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Comparing Prehistoric Subsistence Practices Revealed by Pottery Residue Analysis Across Asia

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ABSTRACT

Asia, as a cradle of human civilization, saw its prehistoric inhabitants develop diverse subsistence patterns due to varying geographical environments, climatic conditions, and resource distributions. Traditional archaeological methods, while offering some insights into these patterns, are limited in revealing detailed and cultural aspects. In recent years, the analysis of pottery residues has emerged as a new approach, gaining increasing attention. As an essential part of prehistoric life, pottery residues can directly reflect important information such as food sources, processing methods, and trade interactions.

This study systematically classified and summarized 103 published analyses (including more than 240 sites) of prehistoric pottery residues across Asia, spanning from the early Neolithic to the Iron Age. Through statistical charts and comparative analysis, the research uncovered significant diversity in subsistence strategies among different regions: East Asia relied heavily on plant resources, while also utilizing aquatic and animal resources; West Asia was dominated by animal fats, with frequent occurrences of dairy products and beeswax, suggesting early animal husbandry and trade activities; Central Asia showed a clear dependence on ruminant animals and horse milk; and North Asia focused on marine resources.

The results indicate that the subsistence practices of prehistoric people in Asia were influenced by multiple factors, with unique adaptive strategies emerging in different regions. These differences not only reflect the prehistoric populations' ability to utilize and adapt to their natural environments but also laid the foundation for subsequent cultural exchanges. Additionally, the study highlights the importance of interdisciplinary approaches and recommends integrating faunal and floral archaeological data with isotope studies in future research to achieve a more comprehensive understanding of ancient human subsistence and fill existing research gaps.

Keywords: pottery residue, prehistory, subsistence patterns, interdisciplinary research

1 Introduction

People's survival patterns and behavioral habits are closely related to their environment. Modern ethnographic surveys and sociological research reveal differences in dietary habits across various regions in Asia (Nam et al. 2010; Nobayashi 2022). For instance, East Asia has long developed a cooking system based on rice and grain crops, while West Asia has established a survival model centered on wheat and flour-based foods

(Fuller & Rowlands 2011). Given that food, particularly animal protein, is intrinsically linked to the origins of humanity, human evolution, and the development and spread of human civilization (Zink et al. 2014), studying the survival patterns reflected in the diet of our ancestors has always been a hot topic in archaeological research. Currently, archaeologists typically examine animal and plant remains unearthed from sites (Payne 1973; Spengler et al. 2014), carbon and nitrogen isotopes in human bones (Pechenkina et al. 2005; Hanks et al. 2018), dental calculus (Warinner et al. 2014), and other related studies to infer the survival patterns and resource utilization of ancient ancestors. Additionally, pottery, as one of the longest-used utensils by ancient people, is often employed for cooking and storage and can aid in studying the survival practices of our ancestors (Skibo 2022). Extensive research has been conducted on the emergence of pottery, with findings indicating that the appearance of pottery in West Asia lagged behind that in East Asia by several millennia. For example, recent radiocarbon dating of pottery shards found in Yuchanyan Cave in southern China suggests a date of around 18,300 - 15,430 cal BP (Boaretto et al. 2009). Although there is much debate surrounding the earliest pottery in West Asia, but a consensus has been reached that practical and stable pottery production began at the onset of the Neolithic period, around 7000 cal. BC (Le Mière and Picon 1998; Aurenche et al. 2001; Khanipour et al. 2021; Khanipour and Nishiaki 2024). The emergence of pottery in different regions of Asia occurred at varying times, and the shapes of the earliest pottery also differed (Wu et al., 2012; Craig et al., 2013; Campbell et al., 2017), which may be related to the distinct living patterns of Eastern and Western populations.

Previously, scholars often determined the function of pottery based on its shape, material, traces, and excavation site (Vukovic 2010). However, this approach was often subjective and could not provide more specific insights. For example, how can we determine whether a particular container was used for cooking meat or boiling dairy products? With the advancement of science and technology, research on pottery residues conducted in recent years has offered an effective solution to this problem. By analyzing the organic residues absorbed or remaining in pottery, it becomes easier to ascertain the purpose of pottery use and the living standards of people at that time (Skibo 2015; Hammann et al. 2022). As a critical period in human settlement and evolution, the analysis of organic residues from prehistoric pottery vessels is essential for a deeper understanding of cooking practices, food processing behaviors, and eating habits of that era. A previous study on the Korean Peninsula revealed how survival strategies varied across different locations and time periods based on lipid residues found in pottery (Kwak and Kim 2020). Similarly, research in central Germany from the Early Neolithic to the Bronze Age demonstrated that changes in the consumption of dairy and non-ruminant products were associated with innovations in pottery types (Breu et al. 2024). These studies highlight the complex relationship between food resources and the methods of preparation, storage, and consumption employed by prehistoric peoples, underscoring the importance of summarizing and comparing findings on pottery residues from different regions.

At present, relatively extensive research on pottery residues has been carried out in various regions of Asia (Shoda et al. 2020; Chasan et al. 2022; García-Granero et al. 2022; Murakami et al. 2022; Eusebio et al. 2023; Lundy et al. 2024), but the summary and understanding are not enough. There is no overall impression, let alone specific in-depth comparative research. This research intends to collect and sort out published literature, summarize and make a macro comparison of the research on prehistoric pottery residues in various regions of

Asia, and reveal the subsistence practices and evolution processes of ancestors in different regions and time spans. This not only helps us better understand the lifestyle and social structure of prehistoric humans, but also provides valuable clues for exploring the origin and development of human civilization.

2 Materials and Methods

In the process of processing, utilization and consumption of biological resources by ancestors, relevant organic molecules may remain or be deposited on various relics such as artifacts, soil, remains or human tissues. During long-term burial, organic matter may still be preserved to a greater or lesser extent despite being affected by physical, chemical, and biological effects. Those organic substances that have been preserved to this day are collectively called organic residues. Based on the observability of the naked eye, they can be divided into visible residues (such as liquids, carbonized materials, etc.) and invisible residues (such as organic molecules adsorbed by pottery shards, dental calculus wrapped protein, starch granules, etc.).

In the study of pottery residues, the analysis of lipid residues is mainly carried out (Rao et al. 2019; Demirci et al. 2020; Guðmundsson et al. 2021), as well as the observation of phytoliths and starch granules (Shibutani 2017; Wang et al. 2021), and the detection of biomolecules such as proteins (Hendy et al. 2018; Lyu et al. 2024) and DNA (Cavalieri et al. 2003). Each of these methods has advantages and disadvantages, and their current degrees of application on pottery are different. However, as far as this study is concerned, we only use the methods of humanities and social sciences to collect, organize and summarize the published literature related to pottery residues in various regions of Asia, and does not involve the application of specific experimental methods, so it is not discussed in detail here.

In terms of time span, this article mainly focuses on the prehistoric period, which roughly covers the period from the early Neolithic Age to the Iron Age (BC). This is a key development stage in human history, and it is also the period from the emergence of pottery making technology to its widespread spread and application. By comparing pottery remains from different time periods, we can observe the impact of the evolution of survival methods and technological progress on prehistoric human life.

In terms of geographical scope, this study covers multiple regions in Asia, including but not limited to East Asia, West Asia, North Asia, Central Asia, and South Asia. Due to their unique geographical environment and climatic conditions, these areas gave birth to diverse prehistoric cultures and survival strategies. For example, the Yellow River Basin and Yangtze River Basin in East Asia are the birthplaces of Chinese civilization (Gao et al. 2024). Their prehistoric pottery styles are unique, residue analysis can help understand the agriculture development and food processing methods of that time. The "Fertile Crescent Zone" in West Asia is another important birthplace of ancient civilization, and its pottery remains may reveal early crop cultivation and animal husbandry.

The research object of this study is mainly prehistoric pottery and its remnants. As part of prehistoric human survival practices, pottery's production techniques and traces of use can reflect the socioeconomic conditions and lifestyles at that time (Hein & Stilborg 2019). Residue analysis is an effective means to extract residual substances on the surface or inside of pottery through scientific methods, such as food residues, oils, plant fibers, etc., and then analyze the eating habits, economic foundation and living environment of ancestors

(Cramp & Evershed, 2014).

We aims to summarize previous research results through specific chart statistics and comparative data analysis, thereby further revealing the lifestyle, economic foundation, and trade exchanges of ancestors in different regions of Asia.

3 Results

3.1 Definition of geographical location in this study

Since there is no unified standard for the division of regions within Asia, for the convenience of comparison and based on previous archaeological and ethnological research, this study divided Asia into six regions: Central Asia, East Asia, West Asia, North Asia, South Asia and Southeast Asia.

The scope of Central Asia is consistent with common understanding, including Tajikistan, Uzbekistan, Kazakhstan, Turkmenistan, and Kyrgyzstan, located in western China, southern Russia, and northern Afghanistan, with its western border extending along the Caspian Sea.

North Asia is the part of Russia close to Asia, referred to in many studies as Siberia. It occupies the entire northern part of the continent, considering that the Far Eastern pottery contained in it represents a unique pottery culture that appeared in the early period, and the hydrology and climate are somewhat different from other regions in Asia, it is defined separately in this study.

South Asia is peninsula-shaped and surrounded by three bodies of water: the Indian Ocean to the south, the Bay of Bengal to the east, and the Arabian Sea to the west. The region includes the Indian subcontinent and its surrounding countries such as Sri Lanka, Bangladesh, India, Afghanistan, Pakistan, Bhutan, Nepal, Maldives.

Southeast Asia is located north of Australia, south of East Asia, west of the Pacific Ocean, and east of the Bay of Bengal. It includes multiple island and archipelagic countries spanning the northern and southern hemispheres and is the only region in Asia located on both sides of the equator. The countries and regions it cover include Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, East Timor, and Vietnam

East Asia is the part located in the eastern part of Central Asia, and the east is bounded by the East China Sea. Countries included are China, Mongolia, North Korea, South Korea, and Japan.

Western Asia is located between Central Asia and Africa, south of Eastern Europe. Much of the region is commonly referred to as the Middle East, but geographically does not include Egypt proper (Egypt is culturally considered a Middle Eastern country). Covering Georgia, Armenia, Azerbaijan, Turkey, Cyprus, Syria, Lebanon, Israel, Palestine, Jordan, Iraq, Oman, Yemen, Kuwait, Bahrain, Qatar, Saudi Arabia, Iran, the United Arab Emirates and other countries.

3.2 Specific situations of pottery use in different regions of Asia

（1） Central Asia

Although with the development of technology, many analyzes of pottery residues have been carried out around the world, relatively few analyzes of prehistoric pottery residues have been carried out in Central Asia. Only 10 articles covering 14 sites have been collected so far. And these 14 sites are all located in Kazakhstan. Judging from the results of these researches. Animal milk was identified in 10 of these 14 sites, and the use of

horse milk was also found in 4 of them; as for animal fat, ruminant body fat was detected in 11/14 sites, and the traces of the horse meat use was detected in8/14, undetermined animal fat were detected on 8/14; in addition, some use of C4 cereal millet and other plants was also found, as well as traces of resin (coniferous tree - Pinaceae) in one case (Figure 1, Table S1).

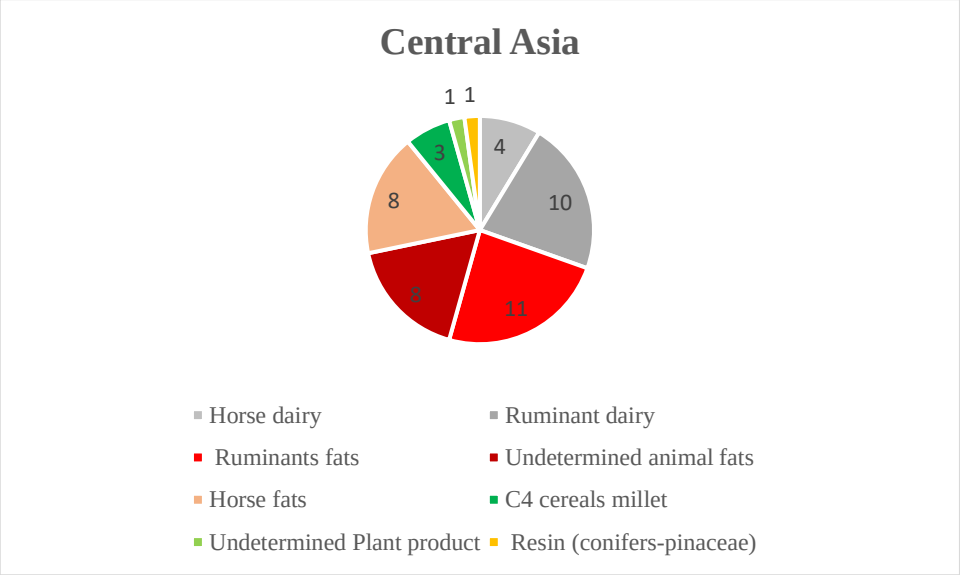

Figure 1. Statistical chart of Central Asia analysis results

By summary, it was found that studies of pottery residues that have been conducted in Central Asia have not found clear non-ruminant fats and the utilization of aquatic animal and plant resources. Among the discovered substances, the use of ruminant meat and milk is more significant, and the use of horse meat and horse milk was also observed, indicating the close connection between horses and the ancestors of Central Asia.

（2） North Asia

Although the Far East was once considered one of the possible origins of pottery and has a unique pottery culture, there are currently not many analyzes of prehistoric pottery residues in this range or in the whole North Asia, only have collected 5 papers from 12 sites (the age span is approximately 15,000 BP - 2,000 BP). It can be found that among the sites currently counted, at least half of the sites use marine resources, which also suggests the possibility of using freshwater fish (combining the location of the sites, we found the use of freshwater fish is mainly concentrated in the west and central part of North Asia, that is, not close to the sea place). Ruminant body fat was clearly detected at three sites, which may indicate the consumption of ruminant meat products. In addition, there are also traces of the use of resins and C3 plants, and the use of dairy products was only found in an Iron Age sites (Figure 2,3; Table S1).

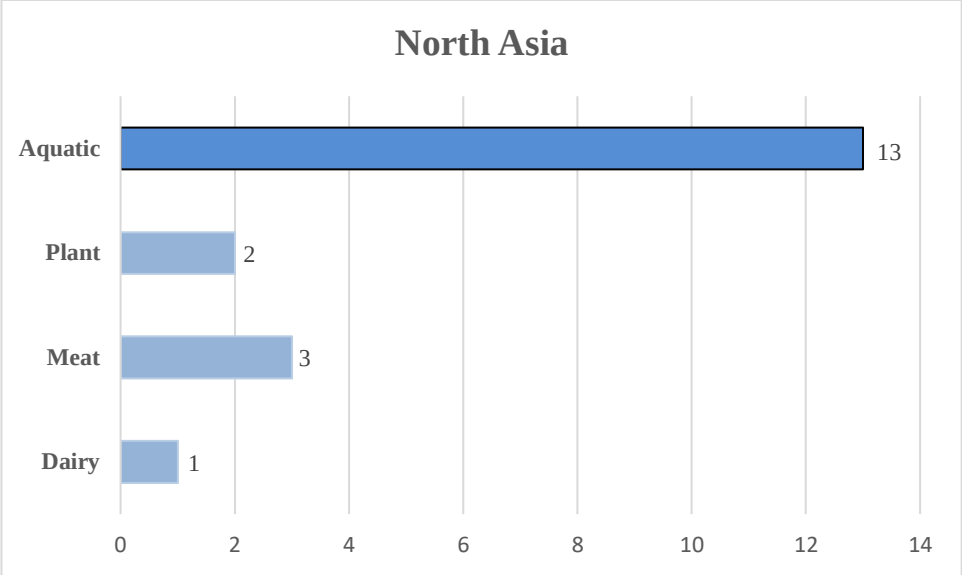

Figure 2. Statistical chart of North Asia analysis results 1

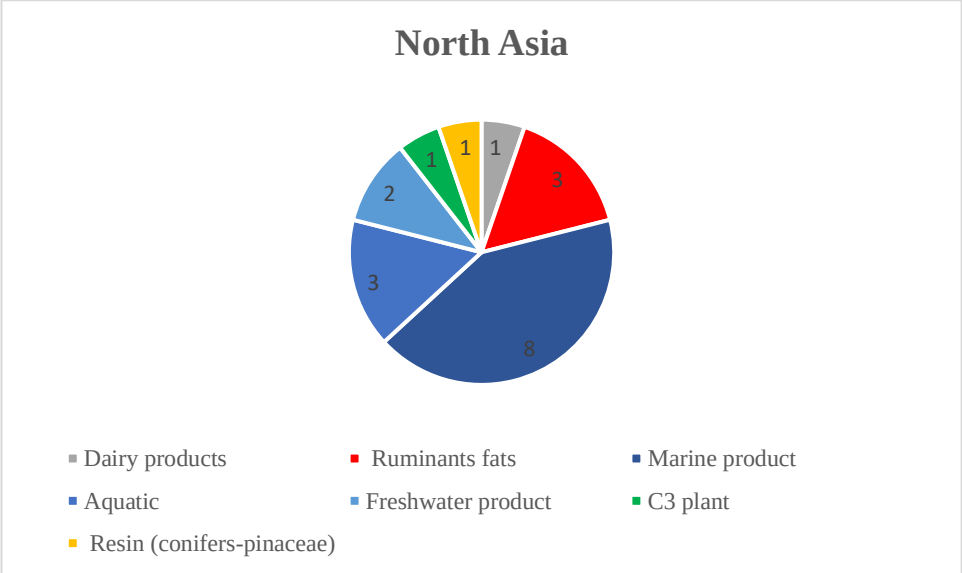

Figure 3. Statistical chart of North Asia analysis results 2

In summary, studies of pottery residues that have been carried out in North Asia have not identified clear non-ruminant uses. Among the substances discovered, clear large-scale use of aquatic resources was observed. Researchers believe that although fish can also be eaten by baking, the ancestors at that time undoubtedly also used pottery to process aquatic resources, such as cooking fish soup (Bondetti et al. 2020).

（3） South Asia

Prehistoric cultures in South Asia are known for the development of early agricultural societies, particularly the Indus Valley Civilization. Here I have collected all 4 published studies related to prehistoric pottery residue in South Asia, including a total of 12 sites in Pakistan and India, with an age range of approximately 3300-1300 BC. Through a simple review of the research results, we can find that dairy products and animal meat products were used in half or more of the sites. Although aquatic resources and plant resources were also used, they were relatively small (Figure 4; Table S1).

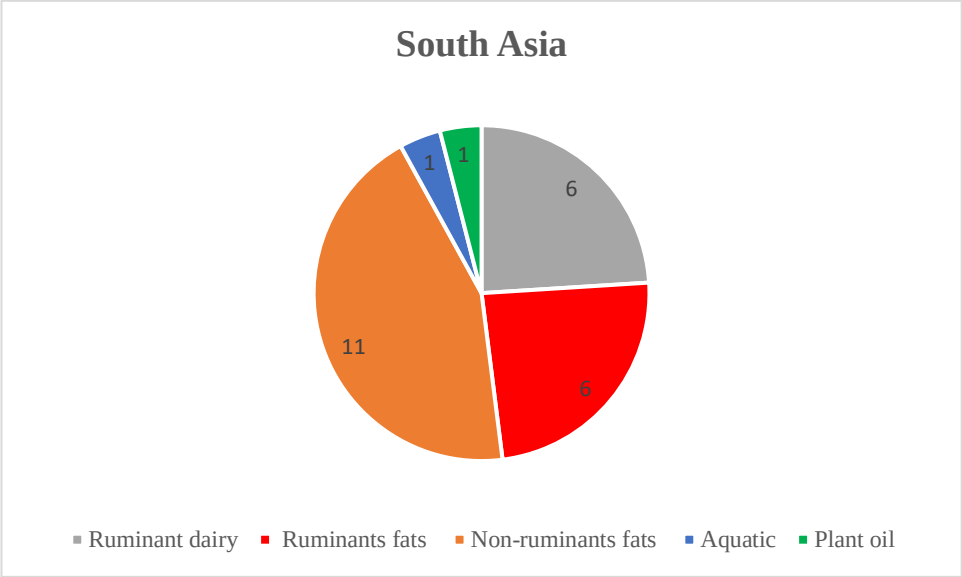

Figure 4. Statistical chart of South Asia analysis results

Judging from the statistical charts, at least from the perspective of residue analysis, non-ruminant animals occupied an important position in the diet of prehistoric people in South Asia. In addition, the ancestors of the Ganges River Basin were very interested in the meat of ruminants. And milk is also widely developed and utilized, which some researchers believe that may have come from potential buffalo (Chakraborty et al. 2020).

（4） Southeast Asia

For the Southeast Asia region, we collected seven prehistoric sites in Thailand and Vietnam from four studies for which pottery remains have been analyzed. Although the number of sites is small, the results obtained are relatively rich, showing the diverse diet of the ancestors of prehistoric Southeast Asia. Although no dairy products are shown to be extracted, there is consumption of some specialty foods such as taro and vegetables (Figure 5; Table S1).

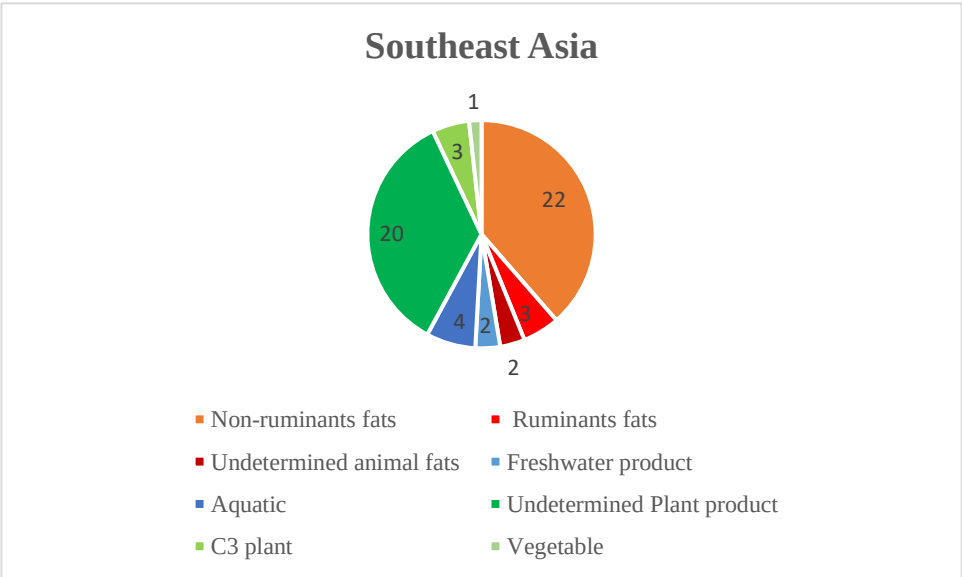

Figure 5. Statistical chart of Southeast Asia analysis results

As shown in the figure above, we use green to represent the use of plant resources, red to represent the use of animal meat resources, and blue to represent the use of aquatic resources. From this picture, we can clearly see that while the prehistoric ancestors of Southeast Asia used a large amount of meat products, they also maintained the use of plants and mixed them with a small amount of aquatic products.

（5）East Asia

East Asia has long been a hotly debated site for the origins of pottery, especially China and Japan. Here, we collected nearly 50 published analysis data of prehistoric remains from Japan, Korea and China, covering 96 important sites from the emerge of pottery to about 2000 years ago (Table S1). A clear consumption of plants can be found in East Asia, with a greater diversity of food resources processed through pottery. In addition, affected by different environmental climates, there are also certain differences in the use of prehistoric pottery and the acquisition of animal and plant resources within East Asia.

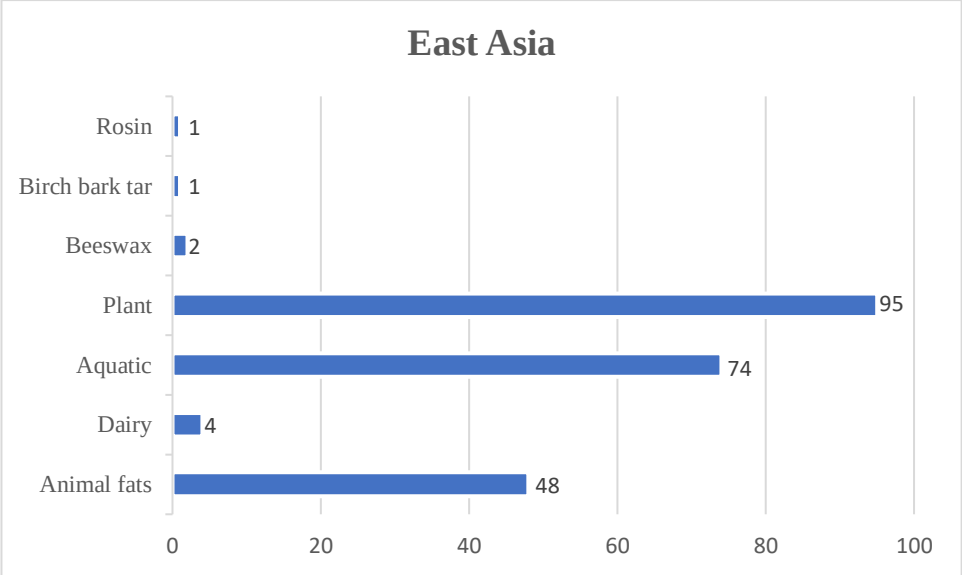

Figure 6. Statistical chart of East Asia analysis results

Firstly, we combined the analysis results of all pottery residues from Korea, Japan, and China and obtained the histogram shown above. From this we can find that early people in East Asia developed and utilized plant resources more. This corresponds to previous researchers' speculation that the reason for the initial emergence of pottery was the need to utilize a wider range of plant resources. In addition to plant resources, aquatic resources and animal meat are also widely used in East Asia. Although dairy products exist at this stage, they are only detected in some areas of China and are not very common (Figure 6; Table S1).

In addition, during the process of data collection and summary, I found that there are actually some differences in the results of pottery residues between Japan, South Korea and China in East Asia. For example, Japan did not clearly detect ruminant fats in pottery. Korea and Japan have not found the use of dairy products in pottery residues... Therefore, I further conducted a statistical analysis of the data in East Asia by country.

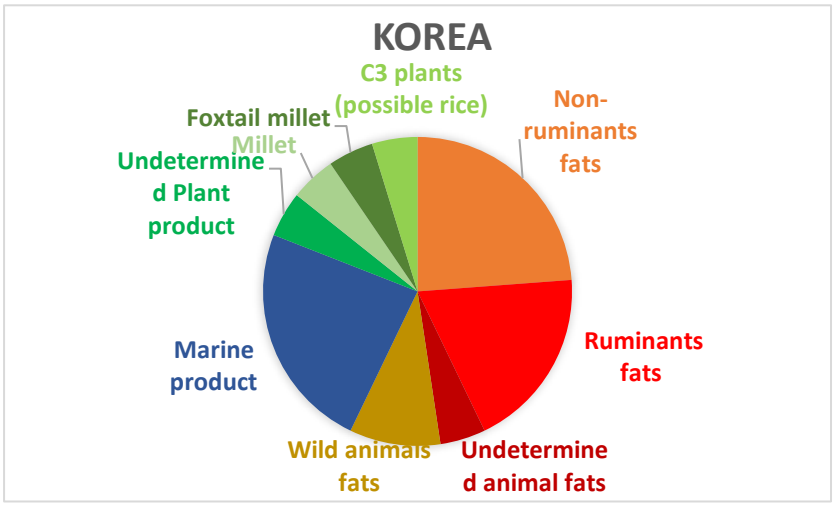

Figure 7. Statistical chart of Korea analysis results

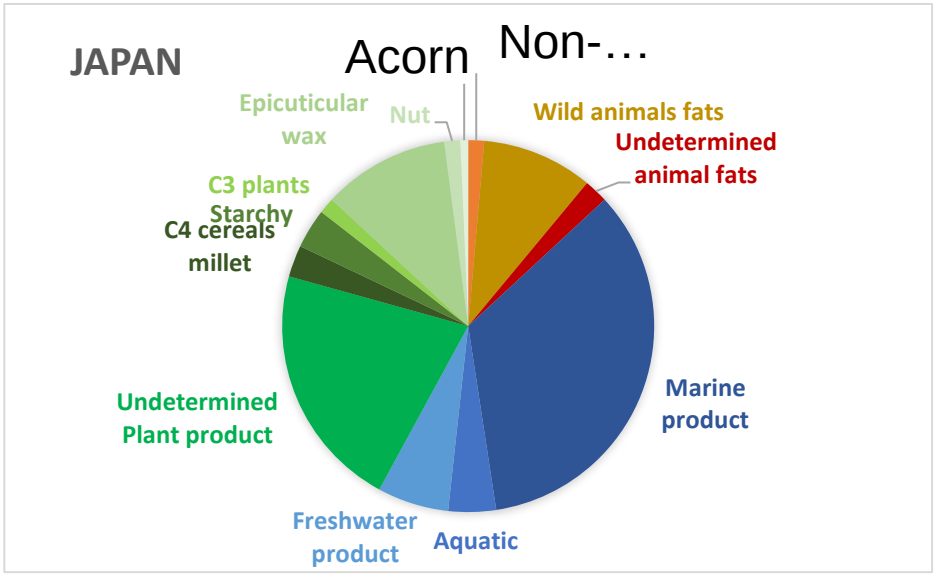

Figure 8. Statistical chart of Japan analysis results

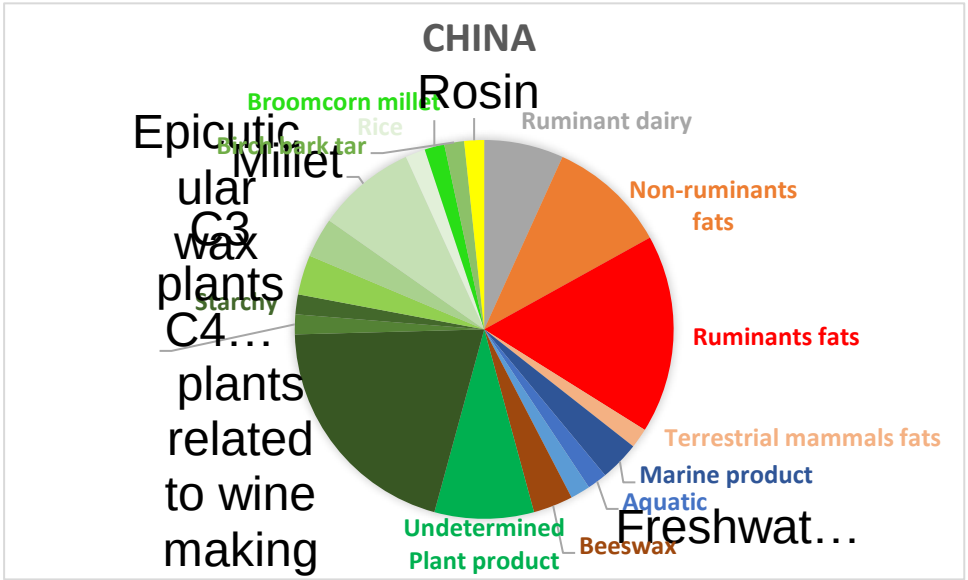

Figure 9. Statistical chart of China analysis results

From the above statistical chart, we can see obvious differences, that is, South Korea mainly processes meat and aquatic resources in pottery, Japan mainly uses aquatic resources and plant resources, and compared with the first two, China Prehistoric pottery shows a more diverse subsistence practice. In addition to the main use of plants for cooking or wine making, aquatic animals, beeswax, dairy products, ruminants and non-ruminant animals have all been exploited, and even Rosin, tar, Epicuticular wax, etc. have been detected in pottery sherds. Which are commonly detected in pottery from Western Asia (Figure 7-9; Table S1).

（6）West Asia

West Asia is the origin of the domestication of many plants and animals and often included in discussions of the origins of agriculture. Therefore, research related to the subsistence practices of prehistoric West Asia has always been very popular. This study reviewed publicly published data, integrated and collected 42 related research papers that have analyzed pottery residues in this area, and made it summarizes. Finally, nearly 100 sites spanning 8600-700 BC were included in the analysis, basically covering most countries in West Asia (Table S1).

Based on this, we can see that a lot of research related to pottery residues has been accumulated in West Asia, and the research results also show that the production practices and resource utilization of prehistoric people in West Asia were very diverse and interesting. For example, opium, bitumen and aromatic spices have never been found in other parts of Asia.

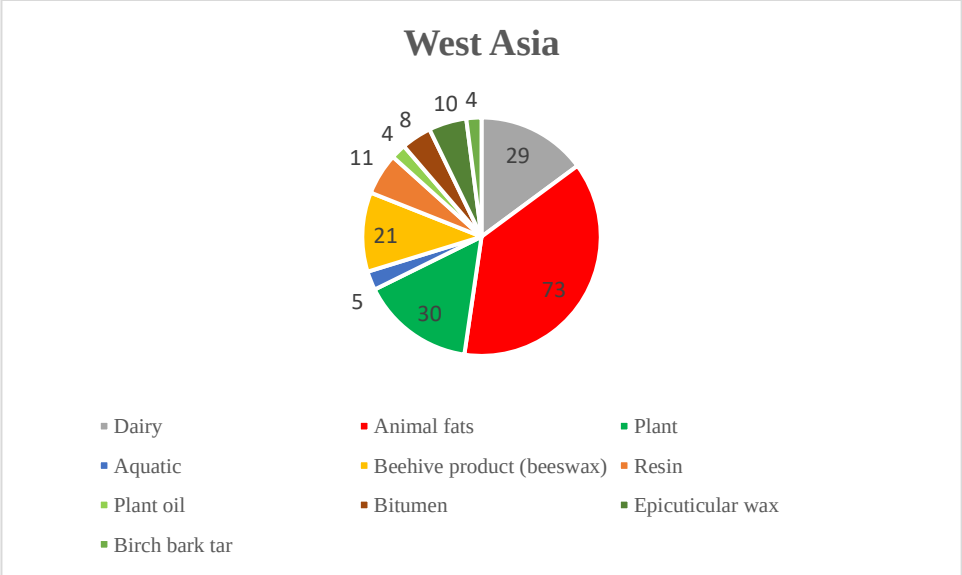

Figure 10. Statistical chart of West Asia analysis results

It can be seen from the above statistical chart that the utilization of animal meat resources occupied the most important position in the lives of people in prehistoric West Asia. In addition, dairy products, beeswax and plant resources are also widely processed and used, while occupying a position of secondary importance. Among them, plant resources are the most diverse, including not only daily edible parts, but also the brewing of beer and wine, and the use of psychotropic drugs such as opium. Due to the special geographical location of

West Asia, the need for trade also increased the need for special uses of pottery. For example, asphalt and conifers-pinaceae resin were used to waterproof or seal pottery, and mastic-pistacia-terpentine and aromatic spices were included as part of the trade goods (Figure 10; Table S1).

4 Discussion

Subsistence practices usually refer to a series of activities carried out by humans in order to adapt to the natural environment and meet life needs. These activities include but are not limited to food collection, hunting, fishing, farming, animal husbandry and other production methods, as well as related Food processing, cooking, storage and other technologies (Conolly et al. 2011).

Prehistoric Asia spanned a vast geographical area, from the cold zones of North Asia to the tropics of South Asia, with widely varying climatic conditions and natural resources. Therefore, affected by environmental factors, etc., there should theoretically be rich diversity in the survival practices of each region. Through the overall organization and summary of the analysis of pottery residues from the prehistoric period in Asia, we have confirmed that in the prehistoric period, due to differences in geographical environment, climatic conditions, resource distribution, etc., the ancestors of various regions in Asia formed unique survival practices.

In prehistoric subsistence strategies, Northern Asia's dependence on aquatic resources is significant (Figure 2,3; Table S1). Take the shore areas of Lake Baikal in Siberia as an example. The extremely cold climate there has prompted hunting - gathering groups to develop a survival adaptation model centered on regional resource utilization. The Kitoi culture (around 5800 - 4900 BC) marks the beginning of the Neolithic era in this region. It is characterized by ritualistic burial customs, pottery technology, and the emergence of ground stone tool assemblages. There is a clear biological and cultural discontinuity between this culture and subsequent ones (Weber 1995). Fishing was important, as shown by fishing hooks and spears in Kitoi burials. Some tools' purposes are unclear, but cord - marked pottery suggests possible net use (Weber et al. 2002; Novikov and Goriunova 2005; Weber and Bettinger 2010; Losey et al. 2012).

Stable isotope studies and archaeological evidence from the Baikal region show that early Neolithic people there relied heavily on freshwater ecosystems in their diet. This is seen in their use of shallow - water fish like ide Leuciscus idus ($\delta^{13}C = -12.9‰$) and top - level consumers like freshwater seals ($\delta^{15}N = 14.0‰$). Zooarchaeological analysis in the Maloye More area of Lake Baikal finds that bay and lagoon fish were the main catches. So, researchers think large - meshed nets were used (Losey et al. 2008; Nomokonova 2009; Weber et al. 2011; Losey et al. 2012). Also, modern ethnographic data shows that to survive long winters, local natives mainly preserved low - fat fish by air - drying and birch - wood smoking (Scharlotta et al. 2016). The Kitoi people likely knew these methods too.

However, isotope data from a broader area of Northern Asia shows significant dietary differences between regions. Groups near lakes consistently relied on local aquatic resources. In contrast, groups far from lakes showed no evidence of regular fishing trips. Instead, they relied more on terrestrial herbivores ($\delta^{13}C \approx -20‰$, $\delta^{15}N \approx 10‰$) (Katzenberg and Weber 1999). This suggests that the survival patterns of prehistoric people may have been influenced not only by the broad environment but also by the small - scale natural environment around sites.

The steppes of Central Asia have long been considered the birthplace of nomadic culture. The ancestors here lived by water and grass and made a living by grazing (Satybaldiev et al. 2024). Livestock such as cattle and sheep were not only their source of food, but also an important means of livelihood. The analysis of pottery residues also proves this: the prehistoric Central Asian people's utilization of primary and secondary animal products accounted for almost 90% of all resources, especially the use of mare's milk and horse meat (Figure 1; Table S1). This way of survival requires them to be proficient in animal husbandry techniques, such as seed selection, breeding, disease prevention, etc., and they must also learn to make cheese, felt and other animal products. According to the research of Frachetti (2008), archaeological evidence from the Central Asian steppes, including the discovery of large numbers of pastoral tools and the remains of livestock in ancient tombs, shows that the nomadic lifestyle in this region has a long history. The use of mare's milk and horse meat was an important part of their subsistence economy, and the development of animal husbandry techniques was crucial for their survival and prosperity.

Analysis of prehistoric pottery residues in South Asia shows the important role that non-ruminants played in people's lives. In addition, ruminant milk and meat were also widely used (Figure 4; Table S1); and analysis of residues in Southeast Asia shows that about 40% of the region's Non-ruminant meat resources, 40% plant resources, which corresponds to its location in a tropical rainforest area with rich animal and plant resources. The ancestors here may have been more inclined to collect and farm, planting rice, taro and other crops, while collecting various wild fruits, nuts and medicinal materials (Figure 5; Table S1). In South Asia, studies by Fuller (2011) on prehistoric agricultural development have shown that the region had a complex agricultural system that included the cultivation of various crops and the utilization of animal resources. The analysis of pottery residues is consistent with the archaeological evidence of agricultural activities in this area. In Southeast Asia, Bellwood's (2004) research on the prehistoric settlement and subsistence patterns has pointed out that the rich natural resources in the tropical rainforest area provided favorable conditions for the development of collection and farming. The proportion of plant and non-ruminant meat resources in the analysis of pottery residues also reflects the characteristics of the local subsistence practices.

In regions such as China, Japan and South Korea in East Asia, survival practices have their own characteristics due to differences in geographical environment and climatic conditions (Figure 6-9; Table S1). For example, ancient Chinese ancestors mastered farming techniques as early as the Neolithic Age, growing crops such as millet and broomcorn millet. They also developed unique pottery-making techniques for storing grain and cooking food. Archaeological discoveries in China, such as the Yangshao Culture and Longshan Culture sites, have provided a large amount of evidence for the development of early agriculture and pottery-making techniques (Liu & Chen 2012). Japan's ancestors may have relied more on marine resources and developed a unique fishing culture. Research by Imamura (1996) on prehistoric Japanese subsistence has shown that the surrounding marine environment was an important source of food for the Japanese ancestors, and the development of fishing technology was closely related to their survival. For the Korean Peninsula, previous studies have proven the continuity of resource utilization in the region, which is reflected in our study as the long-term utilization of plants and primary products of terrestrial and aquatic animals. According to the research of Kim (2025), archaeological evidence from the Korean Peninsula shows that the local people have a long

history of using a variety of resources, which is consistent with our analysis of pottery residues.

As the cradle of ancient civilization and one of the first places where agriculture appeared, West Asia has made extensive and diversified use of animal and plant resources (Zeder 2008) (Figure 10; Table S1). As the surrounding areas of the Mediterranean Sea, Black Sea, Caspian Sea, etc., West Asia's waterway trade network extends in all directions. Pottery, as a carrier of goods, has left behind a lot of information about special trade items, which shows the living conditions and subsistence practices of the people at that time. In West Asia, studies by on the prehistoric agricultural revolution and trade development have shown that the region's unique geographical location and rich resources promoted the development of agriculture and trade (Algaze 2008; Zeder 2011). The analysis of pottery residues provides important clues for understanding the subsistence practices and trade activities of the people in this area.

5 Conclusion

By collecting, organizing, analyzing and summarizing the analysis of prehistoric pottery residues in various regions of Asia, we can find that the subsistence practices of prehistoric people in North Asia, Central Asia, West Asia, East Asia, South Asia and Southeast Asia were affected by the environmental climate and local resources and have clear difference. The corresponding characteristics of each region are consistent with previous research, that is, North Asia is dominated by fishing and hunting; Central Asia focuses on the utilization of ruminants and horse primary and secondary products; West Asia focuses on the utilization of animal resources, accompanied by The development of many special and diversified products; the three countries in East Asia each have their own characteristics, but East Asia as a whole can be summarized as equal emphasis on the use of aquatic resources and plant resources, followed by the use of animal first-class products; for South Asia and Southeast Asia, the extensive use of non-ruminant animals by the ancient people cannot be ignored. In addition, South Asia pays more attention to the development and utilization of secondary animal products such as dairy products, while Southeast Asia pays more attention to the processing and use of plants.

The subsistence practices of various regions in prehistoric Asia had distinctive regional characteristics and diversity. These different ways of survival not only reflect the ancestors' ability to adapt to and utilize the natural environment, but also lay the foundation for cultural exchanges and development in later generations.

However, for the study of the survival practices of prehistoric people, it is not enough to rely solely on pottery residues. In future research, we should further combine animal and plant archaeological data and isotope-related research to discuss in-depth. In addition, for the study of residues in archaeology, more simulation experiments and modern sample aging data are needed to help us make more accurate judgments.

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