

A Study on the Development of Food Vessels from Prehistoric Times to the Qin and Han Dynasties in the Shandong Region

Yutong Liu

*Affiliated High School of Shandong Normal University, Jinan, China
1091164483@qq.com*

Abstract. Shandong Province, one of the cradles of Chinese civilization, developed an agricultural culture that established the life concept of "food as the paramount necessity." From the prehistoric Stone Age to the Qin and Han dynasties, the region's cultural evolution was vividly embodied in its food vessels. These artifacts, used across social classes, reveal shifts in economy, technology, and ritual systems. In the prehistoric era, vessels were simple and made from accessible materials, reflecting basic subsistence needs. By the pre-Qin period, with the rise of ritual principles and social hierarchy, food vessels gained symbolic meaning and incorporated metal materials. During the Qin and Han dynasties, national unification and cultural integration standardized and diversified vessel forms, while external exchanges in the Eastern Han further enriched designs. This study traces the evolution of food vessels in Shandong from prehistory to the Qin and Han dynasties by combining archaeological, historical, and modern literature. It finds that the transformation of vessel forms are not only indicators of technological progress but also material representations of socio-economic development and cultural changes. The research conclusions are somewhat limited; the studied timeframe spans from "prehistoric times to the Wei, Jin, and Northern and Southern dynasties." Key changes in food vessel morphology across various historical stages could be highlighted.

Keywords: Shandong Province, Food Vessel Forms, Production Technology, Cultural Influence

1. Introduction

As the birthplace of Chinese civilization, which holds "food as the paramount necessity of the people" as its core life concept, Shandong Province possesses a profound historical and cultural heritage, making it an ideal region for studying the morphological evolution of ancient Chinese food vessels. Starting from the Paleolithic Age, distinct cultural areas emerged in Shandong. The food vessels unearthed from these cultural regions across different periods exhibit significant stage-specific changes in form, material, and decoration, reflecting the influence of their respective eras. Furthermore, social stratification and ideological diversification during the imperial period further stimulated changes in the forms and decorative patterns of food vessels, these everyday utensils. With advancements in archaeological excavation and the integration of historical records with archaeological data, recent progress in archaeological discoveries has shifted the research focus

from purely typological analysis towards interdisciplinary investigations incorporating socio-technical and cognitive perspectives.

This study adopts a multidisciplinary and multifaceted approach, combining archaeological analysis with perspectives from history and anthropology. Data sources include published archaeological reports, museum collections, and historical documents. The analytical focus concentrates on artifact morphology, material usage, and usage contexts. A comparative research method is employed to identify the influences of regional differences and temporal changes on the development of food vessels. This research aims to explore the manifestation of diverse cultural aspects in archaeological findings through the lens of historical-cultural development and economic changes in the Shandong region. In studying primary historical sources, it seeks to discuss the historical and cultural development of Shandong from multiple angles with the greatest possible accuracy.

2. Resource base and technological innovation

As one of the important origins of Chinese civilization, the unique cultural environment of the Shandong region gave birth to the Haidai Cultural Zone, where the extraction of raw materials for food vessels possessed distinct regional characteristics. Based on the specific geographical environment and the distribution of mineral resources, archaeological analysis of food vessels from different periods reveals that early materials for food vessels in Shandong primarily utilized local high-quality minerals. In the middle and late periods, long-distance jade trade developed, eventually leading to the refined mining and processing of raw materials for high-end pottery [1]. This process was deeply influenced by geographical environment, cultural traditions, and technological evolution, reflecting the continuous innovation and progress of the people in Shandong in material utilization and craft development.

2.1. Local resources and early application

The abundant natural resources in the Shandong region provided the conditions for food vessel manufacture, showing significant advantages especially in the application of clay, wood, stone, and metal materials: sedimentary clay from the eastern coastal areas, quartz and hornfels from the central hilly regions, and timber resources from the western plains. These diverse natural resources provided the material foundation for food vessel production. During the Houli Culture period, the ancient inhabitants primarily used local riverbank sedimentary clay to make simple “round-bottomed fu” (cauldrons) to meet basic cooking needs. By the Dawenkou Culture period, people could distinguish between different types of clay, such as using red clay for painted pottery and kaolin clay for white pottery. With the deepening understanding of materials, the types and quality of food vessels saw significant improvement as early as the Dawenkou period [2]. Concurrently, the exploitation of metal resources like copper in Shandong promoted the emergence of bronze food vessels, which peaked during the Shang dynasty, utterly transforming crafting techniques and usage patterns.

Early food vessel production relied on local resources: using vein quartz and hornfels to make stone grinders and grinding rollers, and using sedimentary clay to make pottery food vessels, with the Houli Culture round-bottomed fu being a representative example [3]. During the Dawenkou Culture period, the potter's wheel technique appeared, making pottery more regular and the body thinner. Specialized steaming vessels also emerged, which could be combined with fu and ding vessels, advancing cooking methods. Wood was also used to make food vessels, such as bowls,

which, although not easily preserved, their existence can be inferred from archaeological traces. These early practices laid the foundation for subsequent development.

With technological progress, the mining of metal deposits gradually rose in Shandong, particularly the mining of copper and the production of bronze ware, marking the advent of a new era in food vessel production. The Shandong region is rich in mineral resources such as copper, tin, and lead, providing the material basis for bronze food vessel production. Archaeological discoveries indicate that as early as the Longshan Culture period, copper slag and brass awls were unearthed at the Rizhao Yaowangcheng site. However, it was until the Xia and Shang periods that the production technology of bronze food vessels gradually matured. Bronze wine vessels and food vessels like “gu” (beakers) and “jue” (cups) unearthed from the Shang Dynasty site at Jinan Daxinzhuang feature exquisite decorations and mature casting techniques, indicating that bronze food vessels had become an important part of noble banquets and sacrificial activities [4]. By the Spring and Autumn and Warring States periods, iron implements appeared, and iron fu and ding cooking vessels were discovered at sites like the ancient capital of Qi in Linzi. Iron food vessels were more robust and durable than bronze ones, and their raw material sources were more extensive, allowing for wider dissemination of food vessels [5].

2.2. Craftsmanship and technical refinement

The spirit of craftsmanship and technical refinement in food vessel production in Shandong are closely intertwined. From early pottery making to later metal vessel casting, artisans consistently pursued technical excellence and product perfection. During the Dawenkou Culture period, potters could already select clay based on intended use and mastered firing techniques using oxidizing and reducing flames, producing brightly colored painted pottery and solid gray pottery. During the Longshan Culture period, pottery-making technology peaked, exemplified by the extremely thin “eggshell black pottery”. This pursuit of ultimate craftsmanship reflects the high development of the artisan spirit.

Metal food vessels from the Xia and Shang periods continued this craftsmanship spirit. Bronze casting during the Shang and Zhou periods required collaboration between multiple trades, including mining, smelting, mold-making, pouring, and finishing, with each step demanding exquisite skill. For instance, the piece-mold casting method used for intricate bronze ding and gui (food containers) demonstrated a high degree of standardization and technical proficiency. These technological advancements improved product quality and food vessel production from purely utilitarian towards artistic development.

In an environment of limited resources, the ancient people developed adaptive skills and strategies: they improved efficiency through enhanced extraction techniques, such as identifying quartz vein directions to select high-quality stone; and through refined raw material processing, they removed impurities and improved clay quality. As local resources became insufficient, long-distance resource trade networks formed. During the late Dawenkou and Longshan Culture periods, Xiuyan jade from the Liaodong Peninsula and hard stones from the south entered the Shandong region through trade networks, being processed into ceremonial food vessels like jade xuanji discs and jade bi discs. This interactive resource trade not only solved the problem of insufficient local high-quality stone but also promoted cultural exchange and technological dissemination between different regions.

3. The impact of economic development on human culture: the divergent development of food vessel forms

3.1. The evolution of food vessel forms driven by different modes of production

From settlements to states and from a slave system to a feudal system, the forms of food vessels changed alongside the evolution of production and lifestyles. From knapped stone tools designed for portability and production, to cooking utensils mass-produced after the adoption of a settled life, to vessels that also served ritual functions after clear social stratification emerged, food vessels were always profoundly influenced by the changes of their times.

3.1.1. Functional food vessel production in the gathering, fishing, and hunting period

During the era of a gathering, fishing, and hunting economy, the ancient inhabitants of Shandong relied on natural resources, and food vessels were dominated by practicality and function. The Houli Culture round-bottomed fu had a simple form, suitable for placing over a fire for cooking; stone grinders and grinding rollers were used to process nuts and grains. The shapes of these stone tools followed the principle of utility: grinders were often flat slab-like stones with slightly concave surfaces to hold the food; grinding rollers were elongated for easy gripping and grinding. Shell shovels and shell knives from shell midden sites were made from leftover shells after consumption, reflecting highly efficient and thorough resource utilization [6]. Decoration on food vessels in this period was extremely simple, and any occasional decoration was often related to practical functions, also greatly revealing the life wisdom of the ancestors. For example, wave patterns on the rim of pottery might have aided in preventing slippage.

Due to the limitations of the prehistoric era, the variety of food vessels was relatively limited, primarily satisfying basic needs for food processing, cooking, and containment. This functional-dominated characteristic of food vessel forms more clearly reflects the lifestyle of the gathering, fishing, and hunting period and the basic demands placed on food vessels—namely, to meet survival needs to the greatest extent, with no apparent social differentiation or ritual function yet present.

3.1.2. The development of food vessels after the formation of a primitive agricultural settlement pattern

With the emergence of primitive agriculture and the formation of settled life, population growth and social complexity brought diversified demands. People began making agricultural tools for tilling, sowing, and harvesting, such as stone plows and stone sickles. The design of these implements paid more attention to efficiency and convenience to adapt to the needs of agricultural production. Simultaneously, with the stability of settled life, the types and functions of utensils gradually enriched, with vessels for cooking, storage, and decoration appearing.

Archaeological excavations reveal that during the Dawenkou Culture period, the variety of food vessels increased significantly, and functional division of labor became more precise. Among cooking vessels, besides the continued use of the fu and ding, the specialized pottery zeng steamer emerged. This vessel, with holes in its bottom, required use in combination with other cooking vessels, demonstrating the diversification of cooking methods and enriching the diet [7]. For serving vessels, forms like pottery dou, plates, and bowls appeared in large numbers around the same period, used for holding different kinds of food. Traditional storage vessels like pottery urns and jars increased in capacity and became more regular in form, reflecting a growing need for grain storage

[8]. The standardization of food vessels increased during this period, with the widespread use of the fast wheel technique making the forms of similar vessel types more uniform. Concurrently, decorative patterns began to appear on food vessels. Painted pottery of the Dawenkou Culture featured geometric patterns in red, black, ochre, etc., such as petal and spiral patterns, on the vessel surfaces. These decorations not only had an aesthetic function but also might have carried certain cultural meanings.

These changes in food vessel forms reflect the social transformations brought about by agricultural settled life: the refinement of vessel functions highlights the increased variety and quantity of edible food; the sophistication of vessel patterns indicates the stability of settled life; and the emergence of social division of labor allowed specialized potters to focus on improving the quality and innovating the designs of food vessels.

3.2. The influence of political and economic development on decorative patterns

Since ancient times, with "food as the paramount necessity of the people," food vessels gradually took on ritual and aesthetic functions, a process in which political and economic development played a decisive role. With social progress and economic prosperity, people began pursuing a higher level of spiritual life, and the aesthetic and craftsmanship requirements for food vessels consequently increased. As one of the birthplaces of Chinese culture, the historical changes in the Shandong region are particularly significant. The leap from a slave society to a feudal society not only brought changes in social structure but also had a profound impact on the forms and decorative patterns of food vessels.

In slave society, the forms of food vessels were relatively simple, and patterns were mostly based on geometric shapes, reflecting the limitations of productive forces and the simplicity of aesthetic concepts at the time. After entering feudal society, with the widespread use of iron tools and the rapid development of ceramic technology, the forms and patterns of food vessels began to become rich and diverse. In feudal society, the production and use of food vessels were often closely related to social hierarchy and status; people of different social strata used food vessels of different materials and decorations, reflecting the contemporary hierarchical system and cultural customs.

3.2.1. Tribal division

Totems and Beliefs During the period of tribal society, food vessel patterns became symbols expressing group identity and religious beliefs. Symbols such as "sun, moon, and mountain" carved on pottery zun vessels and painted pottery dou with eight-pointed star patterns from the late Dawenkou Culture period illustrate the ancestors' observation and reverence for nature and the cosmos and might also have been tribal totems or sacrificial symbols [9]. Symbols like these were typically carved in prominent positions on the zun vessels, meticulously made, conveying the special meaning represented by the pattern through their fine execution. Archaeological research suggests these symbols might have been tribal totemic marks or religious symbols related to sacrifices to heaven and earth or nature worship. These zun vessels with special symbols were likely not used in daily life but served as ritual vessels for holding offerings during major tribal sacrificial ceremonies, their patterns symbolizing the collective beliefs and identity of the tribe. Furthermore, patterns on some painted pottery might also have had totemic significance; for instance, certain recurring animal patterns might represent the tribe's guardian animals. The use of these totemic patterns reflects the emergence of a certain degree of organizational structure and group identity

consciousness in the society at that time. Different tribes might have distinguished themselves through different pattern systems.

During this period, food vessels became material carriers of cultural identity. This development of totemic patterns not only enriched the decorative art of food vessels but also laid the foundation for the later ritualized pattern systems. At this point, food vessels were no longer merely utilitarian objects but began to undertake functions of socio-cultural and spiritual belief expression, marking an important turning point in the history of food vessel development.

4. The enrichment of food vessel decoration by humanistic thought

4.1. The gradual elevation of aesthetics and the diversification of food vessel patterns

4.1.1. The growth of the love of beauty

The Emergence of Adornment and the Development of Patterning With social development and the enhancement of aesthetic awareness, the decorative nature of food vessels in the Shandong region became increasingly prominent, with patterns gradually shifting from practical functions to aesthetic ones. During the Dawenkou Culture period, the maturation of painted pottery technology marked a significant advancement in decorative art. Artisans used mineral pigments such as ochre red, black, and white to paint geometric patterns like petal, spiral, and net patterns, which not only possessed decorative beauty but might also contain cultural meanings and religious beliefs. For instance, some scholars suggest that the recurring petal patterns might be related to fertility cults or celestial worship. By the Longshan Culture period, painted patterns gave way to the black pottery craft, which emphasized beauty of form and texture. Although the "eggshell black pottery" high-stemmed cups had simple decoration, their flowing lines and elegant proportions demonstrated a restrained and sophisticated aesthetic pursuit. This aesthetic shift reflected a change in social values: from outward, colorful expression to an inward, restrained aesthetic taste focused on texture and form.

Food vessels of different materials also exhibited distinct decorative characteristics. Jade wine vessels unearthed from the Dawenkou Culture often used relief and openwork techniques to highlight the material's warm, smooth quality; bronze food vessels, meanwhile, excelled in using relief and three-dimensional decorations to display a majestic and solemn artistic effect. The development of these decorative techniques not only enriched the visual effect of food vessels but also drove the progress and innovation of manufacturing crafts.

4.1.2. The stylistic development of utilitarian vessels and the application of patterns

For utilitarian vessels, artisans began to focus on the design of shapes and patterns, integrating aesthetics into everyday objects, thereby giving the vessels both practical and artistic value. For example, the shapes of pottery became diversified: some imitated forms from nature, such as animals or plants; others adopted geometric shapes, displaying simple yet elegant lines. The pottery gui (pitcher) of the Dawenkou-Longshan period is an outstanding representative of sculptural art. Its overall form imitates a bird standing upright with its head raised, the spout resembling a beak, the bag-like legs resembling a belly, and the handle resembling a tail. It both fulfilled the function of cooking and possessed high artistic appeal. This biomimetic shape not only reflects the artisans' observation and imitation of nature but might also contain elements of totemic worship or religious belief. Beyond the depiction of overall forms, the treatment of details became more refined. For instance, the high stems of pottery dou were often adorned with openwork or bamboo-node patterns,

which reduced weight and increased beauty; the legs of ding vessels diversified into conical, columnar, and "ogre-mask" types, each design balancing function and aesthetics.

Regarding the application of patterns, from the simple incised lines of the early periods to the painted designs on colored pottery and further to the relief decorations on bronze ware, decorative techniques continuously enriched and refined over time. Patterns like the taotie (monster mask) and kuilong (dragon) on Shang and Zhou bronze food vessels not only served a decorative function but also carried mysterious religious meanings and symbols of power. These patterns were typically symmetrically distributed with a rigorous structure, reflecting the contemporary worldview and sense of order. By the Han Dynasty, food vessel decoration became even more diverse: painted lacquerware appeared, pottery had molded impressions, and bronze vessels featured gold and silver inlay. These rich and varied decorative techniques turned food vessels into practical artworks, reflecting the highly developed aesthetic standards and craftsmanship of the time.

4.2. Ideological, cultural, and religious factors

4.2.1. Confucian culture and the "six arts of the gentleman"

As the birthplace of Confucian culture, Shandong was deeply influenced by the concept of "ritual." The ritual-music culture formed during the Western Zhou period strictly ritualized dining activities, making food vessels an important vehicle for practicing "ritual" [10]. The usage and combination of bronze food vessels reflected strict hierarchical norms: ding were for holding meat, gui for holding millet, dou for holding pickles, and different status levels used different combinations and specifications of food vessels. For example, the ranked ding system recorded in the "Zhou Li" stipulated, "The Son of Heaven uses nine ding, feudal lords seven, high officials five, and lower officials three." This numerical regulation materialized the social hierarchy through food vessels. During banquets, the placement and sequence of using food vessels were strictly regulated, embodying Confucian dietary etiquette requirements such as "do not speak while eating" and "do not sit if the mat is not straight." Furthermore, the patterns on food vessels also carried the function of moral edification. For instance, the common taotie pattern on bronze ware served both to awe and to warn people against gluttony; geometric patterns like the qiequ pattern and band patterns embodied the beauty of uprightness and harmony advocated by Confucianism. Confucian culture also emphasized the concept of "fine food and fine vessels," holding that food vessels should not only be practical but also possess aesthetic value, a concept that drove the relentless pursuit of perfection in food vessel craftsmanship.

By the Han Dynasty, when Confucianism became orthodoxy, the ritual norms surrounding food vessels became more systematic. A large number of texts explaining the rules for using food vessels appeared, such as the relevant records in the "Li Ji." Food vessels became an important medium for disseminating Confucian culture.

4.2.2. Mythology and ethnic core

The myths and religious beliefs of the Shandong region also deeply influenced the forms of food vessels. The bird worship of the Dongyi culture was embodied in bird-shaped pottery gui, possibly related to the totemic legend of "the heavenly mandate to the dark bird, which descended and gave birth to the Shang." During the Han Dynasty, thoughts of immortals and deities were prevalent, leading to the abundant appearance of patterns related to themes such as longevity and immortality on food vessel decorations [11]. Lacquered food vessels were often painted with cloud patterns and

immortal beast patterns; bronze food vessels featured gilded and silver-inlaid auspicious motifs; and pottery food vessels were molded with various lucky patterns. These decorations reflected people's desire to pursue health, longevity, and the avoidance of misfortune through dietary activities.

Some special food vessels also contained religious symbolism. For instance, the high stem of the dou might imitate a mythical tree connecting to heaven, used for communication between humans and gods during sacrifices; jade food vessels, due to the perceived mystique of their material, were believed to possess spiritual or transcendent functions. Thus, food vessels in the Shandong region were both utilitarian objects and important media carrying cultural beliefs and spiritual pursuits.

5. Conclusion

Firstly, the geographical environment and resource extraction formed the foundation for the development of food vessels. The diverse natural resources of the Shandong region—from local vein quartz, hornfels, and sedimentary clay in the early periods to later imports like obsidian and jade through trade networks, and further to local metal deposits—provided continuous material support for food vessel production across different eras. The strategies of the ancient people in Shandong for resource utilization, from using locally available materials to refined processing and eventually to engaging in long-distance trade, fully demonstrate their remarkable ability to actively adapt to the environment and continuously pioneer and innovate.

Secondly, the transformative development of the economy and society was the fundamental driver behind the evolution of food vessel forms and functions. Food vessels in the gathering, fishing, and hunting economy were predominantly simple and practical. The settled lifestyle of primitive agriculture brought population growth and social complexity, which directly led to an increase in the variety of food vessels, a refinement of their functions, and a rise in standardization. With the emergence of social stratification and state power, food vessels were endowed with the function of signifying social status.

Finally, humanistic thought and religious beliefs were the soul that shaped the decorative patterns and cultural connotations of food vessels. From the "sun, moon, mountain" symbolic totems of the Dawenkou culture to the standardized bronze decoration system governed by "ritual" in the Western Zhou period and further to the auspicious motifs incorporating celestial themes in the Han Dynasty, the evolution of food vessel patterns clearly outlines the intellectual development of the ancient people, from primitive beliefs to ritualized culture. Particularly, Confucian culture, which originated in the Shandong region, deeply infused the concept of "ritual" into human development, simultaneously influencing all aspects of food vessel use and making them important tools for maintaining social order and disseminating moral concepts.

In summary, the development of food vessels in the Shandong region integrated technological progress, economic changes, and humanistic spirit. Food vessels evolved from simple, practical everyday objects into brilliant crystallizations of civilization, vividly demonstrating the summarizing practice of the ancient people in Shandong amidst the changes of the ages. It reflects a great process of continuously enriching the spiritual world while transforming the material world.

References

- [1] Wang, Q. (2018). A Study of Prehistoric Jade Artifacts in the Haidai Region. *Kaogu [Archaeology]*, (4), 88-96.
- [2] Luan, F. S. (1997). *Archaeological Research in the Haidai Region*. Shandong University Press, pp. 98-102.
- [3] Institute of Archaeology, Chinese Academy of Social Sciences. (1973). *Excavation Report of the Zijingshan Site in Penglai, Shandong*. *Kaogu [Archaeology]*, (1), 11-15.

- [4] Institute of Historical Metallurgy and Materials, University of Science and Technology Beijing. (1981). A Preliminary Study of Early Chinese Copper and Bronze Artifacts. *Kaogu Xuebao* [*Acta Archaeologica Sinica*], (3), 287-302.
- [5] Bai, Y. X. (2005). *An Archaeological Study of Iron Implements in the Pre-Qin and Han Periods*. Science Press.
- [6] Shandong Provincial Institute of Cultural Relics and Archaeology. (1995). Excavation Report of the Houli Culture Site at Xiaojinshan, Zhangqiu City, Shandong Province. *Kaogu* [Archaeology], (5), 385-390.
- [7] Luan, F. S. (1996). Dongyi Archaeology. *Kaogu Xuebao* [*Acta Archaeologica Sinica*], (3), 295-324.
- [8] Jin, G. Y. (1995). A Preliminary Study on Agriculture in the Neolithic Age of Shandong. *Nongye Kaogu* [Agricultural Archaeology], (3), 45-55.
- [9] Li, X. Q. (1987). On the Newly Discovered Pottery Symbols of the Dawenkou Culture. *Wenwu* [Cultural Relics], (12), 75-80.
- [10] Yu, W. C. (1978). Studies on the Ding Usage System of the Zhou Dynasty. *Journal of Peking University* (Philosophy and Social Sciences Edition), (1), 84-98; (2), 84-97.
- [11] Xin, L. X. (2000). *A Comprehensive Study of Han Dynasty Pictorial Stone Carvings*. Wenwu Press.