing technique, mould-blowing technique.*

INTRODUCTION

Glass was widely used in Antiquity not only in daily life but also for funerary practices and ritual purposes. In this period, the technical innovations and formal diversity in glass production provide important data on the production skills and design approach of the time. Throughout the Roman Empire and the Late Antique period, the Eastern Mediterranean was one of the principal

centres of glass production and trade.[1] Archaeological finds indicate the presence of glass workshops operating in the region and the decisive role of the Eastern Mediterranean within the distribution network.[2] In this period, technical developments and form diversity spread rapidly; regional differences and distinctive styles manifested themselves in glassworking.

To date, definitive and direct archaeological evidence for glass production in the Cilicia region is limited. Nevertheless, the furnace remains and production waste identified at major centres such as Anemurium, Tarsus, Misis, and Antiochia ad Cragum, as well as references to glass craftsmen in Greek funerary inscriptions from Silifke and Korykos, constitute important indicators for the presence of glassworking in the region.[3] Although traces of glass production have been encountered in many excavations in Anatolia, glass furnaces are very rare. The main reasons for this are that the furnaces were short-lived and were frequently renewed by itinerant craftsmen. Moreover, the recyclable nature of glass and the reuse of production waste make it difficult for traces of glass production to be preserved in the archaeological record. This situation leads to the limited availability of archaeological evidence related to glass production.[4]

The glass bottles in the Adana Museum collection, dated to the Roman and Late Antique periods, reflect the technical and aesthetic richness of Eastern Mediterranean glassworking in terms of form and decorative features. In his general assessment of the collection, Stern states that a significant part of the objects was acquired from local dealers and that they most probably have been found in the Cilician Plain.[5] The dense and varied representation of these objects in the region, as indicated by technical analyses and comparative assessments, shows that a significant part of them was produced in local workshops or was directly influenced by this production tradition. The presence in the collection of examples bearing distinctive technical and formal qualities also reveals the diversity of glassworking in Cilicia and the aesthetic sensibilities of the period. This situation shows that the forms examined did not reach the region solely through commercial circulation, but were also associated with local production activities.

The main aim of this study is to examine the Roman and Late Antique glass bottles in the Adana Museum through their production techniques and formal features, and to offer new contributions to the regional glass production tradition in Cilicia and to general assessments of Eastern Mediterranean glassworking.

Oinochoe (Cat. Nos. 1–2)

The oinochoe, used for pouring liquids such as wine, is a vessel form generally distinguished by its single handle and its body narrowing from top to bottom.[6] Although different rim types are observed, the most common is the three-lobed form known as the "trefoil rim."[7] The oinochoe form is divided into two phases in terms of production techniques. The early examples were produced using the internal mould technique and were generally decorated with coloured glass trails.[8] The later examples, however, were shaped by the free-blowing technique and were mostly left plain.[9] In both groups, it is observed that the handle and base parts were added to the body later; nevertheless, examples without a base are also encountered.[10]

In the Adana Museum collection, both early decorated examples produced with the internal mould technique and later undecorated examples shaped by the free-blowing method are encountered. The first piece in this group, the object numbered Cat. No. 1, is decorated with zigzag and spiral ornaments formed by coloured glass trails applied on a white ground. The rim and handle parts of this small-sized example are broken. The oval body rising on the base continues with a short neck and ends with a wide mouth. The form constitutes a typical example reflecting the characteristic features of the period.[11] Examples with similar characteristics are also found in the collections of the Royal Ontario Museum,[12] the Carnegie Museum of Natural History,[13] the Montreal Museum of Fine Arts[14] and the J. Paul Getty Museum.[15] Such examples are dated to the 5th century BC on the basis of their form and decorative features. Therefore, the proposed date for Cat. No. 1 is supported by both the production technique (internal mould) and comparative typology.

Another oinochoe example from the Adana Museum (Cat. No. 2) was produced in plain, transparent greenish-blue glass. The object has a trefoil rim, a short and wide cylindrical neck, a pear-shaped body swollen in the lower part, a distinct base, and a single handle extending from the rim to the shoulder. This form belongs to the group of footed jugs that Isings defined as "Form 88a" in her glass vessel typology and dated to between the 2nd and 3rd centuries AD.[16] An oinochoe made of transparent glass in the Hermitage Collection is dated to the late 1st century AD,[17] while another example of opaque blue glass in the Metropolitan Museum is dated to the late 1st century BC and the early 1st century AD.[18] The neck structure of both oinochoai is thinner than the form in the Adana Museum; this difference is noteworthy in terms of form. An unfooted oinochoe in the Allaire Collection,[19] dated to the second half of the 1st century AD, shows similarity to the Adana example in terms of neck thickness.

[1] STERN 1999, 443–444; HAYES 1975, 188, cat. 16–33.
[2] ANTONARAS 2017, 15–17, 47–51, 195.
[3] TEK 2005, 108–123, 117 dn. 74–78; ADIBELLİ 2006, 6; ADIBELLİ 2007, 25–40; ADIBELLİ 2013, 93–100; STERN 1989a, 121–127; KEIL/WILHELM 1931, 10, 180, 594B, 186, 591, 187, 598B; LIGHTFOOT 1989, 14 dn. 15–16; HOFF et alii 2014, 581–595.
[4] LIGHTFOOT 2005, 173–181; TAŞTEMÜR 2018, 224.
[5] STERN 1989b, 584.
[6] AKKURNAZ 2016, 102.
[7] AKKURNAZ 2016, 103.
[8] EKER 2018, 1254.
[9] EKER 2018, 1254.
[10] LIGHTFOOT 2001, 23.
[11] EKER 2018, 1254.
[12] HAYES 1975, 188, no. 19.
[13] OLIVER 1980, 39, no. 8.
[14] CARON / ZOÏTOPOÚLOU 2008, 4, no. 3.
[15] ANTONARAS 2025, 74, no. 48.
[16] ISINGS 1957, 104.
[17] KUNINA 1997, 309, no. 270.
[18] LIGHTFOOT 2001, 23.
[19] https://ancientglass.wordpress.com/2012/02/25/early-roman-jug

In light of these comparisons, considering the free-blowing technique of the object numbered Cat. No. 2, its formal features, and its Eastern Mediterranean-based parallels, it seems appropriate to date it between the late 1st century AD and the mid-2nd century AD.

In conclusion, the two *oinochoai* in the Adana Museum inventory are consistent with the Eastern Mediterranean glass production tradition in terms of both production technique and formal features. The fact that the early example can be dated to the 5th century BC and the later example to between the late 1st century AD and the mid-2nd century AD reveals that the collection represents a rather wide chronological range.

Spiral-Banded Bottle (Cat. No. 3)

Spiral-banded glass vessels used as perfume bottles[20] are among the elegant examples of Roman glassworking. In these vessels produced by the free-blowing technique, a decorative ornament was created with thin glass trails wrapped around the hot surface in a spiral manner after the form was completed.[21] This practice is regarded as a technique that enriched the glass art of the period with its aesthetic contribution as well as its functionality. Spiral-banded bottles, known to be of Eastern Mediterranean origin, were produced in different sizes.[22] The recovery of especially small-sized examples in children's graves shows that these vessels were used not only in daily life but also as grave goods.[23]

The example numbered Cat. No. 3 in the Adana Museum collection has a funnel-shaped rim flaring outward, a thin and long cylindrical neck, a globular body, and a slightly flattened base. The surface of this bottle, produced in burgundy glass, is decorated with ten spiral bands made of white glass trails, extending from the shoulder to the base. The applied decorative style and technique reflect the characteristic features of Roman glassworking.

Similar examples of this form are found in various collections such as the Pennsylvania Museum,[24] the Museum of Anatolian Civilizations,[25] the Gaziantep Medusa Glass Museum,[26] the Montreal Museum of Fine Arts,[27] the Cesnola Collection[28] and the J. Paul Getty Museum[29]. Despite some differences in rim structure and dimensions, these examples are dated to the 1st century AD.

This spiral-banded bottle in the Adana Museum is consistent with the Eastern Mediterranean glass production tradition in terms of its technical and typological features and can be dated to the 1st century AD through comparison with similar examples. Its decorative elements and miniature size shed light on assessments of the object's functional and production background.

Pointed-Bottom Bottle (Cat. No. 4)

In the Roman period, pointed-bottom glass bottles were generally used as perfume bottles.[30] These types of bottles, preferred for storing substances such as perfume, scented oils, and ointments, cannot stand upright due to their pointed bottoms. Since this situation makes it difficult to place them on a stable surface in everyday use, they are thought to have been mostly placed in graves as grave goods.[31] This mode of use shows that these bottles had both symbolic and ceremonial functions.

The example from the Adana Museum was produced by the free-blowing technique. It is a typical example with a thin rounded rim projecting outward, a long cylindrical neck, a body widening downward in a drop-shaped form, and a pointed base that narrows again at the lowest part and ends in a pointed tip. On the surface of this bottle, made of cobalt blue glass, traces of oxidation and iridescence of various sizes are observed. These traces emerged as a result of the burial conditions of the object and the chemical alteration processes associated with the age of ancient glass.

Similar examples of the form are found in the collections of the Carnegie Museum of Natural History,[32] the Marmaris Museum,[33] the Montreal Museum of Fine Arts,[34] the Cesnola Collection[35] and the J. Paul Getty Museum.[36] Although these examples show some differences in terms of rim form, dimensions, and shoulder structure, they are all dated to the 1st century AD.

The pointed-bottom glass bottle in the Adana Museum should be evaluated as a typical Roman-period Eastern Mediterranean product in terms of its formal features and production technique.[37] The functional nature of the object and its use in a funerary context also make it significant in terms of social history and the archaeology of ritual.[38] In line with the comparable examples, this bottle is dated to the 1st century AD.

Guttus (Cat. No. 5)

Derived from the Latin word *gutta* (drop), "*guttus*" forms are specialized vessels designed in the Roman period to allow liquids to be poured in a controlled, drop-by-drop manner.[39] The glass bottles in question are also referred to in the literature by various names such as "sprinkler bottle", "askos" or "feeding bottle."[40] Among the principal functions of these vessels are filling lamps and dripping medicines.[41]

[20] LIGHTFOOT 2017, 192–193.
[21] ÖZET 1987, 597.
[22] FLEMING 1996, 23; ÖZET 1987, 597; CARON/ZOÏTOPOÚLOU 2008, 42; ANTONARAS 2025, 286.
[23] HÖPKEN/ÇAKMAKLI 2015, 122.
[24] FLEMING 1996, 23, no. 17a.
[25] ÖZET 1987, 606, no. 14.
[26] HÖPKEN/ÇAKMAKLI 2015, 122, no 260.
[27] CARON/ZOÏTOPOÚLOU 2008, 42, no. 36.
[28] LIGHTFOOT 2017, 193, no. 237.
[29] ANTONARAS 2025, 286, no. 330.
[30] ERTEN 2003, 403.
[31] ERTEN 2003, 404.
[32] OLIVER 1980, 52, no. 38.
[33] ERTEN 2003, no. 1-3.
[34] CARON/ZOÏTOPOÚLOU 2008, 42, no. 36.
[35] LIGHTFOOT 2017, 189, no. 231.
[36] ANTONARAS 2025, 287, no. 334.
[37] VESSBERG / WESTHOLM 1956, 203; ANTONARAS 2017, 281.
[38] ERTEN 2003, 404.
[39] AKKURNAZ 2016, 94.
[40] WHITEHOUSE 1997, 122; AKKUŞ KOÇAK/ARSLAN 2024, 45.
[41] ANTONARAS 2017, 102.

Although some researchers have suggested that they may have been used for feeding infants, this view has not been widely accepted due to medical safety.[42]

These glass vessels, which were extensively used throughout the Roman Empire, exhibit distinct morphological characteristics in the eastern and western provinces.[43] Examples defined by Isings as *Form 11*[44] and produced in the shape of a bird from the western regions of the Empire are dated to earlier periods.[45] Such bird-headed forms are attested in collections such as the Hüseyin Kocabaş Collection[46] and the Corning Museum.[47] The fact that some of these early Western examples have been recovered with residues of cosmetic powder indicates that these vessels may also have been used for personal care and cosmetics.[48]

Syrian-type examples, on the other hand, are divided into two main groups. The first group consists of plain examples with a rounded mouth; the second comprises those in which the mouth has been drawn out in hot glass so that the liquid can be poured in a more controlled manner.[49] A specimen in the Corning Museum is significant in that it displays the characteristic features of the second group.[50] A similar form is preserved in a private collection in Ankara,[51] where it is described as a "guttus", "askos" or "sprinkler bottle."[52] The bottles in this group indicate that their patterns of use were closely related to their functional characteristics, particularly their mouth form and pouring capacity.[53] Lightfoot states that the rounded-mouth examples were used as glass lamps.[54] Research has demonstrated that *guttus* vessels were in use between the 1st and 3rd centuries AD, and their form underwent changes during this period.

The example of a *guttus* from the Adana Museum (Cat. No. 5), which was used in Anatolia particularly in the region of Cilicia,[55] represents one of the early examples of the Syrian type and was produced by free-blowing, with a rounded mouth. This form is among the later Syrian types and shows a high degree of similarity to the rare glass lamp preserved in the Cesnola Collection discussed by Lightfoot.[56] This similarity suggests that the example from Adana may likewise have been used as a lamp.

Comparable examples of the piece are attested in the Pierides Collection in Larnaca, Cyprus,[57] the Royal Ontario Museum,[58] the Carnegie Museum of Natural History,[59] the Glass Objects Collection of the Turkey Şişe ve Cam Fabrikaları,[60] the Tire Museum,[61] the Cesnola Collection in the Metropolitan Museum,[62] and the Medusa Collection in Gaziantep.[63]

This rounded-mouth *guttus* from the Adana Museum was produced by the free-blowing technique and, on the basis of its simple mouth form and comparison with similar examples, is dated to the 1st–2nd centuries AD.

Aryballos (Cat. Nos. 6–8)

The aryballos form comprises small-capacity vessels used in Antiquity primarily for storing personal care products, above all oils and various other substances.[64] These vessels are generally defined as having a globular body, a short and thick neck, a single handle, and a flat or rounded base.[65] They were used particularly by athletes to oil the body after exercise and, together with the strigil, became an integral component of Roman bath culture.[66]

Early examples of aryballoi were generally produced in ceramic and bronze.[67] By contrast, the production of glass aryballoi began in the Archaic period with the core-forming technique,[68] while from the 1st century AD onwards examples made by the free-blowing technique became widespread.[69] Blown-glass aryballoi were used intensively during the Roman Imperial period, particularly up to the 3rd century AD.[70] It has been determined that on most glass aryballoi bronze chains and rings attached to the handles were provided in order to facilitate transport.[71]

Isings, who conducted a detailed study on aryballos examples from the western provinces, has emphasised the characteristic features of these finds.[72] In particular, she notes that the rims of the vessels were produced with their edges folded inwards and flared outwards.[73] She further states that aryballoi of this form have been found in tombs dated to AD 79 during archaeological excavations at Pompeii.[74] Sorokina, who has worked on finds from the northern Black Sea region, has divided this form into two main types according to the structure of the rim.[75] The first group in this classification is constituted by examples with a wide infolded lip and a flattened rim, as also defined by Isings.[76] Sorokina has designated this group as "Type A".[77] This form resembles the aryballos types widespread in the western Roman world and reflects the manifestation of the

[42] ANTONARAS 2017, 102.
[43] AKKUŞ KOÇAK/ARSLAN 2024, 45.
[44] ISINGS 1957, 27.
[45] TAŞTEMÜR/GÜRLER 2019, 94–95.
AKKUŞ KOÇAK/ARSLAN 2024, 45.
[46] AKAT/FIRATLI/KOCABAŞ 1984, 42, no. 158.
[47] WHITEHOUSE 1997, 121, no. 187.
[48] AKKUŞ KOÇAK/ARSLAN 2024, 45.
[49] WHITEHOUSE 1997, 122.
[50] WHITEHOUSE 1997, 121, no. 187.
[51] AKKUŞ KOÇAK/ARSLAN 2024, 52, no. 4.
[52] AKKUŞ KOÇAK/ARSLAN 2024, 45.
[53] TAŞTEMÜR/GÜRLER 2019, 95; AKKUŞ KOÇAK/ARSLAN 2024, 45.
[54] LIGHTFOOT 2013, 86.
[55] ERTEN 1999, 176.
[56] LIGHTFOOT 2013, 86.
[57] VESSBERG/WESTHOLM 1956, 171, no. 51/1–2.
[58] HAYES 1975, 219, no. 539.
[59] OLIVER 1980, 57, no. 144.
[60] CANAV 1985, 39, no. 23–24.
[61] GÜRLER 2000, 51, no. 55.
[62] LIGHTFOOT 2013, 92, no. 4.
[63] HÖPKEN/ÇAKMAKLI 2015, 81, no. 44.
[64] AKKURNAZ 2016, 164.
[65] AKKURNAZ 2016, 164.
[66] OLIVER 1980, 23; HÖPKEN/ÇAKMAKLI 2015, 98.
[67] EKER 2018, 1250.
[68] TAŞTEMÜR/GÜRLER 2019, 87.
[69] WHITEHOUSE 1997, 201.
[70] TAŞTEMÜR/GÜRLER 2019, 87.
[71] ISINGS 1957, 78.
[72] ISINGS 1957, 79.
[73] ISINGS 1957, 79.
[74] ISINGS 1957, 79.
[75] SOROKINA 1987, 41.
[76] SOROKINA 1987, 41.
[77] SOROKINA 1987, 41.

Western tradition in the northern Black Sea region.[78] The second group, "Type B," consists of aryballoi whose rims are folded downwards or upwards to create a collar-like appearance.[79] Sorokina emphasises that Type B is of Eastern Mediterranean origin and that this rim form shows a strong similarity to examples produced in the ceramic workshops of Pergamon.[80]

There are three different types of aryballoi recorded in the inventory of the Adana Museum:

Cat. No. 6: This aryballos, classified as the Western type (Type A) by Isings and Sorokina, has a structure defined by the inward folding and outward flaring of the rim. It was produced by the free-blowing technique. Comparable examples have been documented by excavations in the region of Gallia (Gaul,) [81] in the Carnegie Museum of Natural History,[82] in the Hermitage Collection,[83] in the Corning Museum of Glass,[84] and in the Medusa Glass Collection in Gaziantep.[85] This form is dated to the period between the late 1st century and the 2nd century AD.

Cat. No. 7: This aryballos, classified as Type B by Sorokina, is defined by its collar-shaped rim formed by the folding of the rim upwards or downwards and is regarded as a form specific to the Eastern Mediterranean production tradition.[86] The most striking feature of the piece is that the bronze rings attached to its handles have survived to the present day. This is significant in terms of its mode of use and the preservation of the original form. Comparable examples have been identified in excavations from Gallia (Gaul),[87] in the Carnegie Museum of Natural History,[88] where they are preserved together with their bronze rings and chains, as well as in the northern Black Sea region,[89] in the Hermitage Collection,[90] in the Yale Collection,[91] among the finds from the South Necropolis at Parion,[92] in the National Museum of Scotland,[93] in the Medusa Glass Collection in Gaziantep[94] and in the museums of Eastern Thrace.[95] It is stated that aryballoi of this type were in use from the mid-1st century to the 3rd century AD.

Cat. No. 8: This example is a miniature aryballos reflecting the Type A rim form defined by Sorokina. Unlike the other two examples, it has a foot,a morphological feature rarely attested in this form. Its form and dimensions exhibit a high degree of similarity to a piece in the Hermitage Collection.[96] Accordingly, the miniature aryballos in the Adana Museum is dated, on the basis of comparative analyses, to the second half of the 1st century AD.

The three different aryballos examples from the Adana Museum stand out for their distinctive features, such as having been produced by the free-blowing technique, their varying rim typologies, the preservation of the bronze rings attached to the handles, and the presence of a foot at one example. In this context, Cat. No. 6 is dated to the late 1st–2nd centuries AD; Cat. No. 7 to the mid-1st–3rd centuries AD; and Cat. No. 8 to the second half of the 1st century AD. These pieces are significant in that they illustrate the formal transition between Eastern and Western production traditions and the diversity of glass technology in the Roman period.

Bottles with Prismatic Bodies (Cat. Nos. 9–13)

Prismatic-bodied glass bottles dated to the Roman Imperial period were produced using both mould-blowing and free-blowing techniques.[97] Mould-blown examples are particularly common in the western Roman provinces[98] and are easily distinguished by their bluish or greenish hues, their regular, symmetrical bodies, and their thick walls.[99] In the Eastern Mediterranean, particularly in the Syro-Palestinian region, prismatic bottles made by the free-blowing technique, with thinner walls and freer forms, are more prominent.[100] By contrast, in the western Roman territories similar examples appear to be rather limited in number.[101] For this technique, it has been observed that the bottle walls are generally thinner, that the body form is shaped freely without a mould, and that the base and corner sections are subsequently pressed and flattened with the aid of a tool.[102] Bottles produced by both techniques provide important information about Roman-period glassworking not only through their modes of manufacture but also through their regional distribution.

Thanks to their versatile functionality, prismatic-bodied bottles were widely preferred in both commercial and everyday contexts between the 1st and 4th centuries AD.[103] They were used for the transport and storage of various liquids, while the miniature examples, in particular, played an important role in the storage of cosmetic products.[104] In addition to the versatile functionality of these vessels, the fact that some examples have been found in graves, particularly in cremations, together with the ashes, shows that prismatic bottles were sometimes used as cremation urns in Anatolia.[105] The prismatic glass bottles recovered with their mouths sealed at Arycanda, Germanicopolis and Olba are among the important manifestations of this tradition in Anatolia.[106]

[78] SOROKINA 1987, 41.
[79] SOROKINA 1987, 41.
[80] SOROKINA 1987, 42.
[81] MORIN-JEAN 1922–1923, 84, no. 87.
[82] OLIVER 1980, 73, no. 72.
[83] KUNINA 1997, 323, no. 349.
[84] WHITEHOUSE 1997, 201, no. 351.
[85] HÖPKEN/ÇAKMAKLI 2015, 98, no. 192.
[86] SOROKINA 1987, 41–43.
[87] MORIN-JEAN 1922–1923, 84, no. 88.
[88] OLIVER 1980, 73, no. 71.
[89] SOROKINA 1987, Fig. 2.
[90] KUNINA 1997, 323, no. 346–347.
[91] GROSSMANN 2002, 11, no. 10.
[92] AYDIN TAVUKÇU 2007, 158, no. 7.
[93] LIGHTFOOT 2007, 110, no. 254–255.
[94] HÖPKEN/ÇAKMAKLI 2015, 98, no. 191.
[95] TAŞTEMÜR/GÜRLER 2019, 156, no. 4.
[96] KUNINA 1997, 323, no. 348.
[97] ISINGS 1957, 63–64.
[98] HARDEN 1936, 238; WHITEHOUSE 1997, 183.
[99] HARDEN 1936, 238; TEMÜR/ÖZBİLGİN 2019, 43.
[100] ISINGS 1957, 64; HARDEN 1936, 238.
[101] ANTONARAS 2017, 116.
[102] HARDEN 1936, 237; TEMÜR/ÖZBİLGİN 2019, 43.
[103] ERTEN 2018, 251.
[104] HÖPKEN/ÇAKMAKLI 2015, 179.
[105] ERTEN 2015, 19; ISINGS 1957, 66.
[106] TEK 2003, 82.

In the collection of the Adana Museum there are five prismatic-bodied glass bottles dated to the Roman period. These bottles, produced by the free-blowing (four examples) and mould-blowing (one miniature) techniques, reflect Eastern Mediterranean glassworking in their differing formal characteristics.

One of the handled examples with a rectangular body (Cat. No. 9) was produced in yellowish-brown glass. Its rim is folded both upwards and downwards and has a slightly everted profile. The bottle has a short cylindrical neck, sloping shoulders, a prismatic body and a slightly concave base. In this single-handled example, the handle is attached to the shoulder, being bent at a right angle from just below the rim. The asymmetrical body and the flattening marks on the base indicate that the free-blowing technique was employed.

Another one-handled example with a rectangular body (Cat. No. 10) was produced in light blue glass. The wide, thickened rim is slightly everted, with its upper edge folded over very slightly. The cylindrical neck, sloping shoulders, and four-cornered prismatic body reveal the characteristic structure of the form. The handle springs from just below the rim and is attached to the shoulder in a curved profile. Both examples are included in Isings' "Form 50".

Comparable examples of this form are attested in the collections of the Kahramanmaraş Museum[107] (1st–2nd c. AD), the Samsun Museum[108] (1st–2nd c. AD) and the J. Paul Getty Museum[109] (2nd–3rd c. AD). Mould-blown examples, on the other hand, are represented in the Yüksel Erimtan Collection[110] (2nd c. AD), the Hermitage Collection[111] (1st c. AD) and the Silifke Museum[112] (1st–4th c. AD). In addition, the examples in the Medusa Glass Collection in Gaziantep[113] and in Thessaloniki[114] are dated to between the 1st and 3rd centuries AD.

On the basis of typological and chronological comparisons, the rectangular-bodied bottles from the Adana Museum date to between the 1st and 4th centuries AD.

The handleless rectangular bottle Cat. No. 11 was produced by the free-blowing technique. It is defined by a flaring funnel-shaped mouth, a narrow and short neck, an elongated prismatic body, and a slightly concave base. Comparable examples are attested in the Yüksel Erimtan Collection[115] (5th c. AD), in the Medusa Glass Collection in Gaziantep[116] (1st–3rd c. AD), and in the collection of the Samsun Museum[117] (3rd–5th c. AD). Accordingly, it is feasible to date the example from Adana to between the 1st and 5th centuries AD.

The miniature rectangular-bodied bottle (Cat. No. 12), produced by the mould-blowing technique, is defined by its fire-flattened rim, cylindrical neck tapering towards the body, rectangular-section body, and flat base. Corrosion, patches of iridescence, and marked surface deterioration are observed on the glass. With its technical and dimensional features, which distinguish it from the others, this bottle constitutes an original example of the miniature prismatic form. Similar forms are represented in the Hatay Museum,[118] in the Medusa Collection in Gaziantep[119] and in the Kahramanmaraş Museum,[120] and are dated to the 9th–10th centuries AD.

A single square-bodied bottle (Cat. No. 13) in the collection of the Adana Museum was produced by the free-blowing technique and is made of light blue transparent glass. The rim has been widened outwards and flattened. The slender, elongated neck provides a smooth transition to the body through the sloping shoulder. The square-section body terminates in a slightly concave base. The bottle has a single handle, which springs from just below the rim and joins the shoulder at a sharp angle. Similar examples of this form, which in Isings' classification is included in the "Form 50a"[121] group, are found in the Yüksel Erimtan Collection[122] (3rd c. AD) and in the Samsun Museum[123] (1st–2nd c. AD). In light of this information, the square-bodied example from the Adana Museum is dated to between the 1st and 3rd centuries AD.

Bottles with Cylindrical Bodies (Cat. Nos. 14–15)

Cylindrical glass bottles were produced using either the free-blowing technique or the mould-blowing technique. These bottles were developed as an alternative to prismatic (angular) examples and were preferred particularly because they are more resistant in terms of fragility[124].

In the inventory of the Adana Museum there are two cylindrical-bodied bottles. Of these, one is handled and the other handleless. The bottles in question were produced by the free-blowing technique.

The handled cylindrical bottle (Cat. No. 14) is associated with Isings' "Form 151b"[125] type. This example has a rounded rim folded back towards the exterior. Its neck is short and cylindrical in form. The body is straight and cylindrical, while the base is designed as slightly convex. Its handle extends from the rim to the shoulder and was subsequently added, having been drawn from cast glass.

Comparable examples are attested in the Royal Ontario Museum[126], the Hermitage Collection[127], the Corning Museum of Glass[128], the Eskişehir Museum[129] and the Medusa Glass Collection in Gaziantep[130]. When compared

[107] EKER 2017, 67, Tip II.
[108] TEMÜR/ÖZBİLGİN 2019, 64, no. 2.
[109] ANTONARAS 2025, 271, no. 307.
[110] LIGHTFOOT/ARSLAN 1992, 112, no. 61.
[111] KUNINA 1997, 285, no. 164.
[112] ERTEN 2018, 251, no. 101.
[113] HÖPKEN/ÇAKMAKLI 2015, 72, no. 127.
[114] ANTONARAS 2017, 116, no. 75.
[115] LIGHTFOOT/ARSLAN 1992, 135, no. 82.
[116] HÖPKEN/ÇAKMAKLI 2015, 72, no. 127.
[117] TEMÜR/ÖZBİLGİN 2019, 52, no. 8.
[118] GEYİK KARPUZ 2014, 88, no. 27.
[119] HÖPKEN/ÇAKMAKLI 2015, 181, no. 409.
[120] EKER 2017, 87, Tip XIIE.
[121] ISINGS 1957, 63, no. 50a.
[122] LIGHTFOOT/ARSLAN 1992,110, no. 59.
[123] TEMÜR/ÖZBİLGİN 2019, 51, no 2.
[124] HÖPKEN/ÇAKMAKLI 2015, 73.
[125] ISINGS 1957, 68.
[126] HAYES 1975, no. 208.
[127] KUNINA 1997, 301, no. 235–237.
[128] WHITEHOUSE 1997, 186, no. 327.
[129] OLCAY 2001, 152, fig. 8, no. 11.
[130] HÖPKEN/ÇAKMAKLI 2015, 75, no.134.

with these forms, the single-handled cylindrical bottle from the Adana Museum is likewise dated to between the early 1st century and the late 4th century AD.

The handleless cylindrical glass bottle (Cat. No. 15) in the inventory of the Adana Museum is colourless/transparent, and its rim has been shaped by first folding it outwards and then inwards. It has a short, pronounced neck, sharply defined shoulders, a long cylindrical body and a slightly concave base.

Examples of this form, classified by Isings as "Form 102a"[131] are attested in the Corning Museum, where they are dated to the 3rd–4th centuries AD[132], and in the Yüksel Erimtan Collection, where they are dated to the 2nd–4th centuries AD[133]. Smaller-sized similar forms are represented by examples dated to the 2nd–3rd centuries AD in the collections of the Sivas Museum[134] and the Kahramanmaraş Museum[135]. In this context, it is considered appropriate to date the handleless cylindrical glass bottle in the collection of the Adana Museum to between the 2nd and 4th centuries AD.

Ribbed Bottle (Cat. No. 16)

In bottles of this type, produced by the free-blowing technique, the body was indented while still hot in order to create ribbed decoration.[136] This characteristic decorative style and overall formal features are consistent with the glass-production traditions of the region of Cilicia and strengthen the likelihood that the form is of Eastern Mediterranean origin.[137]

The example from the Adana Museum has an everted, slightly thickened rim and a long, funnel-shaped neck widening upwards. The broad, flat, and compressed body is decorated with ribs formed during the shaping of the hot glass mass. The slightly concave base serves to ensure that the vessel stands in a stable manner.

The closest parallel to this form in the Adana Museum is found in the collection of the Silifke Museum.[138] Similar examples, with a taller body and decorated with a smaller number of ribs, have been documented in the Ankara Yüksel Erimtan Collection[139] and in the museums of Eastern Thrace.[140] Another example of the ring-based variant is found in the Medusa Glass Collection in Gaziantep.[141] Erten[142] notes that only three Western-derived examples of this form are known and that one of them is held in a collection in Thessaloniki.[143] While the examples from Gaziantep, Eastern Thrace, and Thessaloniki are generally dated to the 2nd–3rd centuries AD, the similar forms in the Yüksel Erimtan Collection and in the Silifke Museum are dated to the 3rd–4th centuries AD.[144] These comparisons make it possible to interpret the ribbed bottle form in the Adana Museum as part of an Eastern Mediterranean-centred production tradition. These comparisons indicate that it can be evaluated within this framework. Taking its formal and technical characteristics into account, the piece in question is assessed as belonging to between the 2nd and 4th centuries AD.

Bottle and Amphoriskos with Zigzag Decoration (Cat. Nos. 17–18)

The zigzag-motif glass bottle in the Adana Museum (Cat. No. 17) was produced using the free-blowing technique and draws attention with its zigzag decoration applied to the body using glass trails. Although the rim is broken, it can be deduced that it flared outward. The bottle is characterized by its short and broad neck, globular body, and ring-shaped base. A similar form is preserved in the Carnegie Museum of Natural History and is dated to the 2nd–3rd century AD[145].

Another example with zigzag decoration in the Adana Museum collection is seen on an amphoriskos (Cat. No. 18). The term "amphoriskos" is used to describe the miniature versions of the "amphora" form smaller than 30 cm, which was widely used in antiquity and whose larger examples were employed for the transport and storage of liquids.[146] These small vessels are distinguished by their narrow and elongated necks, two opposing handles, and generally globular or ovoid bodies.

Amphoriskoi produced using the free-blowing technique were sometimes left plain, and at other times were adorned with various decorative ornaments in order to enhance their aesthetic effect. In this context, an amphoriskos on display in the Adana Museum provides an example of the decorated types, being adorned with a zigzag[147] trail decoration formed by the careful application of molten glass trails to its surface.

Although amphoriskos production is known to have begun in many centers in the 1st century AD, the opinion that the form is of Syrian origin is widespread.[148] This view is supported by the fact that the free-blowing technique developed in the Eastern Mediterranean.[149] This situation indicates that the region held a leading position in glass production in terms of technical and formal diversity.

A plain, straight-profile amphoriskos found in Thessaloniki and dated to the 1st century AD is considered one of the early examples of this form.[150] Zigzag-patterned amphoriskos forms, such as the example in the Adana Museum, are encountered in a very limited number. A similar example has been documented only in the J. Paul Getty Museum collection.[151] On this vessel, the zigzag ornament was defined by Antonaras as "snake-thread decoration", and the decoration was noted to be of Eastern Mediterranean

131 ISINGS 1957, 120.
132 WHITEHOUSE 1997, 176, no. 308.
133 LIGHTFOOT/ARSLAN 1992,184, no. 119.
134 ATİLLA 2015, 177, fig. 7, no. 22.
135 EKER 2017, 68, Tip IVA.
136 ANTONARAS 2017, 97.
137 ERTEN 2018, 37.
138 ERTEN 2018, 37 no. 9.
139 LIGHTFOOT/ARSLAN 1992, 139, no. 83.
140 TAŞTEMÜR/GÜRLER 2019, 175, no. 23.
141 HÖPKEN/ÇAKMAKLI 2015, 59, no. 99.
142 ERTEN 2018, 37.
143 ANTONARAS 2017, 97 no 49.
144 LIGHTFOOT/ARSLAN 1992,139; ERTEN 2018, 37.
145 OLIVER 1980, 96, no. 146.
146 AKKURNAZ 2016, 64–65.
147 ANTONARAS 2025, 307–308.
148 VESSBERG/WESTHOLM 1956, 206–207.
149 MORIN-JEAN 1922–1923, 21.
150 ANTONARAS 2017, 138, no. 459–460.
151 ANTONARAS 2025, 307, no. 362.

origin.[152] Antonaras dates this amphoriskos example to the 3rd–4th centuries AD.[153]

One example to which the same zigzag motif was applied, but which differs in form, was found in Palestine and is today housed in the National Museums Scotland collection.[154] Another similar example is preserved in the Montreal Museum of Fine Arts.[155] Both vessels have been dated to the 4th–5th centuries AD.

The glass bottle with zigzag trail decoration in the Adana Museum inventory is dated to between the 2nd and 3rd centuries AD, based on its form and technical features, as well as the analysis of comparable examples. The amphoriskos, on the other hand, shows a strong similarity to the J. Paul Getty example described by Antonaras and, accordingly, is dated to between the 3rd and 4th centuries AD. Both objects are regarded among the important examples of Eastern Mediterranean glass production in terms of their decorative techniques and typological diversity.

Ribbed Bottle with a Single Handle (Cat. No. 19)

These type of glass bottles, produced in Syro-Palestinian workshops,[156] were widely used in the eastern provinces of the Roman Empire, while they are also attested in the western provinces.[157] The fact that these bottles were produced using the free-blowing technique reveals a direct connection with the Syro-Palestinian region, where this technique first emerged and was developed with great skill.[158]

The Adana Museum example draws attention with its long, cylindrical body, its narrow and elongated neck that slightly widens upwards, and its flat-cut, outward-projecting rim. The single handle extending from the rim to the body is shaped in a slightly wavy manner and constitutes an important element both functionally and aesthetically. This vessel is distinguished from other examples of a similar form by the presence of a handle. In the literature, comparable examples with handles, yet displaying certain differences in form, are also described. Such glass bottles are represented in various collections, including the Brooklyn Museum (USA),[159] the Royal Ontario Museum (Canada),[160] the Hungarian Museum of Fine Arts[161] and the J. Paul Getty Museum.[162]

Eisen and Hayes define these bottles as being of Syrian origin.[163]Both scholars date them to between the 3rd and 4th centuries AD. The handleless examples of this form, by contrast, have been documented far more widely. It is understood from finds recovered in the excavations at Karanis that handleless examples reached as far as Egypt.[164] In addition, handleless examples are also present in several private collections, such as the Kocabaş Collection,[165] the Türkiye Şişe Cam Eserler Collection,[166] the Yüksel Erimtan Collection,[167] the Gaziantep Medusa Glass Collection[168] and the Cesnola Collection.[169] In addition, bottles of similar forms have been documented in the Corning Museum of Glass[170] and the Silifke Museum.[171] Handleless examples are generally dated to between the 2nd and 4th centuries AD.

Considering the manufacturing techniques, formal characteristics, and distribution areas of the comparable examples examined, the ribbed glass bottle in the Adana Museum stands out with its distinctive handle construction, the integrity of its form, and its glass workmanship. These characteristics date it most likely to between the 3rd and 4th centuries AD.

Single-Handled Jug with a Trailed Neck (Cat. No. 20)

This jug in the Adana Museum collection has a flaring mouth, a long funnel-shaped neck, and a globular body. Its single handle extending from the rim to the body draws attention with its pronounced curve and gives its distinctive character. A thin blue glass trail is present on the rim, while a thick decorative trail made of transparent glass encircles the neck. A thick and well-defined base (base ring) is present on the underside. On this jug, produced using the free-blowing technique,[172] the glass trails used for decoration were applied to the hot glass surface and then shaped.[173]

In the Roman period, such jugs were generally used for serving wine at dining tables and were especially present on the tables of individuals belonging to the upper classes.[174] However, one of the main reasons why these elegant objects have survived intact to the present day is that they were used not only in everyday life but also in funerary ceremonies and intra-tomb banquet rituals, and were left as grave gifts in the burial of the deceased.[175]

Comparable forms of this Adana Museum vessel, both with and without a base, are encountered in different collections. The based examples are housed in the Royal Ontario Museum,[176] the Hermitage Collection,[177] the Montreal Museum of Fine Arts[178] and the Cesnola Collection[179] and all are dated to the 3rd–4th centuries AD.

Assessments regarding the origin of the jug indicate that glass vessels of similar form were widely produced and used in the Eastern Mediterranean, particularly in Cyprus, Syria, and the Palestine region.[180] In this context, the base-less

[152] ANTONARAS 2025, 307-308.
[153] ANTONARAS 2025, 307-308.
[154] LIGHTFOOT 2007, 129, no. 317.
[155] CARON/ZOÏTOPOÚLOU 2008, 177, no. 165.
[156] HAYES 1975, 86.
[157] ERTEN 2018, 31; LIGHTFOOT 2017, 285.
[158] CANAV 1985, 33.
[159] EISEN 1927, 427, fig. 174.
[160] HAYES 1975, 211, no. 415.
[161] BARKÓCZI 1996, 100, no. 315.
[162] ANTONARAS 2025, 266, no. 301.
[163] HAYES 1975, 111; EISEN 1927, 427–428.
[164] HARDEN 1936, 227, no. 692.
[165] AKAT/FIRATLI/KOCABAŞ 1984, 26, no. 86.
[166] CANAV 1985, 54, no. 71–72.
[167] LIGHTFOOT / ARSLAN 1992, 100, no. 53.
[168] HÖPKEN/ÇAKMAKLI 2015, 120, no. 255.
[169] LIGHTFOOT 2017, 285, no. 428.
[170] WHITEHOUSE 1997, 143, no. 237–239.
[171] ERTEN 2018, 31, no. 6.
[172] ERTEN 2018, 95.
[173] GÜRLER 2000, 9–10.
[174] LIGHTFOOT 2021, 131.
[175] LIGHTFOOT 2021, 131.
[176] HAYES 1975, 79, no. 187.
[177] KUNINA 1997, 331, no. 390–391.
[178] CARON/ZOÏTOPOÚLOU, 2008, 156, no. 146.
[179] LIGHTFOOT 2017, 149, no. 165.
[180] ERTEN 2018, 95.

jug recovered from the excavations at Jalame in Palestine[181] demonstrates the region's association with Roman-period glass production. The Jalame find indicates that this form was not only of Syrian or Cypriot origin, but was also produced in the Palestine region.[182]

Comparable base-less forms have also been documented in museum collections in Turkey. In particular, the examples in the Gaziantep Medusa Glass Collection[183] and the Silifke Museum[184] show parallels in terms of form and decorative details. These vessels were produced using the free-blowing technique and are decorated with trailed-glass ornaments on the rim and neck.

It is known that trailed-glass decoration was not limited to the 3rd–4th centuries AD, but continued to be used in the 7th century AD and thereafter.[185] In light of this data, the glass jug in the Adana Museum is dated to between the 3rd and 4th centuries AD, as idicated by its formal characteristics, production technique, decorative details, and comparative analyses with similar examples.

Funnel-Mouthed Bottle with a Globular Body (Cat. No. 21)

Funnel-mouthed glass bottles are generally regarded as table vessels used for serving beverages.[186] This form, which most commonly has a globular body, was classified by Isings as "Form 104" and was further divided into subgroups—those with a base ring and those without—according to the base structure.[187]

Regarding the origin of this form, various views point to Eastern Mediterranean production centers, particularly in Syria, Palestine, and the Jerusalem region.[188] Hayes considered this form among Palestinian glass;[189] however, Isings notes that there is insufficient archaeological evidence to support this assessment.[190]

The example in the Adana Museum belongs to the group without a base ring defined by Isings as "Form 104b."[191] The vessel displays characteristic features such as a slightly flaring, fire-smoothed funnel-shaped mouth, a long cylindrical neck, a globular body with smooth contours, and a concave base. In addition, horizontal linear decorations are seen on the neck, shoulder, and lower part of the body. Corrosion traces spread over broad areas of the glass surface.

Comparable examples of this form, dated by Isings to the 3rd–4th centuries AD,[192] are attested in the Yüksel Erimtan Collection,[193] the Corning Museum of Glass,[194] the Eskişehir Museum,[195] the finds from the Perrhe Rock-Cut Tomb Necropolis,[196] the Sivas Museum,[197] the Silifke Museum[198] , and the Samsun Museum.[199]

Considering its form, decorative features, and the similarities it displays with parallel finds, it is possible to date this funnel-mouthed, cylindrical-bodied glass bottle from the Adana Museum to between the 3rd and 4th centuries AD.

Lentoid-bodied jug (Cat. No. 22)

Lentoid-bodied glass forms were attested throughout the Imperial period in both the eastern and western provinces of the Empire[200]. By contrast, the lens-bodied form appears in limited numbers.[201] The fact that this form occurs mostly among grave finds[202] indicates that this type was used as a grave offering.[203]

The Adana Museum example (Cat. No. 22) stands out among lentoid-bodied glass jugs. It is characterized by an outdrawn and inward-folded rim, a long cylindrical neck, and pronounced ribs extending from the mouth to the shoulder. Its body is of a typical lens shape and terminates in an oval base. The vessel is completed by a single handle extending from the rim to shoulder level. Although the Adana Museum example does not correspond exactly to the already known examples, it shows similarities in terms of its overall form and its handl construction**.** In particular, the lens-bodied vessels with handle in the Türkiye Şişe Cam Collection[204] and among the glass objects of the Kahramanmaraş Museum[205] can be regarded as morphologically close parallels to this jug. These examples are dated between the 3rd and 4th centuries AD.

The Adana Museum find distinguishes itself from the other examples by its ribbed decoration extending from the neck towards the rim. A similar decorative approach is also observed on different types of glass vessels, even if not of the same form, such as the glass vessels recovered from the excavations at Strata in Israel,[206] dated by Gorin-Rosen to the 4th–5th centuries AD.[207]

Handleless lens-bodied bottle forms are attested in various centers and museum collections. Bottles of this form are represented among the finds from the excavations at Dura-Europos in Syria,[208] the grave finds from Horbat Rimmon in Israel,[209] and in the collections of the Royal Ontario Museum,[210] the Cesnola Collection[211] and the Silifke Museum.[212] Although examples of this form are

[181] WEINBERG 1988, 65–66, no. 207.
[182] WEINBERG 1988, 65–66.
[183] HÖPKEN/ÇAKMAKLI 2015, 149, no. 337.
[184] ERTEN 2018, 95, no. 35.
[185] HÖPKEN/ÇAKMAKLI 2015, 149, no. 337.
[186] ISINGS 1957, 122.
[187] ISINGS 1957, 122-124.
[188] ÖZET ٤١ ,١٩٨٧; OLCAY ١٥٥ ,٢٠٠١.
[189] HAYES 1975, 77.
[190] ISINGS 1957, 123.
[191] ISINGS 1957, 124.
[192] ISINGS 1957, 124.
[193] LIGHTFOOT/ARSLAN 1992, 123, no. 70.
[194] WHITEHOUSE 1997, 254, no. 434.
[195] OLCAY 2001, 156, no. 26.
[196] HÖPKEN 2010, 156, fig. 5, no. 32.
[197] ATİLLA 2015, 177, fig. 8, no. 27.
[198] ÖZET 1987, 41, no. 11.
[199] TEMÜR/ÖZBİLGİN 2019, 65, no. 19.
[200] ERTEN 2018, s.49.
[201] GÜRLER 2000, 115.
[202] GORIN-ROSEN 2009a, 135.
[203] HANAR 2018, 127; ERTEN 2018, 49.
[204] CANAV 1985, 62, no. 90.
[205] EKER 2017, 78, Tip IXC.
[206] GORIN-ROSEN 2009b, 93, no. 2.54:6.
[207] GORIN-ROSEN 2009b, 92.
[208] CLAIRMONT 1963, 142, no. 754.
[209] GORIN-ROSEN 2009b, 1357, no. 2.
[210] HAYES 1975, 198, no. 171.
[211] LIGHTFOOT 2017, 290, no. 439–440.
[212] ERTEN 2018, 49 no. 15.

mostly dated to the 3rd–4th centuries AD, some scholars, such as Lightfoot, extend the chronology back to the 2nd century AD.[213]

It is demonstrated by archaeological finds and examples in collections that this form was widely used in Eastern Mediterranean–centered regions such as Cyprus, Syria, and Israel. Bottles with handles and handleless examples in museums and collections from Turkey document the use of this form in Anatolia. Although no finds directly attributable to this form have been identified in the territories of the Western Roman Empire, written sources and comparative typological analyses indicate that the form was also known in the West.[214]

The lentoid-bodied glass jug in the Adana Museum should be dated to the 4th century AD, considering its overall form characteristics and, in particular, the ribbed decoration on the neck.

Grooved Cylindrical Bottle (Cat. No. 23)

Grooved cylindrical miniature bottles produced using the mould-blowing technique show similarities, in terms of their form and technical features, with Late-period productions from the Syro-Palestinian region.[215] Hayes notes that such vessels were generally produced in pale blue-green hues and considers this form as a counterpart to the hexagonal bottle group, which he designates as "Class 1."[216]

The example in the Adana Museum also reflects these general characteristics. Although its rim is broken, it can be defined by its cylindrical neck, cylindrical body, flat base, and vertical grooves running along the body. These decorative grooves constitute the distinguishing feature of the form. Comparable examples of this form are attested in the Royal Ontario Museum (4th century AD), [217] the Carnegie Museum of Natural History (5th century AD)[218] and the J. Paul Getty Museum (4th century AD).[219] Considering its formal characteristics and analogies, the grooved cylindrical glass bottle in the Adana Museum is dated to between the 4th and 5th centuries AD.

Funnel-Mouthed Bottle with a Globular Body (Cat. No. 24)

Funnel-mouthed, globular-bodied bottles produced using the free-blowing technique are characterized by features such as a fire-polished funnel-shaped mouth, a long cylindrical neck, a globular body, and a ring-shaped conical base formed through a narrow-necked junction.[220] It has been suggested that the origin of this type may be associated with the Syro-Palestinian region.[221]

Although the rim of the Adana Museum example is broken, it can be understood based on similar finds that this piece also had a funnel-shaped mouth. Comparable examples of this form are attested in the Royal Ontario Museum,[222] the Newark Museum,[223] the Hermitage Collection,[224] the Montreal Museum of Fine Arts,[225] the Sivas Museum[226] and collections in Thessaloniki.[227] All of these examples are dated to between the 4th and 5th centuries AD.

All these comparative finds date the glass bottle recorded in the Adana Museum inventory to between the 4th and 5th centuries AD.

Long-Necked Bottle (Cat. No. 25)

From the 1st century AD onward, glass bottles began to be widely used for the storage of various liquids, especially products such as medicines, perfumes, and oils.[228]

The object in the Adana Museum is characterized by an outflaring, fire-smoothed rim, a long cylindrical neck, a globular body, and a slightly flattened base. The three-tier decoration made with blue glass trails arranged in the form of chain rings[229] around the body and neck indicates that the vessel was produced not only for functional purposes but also with an aesthetic approach. The bottle was produced using the free-blowing technique. Comparable examples are housed in the collections of the Newark Museum,[230] the Israel Museum[231] and the Montreal Museum of Fine Arts.[232] In the examples from the Newark Museum and the Israel Museum, the decorations on the neck and the funnel-shaped neck display certain differences from the Adana Museum example. Auth dates this type of decorated glass bottle to between the 6th and 7th centuries AD, and also notes that these motifs continued to be used on Islamic-period glass.[233] The bottle in the Montreal Museum of Fine Arts shows a high degree of similarity to the Adana Museum example in terms of decoration. However, the relatively shorter neck introduces a structural difference to this similarity. Scholars emphasize that this form is of Near Eastern origin and date this bottle type to between the 4th and 7th centuries AD.[234]

Considering its parallels and form–type analyses, it is possible to date this long-necked glass bottle in the Adana Museum to between the 4th and 7th centuries AD.

Molar-Shaped Bottle (Cat. No. 26)

Because the body form resembles a tooth root, it is generally referred to as "molar-tooth bottle" or "molar-

213 LIGHTFOOT 2017, 290, no. 439–440.
214 ERTEN 2018, 49.
215 HAYES 1975, 87; ANTONARAS 2025, 175.
216 HAYES 1975, 87.
217 HAYES 1975, 213, no. 433.
218 OLIVER 1980,126, no. 222.
219 ANTONARAS 2025, 175, no. 180.
220 ANTONARAS 2017, 106.
221 HAYES 1975, 99; KUNINA 1997, 339; ANTONARAS 2017, 106.
222 HAYES 1975. 215, no. 352.
223 AUTH 1976, 127, no. 157.
224 KUNINA 1997, 336, no. 427.
225 CARON/ZOÏTOPOÚLOU, 2008, 160 no 149.
226 ATİLLA 2015, 178 fig. 10, no 33.
227 ANTONARAS 2017, 106 no 60.
228 EKER 2018,1257.
229 CARON/ZOÏTOPOÚLOU, 2008, 187.
230 AUTH 1976, 149, no. 193.
231 ISRAELI 1998, 51.
232 CARON/ZOÏTOPOÚLOU, 2008, 186, no. 174.
233 AUTH 1976, 149.
234 CARON/ZOÏTOPOÚLOU, 2008, 186.

shaped" vessel.[235] These forms, known to have been produced in regions such as Iraq, Iran, and Egypt, are dated to the 9th–10th centuries AD based on archaeological and typological evidence.[236] These small-sized bottles, generally produced using the mould-blowing technique, were used especially for storing perfume and scented oils.[237]

Although the rim and neck of the bottle recorded in the Adana Museum are broken, the body is well preserved. This bottle, made of transparent glass, has a rectangular body and, at the lower part, pointed feet tapering in the form of tooth roots.

Comparable examples of the form are attested in the Hans Cohn Collection (Los Angeles),[238] the Islamic-period holdings of the Corning Museum of Glass[239] and the J. Paul Getty Museum.[240] Considering the comparative examples, it is possible to date this glass bottle in the Adana Museum to between the 9th and 10th centuries AD.

EVALUATION AND CONCLUSION

The glass bottles in the Adana Museum collection, dated from the 1st to the 10th century AD, and systematically examined within the scope of this study, reflect the technical and aesthetic richness of Eastern Mediterranean glassmaking. Oinochoai, gutti, aryballoi, amphoriskoi, as well as examples with cylindrical and prismatic bodies produced by free-blowing and mould-blowing techniques, together with their different rim and body types, clearly demonstrate the diversity of the region's glass-production tradition and the level of craftsmanship attained during the Roman and Late Antique periods. These vessels were used not only in everyday life but also as grave goods, ritual objects, and items of luxury consumption.

Their typological and decorative characteristics reveal a close relationship between the objects in the collection and Eastern Mediterranean production centres. This situation indicates that Cilicia occupied a dominant position in the Mediterranean glass trade in terms of both production and distribution. In agreement with Stern's assessments, the fact that a part of the assemblage appears to have been supplied from local resources points to the continuity of regional glassworking and indicates the presence of a production tradition in Cilicia.

In conclusion, the Adana Museum collection constitutes a valuable archaeological assemblage that reflects the technical development of Eastern Mediterranean glassmaking, regional production traditions, and networks of cultural interaction. This study re-evaluates the role of Cilicia in glass production and trade throughout the Roman and Late Antique periods both at the local and Mediterranean scale, and provides a solid basis for future research on the history of glassworking in the region.

[235] VON SALDERN 1980, 165; ANTONARAS 2025, 322.
[236] VON SALDERN 1980, 165; ANTONARAS 2025, 322.
[237] ANTONARAS 2025, 322
[238] VON SALDERN 1980, 164, no. 161.
[239] WHITEHOUSE 2010, 71, no. 111.
[240] ANTONARAS 2025, 326 no 386-388.

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CATALOGUE

Cat. No: 1 / Oinochoe

Museum Cat. No: 11369

Acquisition: Purchase / H. 7,8 cm, Rim Diam. 2 cm

Description: Produced in the inner-mould technique. Decorated with zigzag and spiral motifs executed with coloured glass threads on a white ground. Form with an oval body, short neck, and wide mouth. Rim and handle broken; with a base. Small-sized.

Parallels: HAYES 1975, p. 188 no. 19; OLIVER 1980, p. 39 no. 8; CARON/ZOÏTOPOÚLOU 2008, p. 4 no. 3; ANTONARAS 2025, p. 74 no. 48.

Dating: 5th century BC.

Cat. No: 1 / Oinochoe

Museum Cat. No: 17623

Acquisition: Purchase / H. 14 cm, Rim Diam. 4,5 cm

Description: Produced by the free-blowing technique. Trefoil-rimmed, with a short and wide cylindrical neck. Pear-shaped body, swollen in the lower part, with a distinct base. Single handle extending from the rim to the shoulder.

Parallels: ISINGS 1957, p. 104; KUNINA 1997, p. 309, no. 270; LIGHTFOOT 2001, p. 23; https://ancientglass.wordpress.com/2012/02/25/early-roman-jug/

Dating: 1st century AD.

Cat. No: 3 / Spiral-banded Bottle

Museum Cat. No: 16600

Acquisition: Purchase / H. 10,8 cm, Rim Diam. 1,9 cm

Description: Produced by the free-blowing technique. Made of burgundy glass, with a funnel-shaped rim, long cylindrical neck, globular body, and flattened base. Decorated with ten bands of white glass thread spirally wound from the shoulder to the base.

Parallels: FLEMING 1996, p. 23, no. 17; ÖZET 1987, p. 606, no. 14; HÖPKEN/ÇAKMAKLI 2015, p. 122, no. 260; CARON/ZOÏTOPOÚLOU 2008, p. 42, no. 36; LIGHTFOOT 2017 p. 193, no. 237; ANTONARAS 2025, p. 286, no. 330.

Dating: 1st century AD.

Cat. No: 4 / Pointed-bottom bottle

Museum Cat. No: 11249

Acquisition: Purchase / H. 15 cm, Rim Diam. 3,4 cm

Description: Produced by the free-blowing technique. Made of cobalt-blue glass, with a thin rim projecting outward and a long cylindrical neck. Body widening in a drop shape, with a pointed base. Surface shows traces of oxidation and iridescence.

Parallels: OLIVER 1980, p. 52, no. 38; ERTEN 2003, no. 1–3; CARON/ZOÏTOPOÚLOU 2008, p. 42, no. 36; LIGHTFOOT 2017, p. 189, no. 231; ANTONARAS 2025, p. 287, no. 334.

Dating: 1st century AD.

Cat. No: 5 / Guttus

Museum Cat. No: 10642

Acquisition: Purchase / H. 6,2 cm, Rim Diam. 4,1 cm, Base: 8,4 cm

Description: Produced by the free-blowing technique. With an outward-projecting funnel-shaped rim and a short neck. Bird-shaped body, with a slightly concave base. Made of blue-green glass. Surface shows traces of oxidation and iridescence.

Parallels: VESSBERG/WESTHOLM 1956, p. 171, no. 51/1–2; HAYES 1975, p. 219, no. 539; OLIVER 1980, p. 57, no. 144; CANAV 1985, p. 39, no. 23–24; GÜRLER 2000, p. 51, no. 55; LIGHTFOOT 2013, p. 92, no. 4; HÖPKEN/ÇAKMAKLI 2015, p. 81, no. 44.

Dating: 1st–2nd century AD.

Cat. No: 6 / Aryballos

Museum Cat. No: 5841

Acquisition: Purchase / H. 13 cm, Rim Diam. 5,5 cm

Description: Produced by the free-blowing technique. Rim folded inward and expanded outward, with a vertical handle; globular body and rounded base.

Parallels: MORIN-JEAN 1922–1923, p. 84, no. 87; OLIVER 1980, p. 73, no. 72; KUNINA 1997, p. 323, no. 349; WHITEHOUSE 1997, p. 201, no. 351; HÖPKEN/ÇAKMAKLI 2015, p. 98, no. 192.

Dating: Late 1st century AD to 2nd century AD.

Cat. No: 7 / Aryballos

Museum Cat. No: 8547

Acquisition: Purchase / H. 7,7 cm, Rim Diam. 3,1 cm

Description: Produced by the free-blowing technique. With a collar rim, vertical handle; bronze rings on the handles; globular body and rounded base.

Parallels: MORIN-JEAN 1922–1923, p. 84, no. 88; OLIVER 1980, p. 73, no. 71; SOROKINA 1987, Fig. 2; KUNINA 1997, p. 323, no. 346–347; GROSSMANN 2002, p. 11, no. 10; AYDIN TAVUKÇU 2007, p. 158, no. 7; LIGHTFOOT 2007, p. 110, no. 254–255; HÖPKEN/ÇAKMAKLI 2015, p. 98, no. 191; TAŞTEMÜR/GÜRLER 2019, p. 156, no. 4.

Dating: Mid-1st century AD to 3rd century AD.

Cat. No: 8 / Miniature Aryballos

Museum Cat. No: 5916

Acquisition: Purchase / H. 3,5 cm

Description: Produced by the free-blowing technique. With an inward-folded, broad and flattened rim; with an applied handle; with a base.

Parallels: KUNINA 1997, p. 323, no. 348.

Dating: Second half of the 1st century AD.

Cat. No: 9 / Rectangular-bodied Bottle with Handle

Museum Cat. No: 973

Acquisition: Purchase / H. 12 cm, Rim Diam. 4,3 cm, Base: 6,2 cm

Description: Produced by the free-blowing technique. Yellowish-brown. Rim folded up and down, everted. With a short cylindrical neck, sloping shoulder, prismatic body, and slightly concave base. Single-handled.

Parallels: EKER 2017, p. 67, Type II; TEMÜR/ÖZBİLGİN 2019, p. 64, no. 2; ANTONARAS 2025, p. 271, no. 307; LIGHTFOOT/ARSLAN 1992, p. 112, no. 61; KUNINA 1997, p. 285, no. 164; ERTEN 2018, p. 251, no. 101; HÖPKEN/ÇAKMAKLI 2015, p. 72, no. 127; ANTONARAS 2017, p. 116, no. 75.

Dating: 1st–3rd centuries AD.

Cat. No: 10 / Rectangular-bodied Bottle with Handle

Museum Cat. No: 16605

Acquisition: Purchase / H. 16,5 cm, Rim Diam. 4,2 cm

Description: Produced by the free-blowing technique. Light blue. The broad, everted and thickened rim is slightly folded. With a cylindrical neck, sloping shoulder, and four-sided prismatic body. Single handle of curved form. Included in Isings' "Form 50" group.

Parallels: EKER 2017, p. 67, Type II; TEMÜR/ÖZBİLGİN 2019, p. 64, no. 2; ANTONARAS 2025, p. 271, no. 307; LIGHTFOOT/ARSLAN 1992, p. 112, no. 61; KUNINA 1997, p. 285, no. 164; ERTEN 2018, p. 251, no. 101; HÖPKEN/ÇAKMAKLI 2015, p. 72, no. 127; ANTONARAS 2017, p. 116, no. 75.

Dating: 1st–3rd centuries AD.

Cat. No: 11 / Rectangular-bodied Bottle without Handle

Museum Cat. No: 10114

Acquisition: Purchase / H. 13,7 cm, Rim Diam. 5 cm

Description: Produced by the free-blowing technique. Transparent greenish glass; however, due to surface corrosion, greyish stains are present. It is defined by an everted, funnel-shaped rim, a narrow and short neck, a long prismatic body, and a slightly concave base.

Parallels: LIGHTFOOT/ARSLAN 1992, p. 135, no. 82; HÖPKEN/ÇAKMAKLI 2015, p. 72, no. 127; TEMÜR/ÖZBİLGİN 2019, p. 52, no. 8.

Dating: 1st–5th centuries AD

Cat. No: 12 / Miniature Rectangular-bodied Bottle

Museum Cat. No: 4961

Acquisition: Purchase

Description: Produced in a mould. With a fire-flattened rim and a tapering cylindrical neck. Body with a rectangular section and a flat base. Surface shows iridescence and traces of heavy corrosion.

Parallels: GEYİK KARPUZ 2014, p. 88, no. 27; HÖPKEN/ÇAKMAKLI 2015, p. 181, no. 409; EKER 2017, p. 87, Type XIIE.

Dating: 9th–10th centuries AD.

Cat. No: 13 / Square-bodied Bottle

Museum Cat. No: 9987

Acquisition: Purchase / H. 12,5 cm, Rim Diam. 3,5 cm

Description: Produced by the free-blowing technique. Made of light-blue, transparent glass. With an everted and flattened rim. Thin, long neck and sloping shoulder. Square-section body with a slightly concave base. Single-handled; the handle is attached at a sharp angle from just below the rim to the shoulder.

Parallels: ISINGS 1957, p. 63, no. 50a; LIGHTFOOT/ARSLAN 1992, p. 110, no. 59; TEMÜR/ÖZBİLGİN 2019, p. 51, no. 2.

Dating: 1st–3rd centuries AD.

Cat. No: 14 / Cylindrical-bodied Bottle with Handle

Museum Cat. No: 8431

Acquisition: Purchase / H. 20 cm

Description: Produced by the free-blowing technique. With a rounded rim folded back. Short cylindrical neck, straight cylindrical body, and slightly convex base. With a handle drawn from trail-applied molten glass, extending from the rim to the shoulder.

Parallels: HAYES 1975, p. 199, no. 208; KUNINA 1997, p. 301, nos. 235–237; WHITEHOUSE 1997, p. 186, no. 327; OLCAY 2001, p. 152, fig. 8, no. 11.

Dating: 1st–4th centuries AD.

Cat. No: 15 / Cylindrical-bodied Bottle without Handle

Museum Cat. No: 2377

Acquisition: Purchase / H. 14,9 cm, Rim Diam. 3,9 cm

Description: Produced by the free-blowing technique. Transparent glass, without a handle. Rim folded outward and inward. With a short neck, sharply carinated shoulder, long cylindrical body, and slightly concave base.

Parallels: ISINGS 1957, p. 120; WHITEHOUSE 1997, p. 176, no. 308; LIGHTFOOT/ARSLAN 1992, p. 184, no. 119; ATİLLA 2015, p. 177, fig. 7, no. 22; EKER 2017, p. 68, Type IVA.

Dating: 2nd–4th centuries AD.

Cat. No: 16 / Ribbed Bottle

Museum Cat. No: 16516

Acquisition: Purchase / H. 16,2 cm, Rim Diam. 3,2 cm, Base Diam. 5,6 cm

Description: Produced by the free-blowing technique. With an everted, thickened rim. Long funnel-shaped neck widening upwards. Broad, flattened body, decorated with ribs formed in hot glass. Slightly concave base.

Parallels: ERTEN 2018, p. 37, no. 9; LIGHTFOOT/ARSLAN 1992, p. 139, no. 83; GÜRLER/TAŞTEMÜR 2019, p. 175, no. 23; HÖPKEN/ÇAKMAKLI 2015, p. 59, no. 99.

Dating: 2nd–4th centuries AD.

Cat. No: 17 / Bottle with Zigzag Decoration

Museum Cat. No: 5102

Acquisition: Purchase / H. 14 cm, Rim Diam. 4,5 cm

Description: Produced by the free-blowing technique. With a broken rim; mouth form widening outward. Short and wide neck, globular body, and ring base. The body is decorated with zigzag ornament applied with glass threads.

Parallels: OLIVER 1980, p. 96, no. 146.

Dating: 2nd–3rd centuries AD.

Cat. No: 18 / Amphoriskos with Zigzag Decoration

Museum Cat. No: 12047

Acquisition: Purchase / H. 8 cm, Rim Diam. 2,2 cm

Description: Produced by the free-blowing technique. With an everted rim, long cylindrical neck, and globular body. With a pair of handles set opposite each other. The body surface is decorated with a raised zigzag ornament formed with melted glass threads.

Parallels: ANTONARAS 2017, p. 138, nos. 459–460; ANTONARAS 2025, p. 307, no. 362; LIGHTFOOT 2007, p. 129, no. 317; CARON/ZOÏTOPOÚLOU 2008, p. 177, no. 165.

Dating: 3rd–4th centuries AD.

Cat. No: 19 / Ribbed Bottle with Single Handle

Museum Cat. No: 5287

Acquisition: Purchase / H. 12,8 cm, Rim Diam. 3 cm

Description: Produced by the free-blowing technique. With a plain, everted rim and a long neck. Elongated oval body with a pointed base. Single handle of wavy form. Surface shows traces of iridescence and oxidation.

Parallels: EISEN 1927, p. 427, fig. 174; HAYES 1975, p. 211, no. 415; BARKÓCZI 1996, p. 100, no. 315; ANTONARAS 2025, p. 266, no. 301.

Dating: 3rd–4th centuries AD.

Cat. No: 20 / Single-handled Jug with Trailed Glass Thread on the Neck

Museum Cat. No: 5086

Acquisition: Purchase / H. 10,5 cm

Description: Produced by the free-blowing technique. With an outward-flaring rim, long funnel-shaped neck, and globular body. Single handle of curved form. Decorated with a blue trail on the rim and a transparent glass-thread trail on the neck. With a thick and distinct base.

Parallels: HAYES 1975, p. 79, no. 187; KUNINA 1997, p. 331, nos. 390–391; CARON/ZOÏTOPOÚLOU 2008, p. 156, no. 146; LIGHTFOOT 2017, p. 149, no. 165; ERTEN 2018, p. 95, no. 35; WEINBERG 1988, pp. 65–66, no. 207; HÖPKEN/ÇAKMAKLI 2015, p. 149, no. 337.

Dating: 3rd–4th centuries AD.

Cat. No: 21 / Funnel-mouthed Bottle with a Globular Body

Museum Cat. No: 10139

Acquisition: Purchase / H. 14,5 cm, Rim Diam. 3 cm

Description: Produced by the free-blowing technique. Included in the ringless-base group. With a fire-flattened, slightly outward-opening funnel rim. Long cylindrical neck, regular globular body, and concave base. With horizontal linear decoration on the neck, shoulder, and above the base. Surface shows widespread traces of corrosion.

Parallels: LIGHTFOOT/ARSLAN 1992, p. 123, no. 70; WHITEHOUSE 1997, p. 254, no. 434; OLCAY 2001, p. 156, no. 26; HÖPKEN 2010, p. 156, fig. 5, no. 32; ATİLLA 2015, p. 177, fig. 8, no. 27; ÖZET 1987, p. 41, no. 11; TEMÜR/ÖZBİLGİN 2019, p. 65, no. 19.

Dating: 3rd–4th centuries AD.

Cat. No: 22 / Lentoid-bodied jug

Museum Cat. No: 16513

Acquisition: Purchase / H. 9,7 cm, Rim Diam. 2,1 cm

Description: With an everted rim folded inward and a long cylindrical neck. With distinct ribbing extending from the rim to the shoulder. Lentoid body with an oval base. Single-handled.

Parallels: CANAV 1985, p. 62, no. 90; EKER 2017, p. 78, Type IXC; GORIN-ROSEN 2009a, p. 93, no. 2.54:6; CLAIRMONT 1963, p. 142, no. 754; HAYES 1975, p. 198, no. 171; LIGHTFOOT 2017, p. 290, nos. 439–440; ERTEN 2018, p. 49, no. 15.

Dating: 4th century AD.

Cat. No: 23 / Grooved Cylindrical Bottle

Museum Cat. No: 5101 / Acquisition: Purchase

Description: Produced in a mould. Rim broken. With a cylindrical neck, cylindrical body, and flat base. Decorated with vertical grooves along the body.

Parallels: HAYES 1975, p. 213, no. 433; OLIVER 1980, p. 126, no. 222; ANTONARAS 2025, p. 175, no. 180.

Dating: 4th–5th centuries AD.

Cat. No: 24 / Funnel-mouthed Bottle with a Globular Body

Museum Cat. No: 5043

Acquisition: Purchase

Description: Produced by the free-blowing technique. Rim broken; with a fire-polished funnel-shaped mouth. Long cylindrical neck and globular body. With a ring-shaped conical base connected to the narrow neck.

Parallels: HAYES 1975, p. 215, no. 352; AUTH 1976, p. 127, no. 157; KUNINA 1997, p. 336, no. 427; CARON/ZOÏTOPOÚLOU 2008, p. 160, no. 149; ATİLLA 2015, p. 178, fig. 10, no. 33; ANTONARAS 2017, p. 106, no. 60.

Dating: 4th–5th centuries AD.

Cat. No: 25 / Long-necked Bottle

Museum Cat. No: 16515

Acquisition: Purchase / H. 17,2 cm, Rim Diam. 4,9 cm, Base Diam. 3,8 cm

Description: Produced by the free-blowing technique. With an outward-flaring, fire-flattened rim. Long cylindrical neck, globular body, and slightly flattened base. Decorated with three rows of chain-ring ornament executed with blue glass threads around the neck and body.

Parallels: AUTH 1976, p. 149, no. 193; ISRAELI 1998, p. 51; CARON/ZOÏTOPOÚLOU 2008, p. 186, no. 174.

Dating: 4th–7th centuries AD.

Cat. No: 26 / Molar-shaped Bottle

Museum Cat. No: 349

Acquisition: Purchase

Description: Produced in a mould. Rim and neck broken; body intact. Made of transparent glass. Rectangular-bodied, with feet whose lower ends taper in the form of a tooth root.

Parallels: VON SALDERN 1980, p. 164, no. 161; WHITEHOUSE 2010, p. 71, no. 111.

Dating: 9th–10th centuries AD.



Cat. No. 1



Cat. No. 2



Cat. No. 3



Cat. No. 4



Cat. No. 5



Cat. No. 6



Cat. No. 7



Cat. No. 8



Cat. No. 9



Cat. No. 10



Cat. No. 11



Cat. No. 12



Cat. No. 13



Cat. No. 14



Cat. No. 15



Cat. No. 16



Cat. No. 17



Cat. No. 18



Cat. No. 19



Cat. No. 20



Cat. No. 21



Cat. No. 22



Cat. No. 23



Cat. No. 24



Cat. No. 25



Cat. No. 26