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Original article

Investigating the materials and manufacture of Jinzi: The lining of Futou (Chinese traditional male headwear) from the Astana Cemeteries, Xinjiang, China

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ABSTRACT

Headwear research is an integral part of costume study, which is regarded as a cultural symbol of human society. In China, the lining of Futou (Chinese traditional male headwear) is called as Jinzi, whose production information is little known. This paper focuses on the analysis of materials and manufacture of Jinzi, found in Astana Cemeteries (dated from about the 3rd to the 9th centuries C.E.), Turpan Basin, Xinjiang, China. The fibers of Jinzi were identified by FTIR (Fourier Transform Infrared Spectroscopy), Light Microscope Examination and Drying-Twist Test; while the black pigment was characterized through Raman Spectroscopy. Proteomics was conducted to analyze the proteinous glue. The results suggested that three Jinzi samples were made from flax mixed with ramie fibers, and one Jinzi sample was made from silk. All of them were painted with carbon black, and animal glue originated from bovine or caprinae was determined in two Jinzi samples. The different manufacture of Jinzi were probably related to the status of the occupiers of tombs. This is a unique report of the scientific analysis about traditional headwear in ancient Xinjiang. It is not only significant complement to the historical literature, but also the utilization of flax and ramie and the wearing of Jinzi shed light on the exchange of the species and culture in ancient Turpan area.

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1. Introduction

The Chinese traditional culture has been affected by the Confucianism for thousands of years. One of the most important influence by the Confucianism is as follows: "Skin and hair are given by parents and cannot get any scratches. This is the beginning of filial conducts.", which was mentioned in The Piety Scripture, one of the essence of Confucianism ethics. Moreover, the head was considered as the most important part of human body and it would represent the dignity of a person in ancient etiquette system [1]. Thus, both male and female used headwear to protect their hair and heads against being damaged, and headwear became a considerable component in the ritual costume system and a representative of the social culture. There are many forms of headwear in ancient China, for instance, Guan, Mian, Mao, Jin, Futou, Ze and so on, which were changed with social characteristics in different historical

periods. Futou, with the history of more than 1000 years, is one of the most important headwears in ancient China. According to ancient literatures, it appeared in the reign of Emperor Wu of Northern Zhou Dynasty (AD 543–AD 578) [2], was prevalent and evolved from Sui to Ming Dynasties (AD 581–AD 1644), and then was abandoned gradually [3]. The development of Futou was based on Fujin, which was popular in all social stratum, especially the scholar-bureaucrats in Eastern Han dynasty (AD 25–AD 220) [3]. Then Futou appeared as a kind of kerchief with long wide bands connected to the four corners respectively. When wearing Futou, the kerchief was put on the top of the head and the bands were laced before the forehead and after the head, which is shown in Fig. 1a.

In order to make the appearance of Futou look more straight and beautiful, a lining called Jinzi was added inside of Futou from AD 614 [5]. According to historical records, Jinzi was usually made from soft and light tung wood. Besides that, bamboo strip, timbo, miscanthus, silk and leather were also mentioned as raw materials [6–8]. After being cut into specific shape, Jinzi was painted to black with lacquer and coated with Futou. So Jinzi had a great influence on the appearance of Futou. For example, different types

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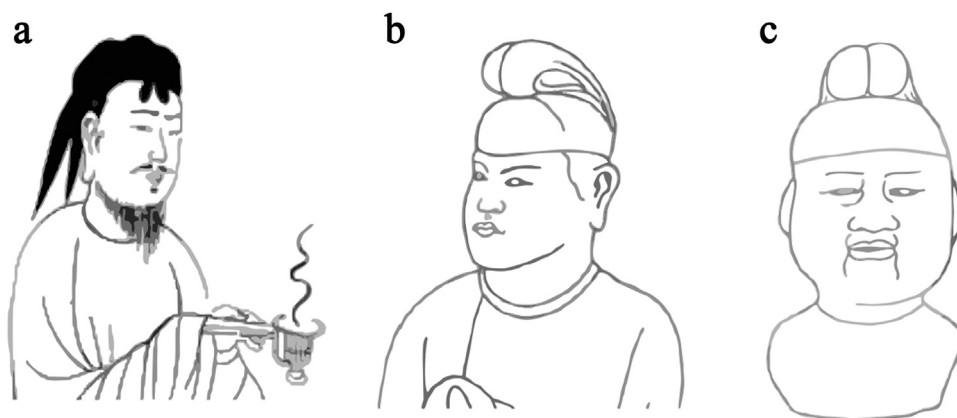


Fig. 1. The line drawing of Futou and different kinds of Jinzi: (a) Futou without Jinzi from Dunhuang mural (modified from Wei, 2013 [4]); (b) Futou with a big and forward top Jinzi inside which is called *Ying wang bo yang*, was prevalent during the reign of Emperor Zhongzong of the Tang Dynasty (AD 705–AD 710); (c) Futou with a small and round top Jinzi inside, called *Nei yang*, was popular during the period of Emperor Xuanzong of the Tang Dynasty (around AD 726) (modified from Gao, 2001 [3]).

of Jinzi showed different appearance of Futou, which were popular in various stages of Tang Dynasty (AD 618–AD 907) (Fig. 1b and c). Therefore, research of Jinzi was not only a part of Chinese traditional headwear study; it was also significant to understand the contemporary social cultural characteristics.

The previous research about Jinzi was mainly conducted by summarizing the historic literatures and the images from paintings, murals and figures. However, there was no detailed information especially about the manufacture of Jinzi in historic literatures. Furthermore, the Jinzi was rarely found in archeological excavations due to the degradation of organic materials in the burial environment. Thus, scientific analysis of Jinzi is rarely reported up to our knowledge.

The excavated Jinzi was only reported in Astana Cemeteries in Xinjiang [3]. Astana Cemeteries are located at the base of the Flaming Mountains and about 5 km south of Gaochang City (Fig. 2). It was a public graveyard for the ancient Gaochang people (dated from about the 3rd to the 9th centuries C.E.) [9–11]. Astana Cemeteries enjoy a high reputation all around the world due to their abundant artifacts, especially the organic objects, such as mummies, paper documents, textiles, plant remains and food residues which were preserved very well owing to the extremely dry and hot environment. Fortunately, Jinzi was found in some tombs, and it is a rare opportunity to conduct scientific analysis about Jinzi, which can provide the detailed information about the raw materials and manufacture of Jinzi. Besides that, the analysis of Jinzi might reflect the exploitation of animal and plant resources of the contemporary society, and it also could help to understand more about culture communication in Xinjiang, northwestern China.

2. Materials and methods

2.1. Materials

The samples of Jinzi were selected from Tomb M178, M192, M194 and M213 (dated to AD 713–AD 741, according to the buried documents), and labeled as Jinzi-1, Jinzi-2, Jinzi-3 and Jinzi-4 respectively. All of the four samples were weaved by fibers into two half spherical and painted to black. Unlike Jinzi-1, Jinzi-2 and Jinzi-3, which were knitted more tightly, Jinzi-4 was knitted as grids with rhombus holes. We got the fragments with black coating from Jinzi-1, Jinzi-3 and Jinzi-4 and some fibers without black from Jinzi-2. It was notable that there was a layer of paper inside of the Jinzi-3 (Fig. 3d) and the function of the paper will be discussed in this paper, the details of samples are shown in Table 1 and Fig. 3.

2.2. Methods

2.2.1. Fibers identification

The utilization of the natural fibers by human being has a long history [13]. Generally natural fibers can be divided by their origin to animal fibers, which are mainly composed of protein; and vegetable fibers, which are mainly composed of cellulose and lignin [14–16]. An increasing number of advanced scientific analysis methods have been conducted to identify the natural fibers. Light microscopy and Electron microscopy have been applied to observe the surface structure of the fibers, which are the one of the most important methods for judging the origin of fibers [17]. And the spectroscopy and chemical analysis have been used to study the chemical component of fibers, such as FTIR, Raman Spectroscopy,

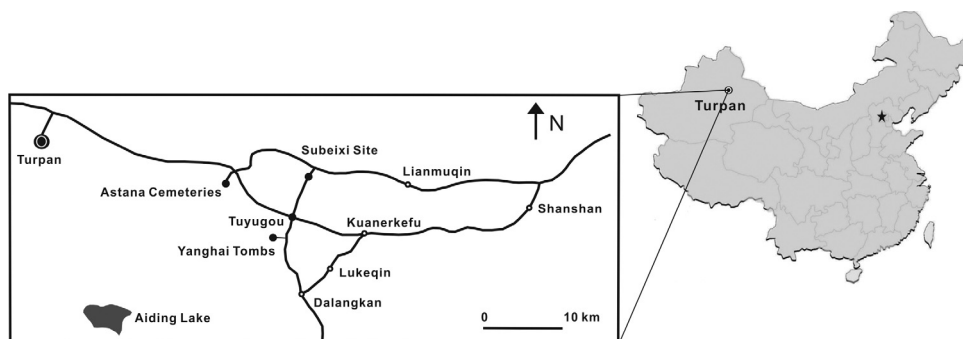


Fig. 2. Location of the ancient Astana Cemeteries in Xinjiang (modified from Gong, 2011 [12]).

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