

Carbon Medicine in Ancient China

Hongyan Yang¹, Zengxiang Fu^{2*}, Xingli Huang¹ and Binrui Ma¹

¹School of Material Science and Engineering, Northwestern Polytechnical University, Xi'an, 710072, P. R. China

²Faculty of Life Science, Northwestern Polytechnical University, Xi'an, 710072, P. R. China

*e-mail: fuzengx@nwpu.edu.cn

(Received October 28, 2005; Accepted November 17, 2005)

Abstract

In traditional Chinese medicine, some herbs are used after toasting or roasting. The process is called "Zhi Tan" in Chinese, which means charring, and the herbs after the treatment is called carbon medicine. Carbon medicine is widely used to arrest bleeding in traditional Chinese medicine. The paper introduces the records, development and applications of carbon medicine in ancient China. The earliest record found about carbon medicine was in the remains of Han dynasty (BC206-A.D.8). The paper also introduces the process of charring herbs and mechanism of carbon medicine in arresting bleeding. Calcium iron and tan released during the charring are believed as main factors for arresting bleeding, helped with porous surface structure of active carbon.

Keywords: Carbon medicine, Charring, Arresting bleeding, Herbs, Chinese traditional medicine

1. Introduction

Carbon medicine has an important position in traditional Chinese medicine all through the years, which is widely used to arrest bleeding. In ancient China, the way to process it was either toasting or roasting herbs. This process was called charring ("Zhi Tan" in Chinese), which was recorded in *52 Prescriptions* (see Fig. 1), unearthed in 1973 in Mawangdui (a small town of china), remains of Han dynasty (BC206-A.D.8). According to statistics, the herbs that were once used to char were about 200 species. 70 of them still are used today and 22 of them were recorded in Chinese

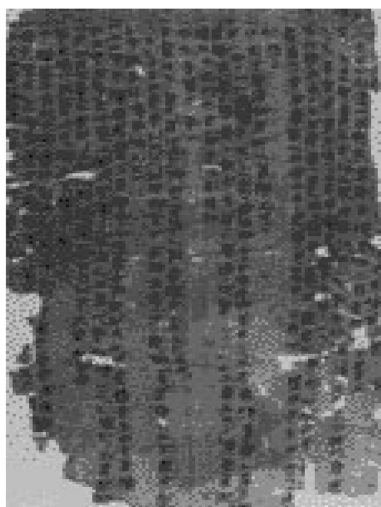


Fig. 1. Remains of 52 *Prescriptions*.

Pharmacopoeia [1]. A common phenomenon of carbon medicines is that there are multitudinous black and brown lumps in them [2]. This paper introduces the records about carbon medicine and its applications, development, effect in arresting bleeding in ancient China; and also the process of charring herbs and mechanism of carbon medicine in arresting bleeding.

2. Records of Applications About Carbon Medicine in Arresting Bleeding

The initial clinical application of carbon medicine in ancient China was in arresting bleeding. Early almost 2000 years ago, Chinese herbalist found that some plants were of very good help to arrest hemorrhage, particularly if they were roasted and just made their surface being turned black. The earliest record about carbon medicine in arresting bleeding was Hongjing Tao's discussion that "chaotic hair..., arrests bleeding. Nose bleeding, toast it to be ash and blow it into nose, thus the bleeding is arrested immediately" [3]. In Tang dynasty, the examples that the herbs (used to arrest bleeding) were needed to be charred were already many. Such as in *Daming Herbs*, there was discussion about palm that "arrests nose bleeding and spitting blood" and in *Qianjin Prescriptions*, rhubarb carbon, *Nepeta japonica* Maxim carbon, *Artemisia* leaf, etc were used. In Song dynasty, the herbs needed to be charred in all kinds of books were accumulated to more than 20 species. Using charred herbs to arrest bleeding in Jin and Yuan dynasties were universal. For example, a medicine named *Shihui San* which was created

by Kejiu Ge demanded charring the ten herbs such as big thistle, small thistle, lotus leaf, Cacumen Platycladi, cogon-grass rhizome, madder, gardenia, rhubarb, tree peony bark and palm to be in powder form and keep their characters, which was used to cure spitting blood, vomiting blood and coughing blood, etc. It was a typical prescription completely using carbon medicine to cure diseases. Shizhen Li proposed that “red stop while meeting the black” in his discussion about the effect of grass bouquet’s frost; Gongxiu Huang said the odor of Cacumen Platycladi can’t be distinguished with blood, and only charring it to be black can arrest bleeding [4]; Kechuan Tang also mentioned that “blood as a thing, flows while heated, coagulates while cooled, halts while meeting the black and cold” [5]. These discussions suggested that using carbon medicine to arrest bleeding had undergone a change from a general phenomenon to a theoretical level. Among all of the carbon medicine, most of them can enhance the effect of arresting hemorrhage. On the basis of experience ancient herbalists found that priceless, *Eclipta alba* and garden burnet were conspicuous in arresting bleeding, which can made the bleeding time decreased at a relative high speed. And madder, Cacumen Platycladi, lotus room and joint of lotus root can also make the bleeding time decreased.

3. The Process of Charring Herbs and Mechanism of Carbon Medicine in Arresting Bleeding

Concocting carbon medicine with herbs, either by toasting or by roasting, fire is necessary. During the process one very important norm is that “keep their characters while charring”, which means when the herbs are fired, just make their surface being turned black and was recorded in many old medical books. For example, in Jingchong Zhang’s *Jingui Summary*, there were the discussions that “Macrostem, toast to be black but not be excessive; chaotic hair, toast to be in ash form; the cortex of mulberry root, toast to be in ash form and keep its character but not to toast excessively”. Thus we can see that charring is of very special requirements for

temperature, tools, time and techniques. Although systematical study of the mechanism of “Zhi Tan” lacks, dispersed research gradually discovers the mechanism behind processing. It have been found the reasons for the enhancement of arresting bleeding function after “Zhi Tan” are release of calcium ions and tan from the plant. Calcium ions can impel the blood to coagulate and tan has convergence and arresting bleeding effects. The helpful function is the formation of porous carbon, which has convergence and absorption effects [2]. It can decrease the clotting time of blood [6].

4. Conclusion

Carbon medicine was originally used in arresting bleeding by Chinese herbalist in ancient China, which is generally prepared by toasting or roasting herbs, called “ZhiTan” in Chinese. There were many records about carbon medicine. The earliest record found about it was in the remains of Han dynasty (BC206-A.D.8). It has been found, calcium ions and tan released during the toasting or roasting, which can improve the blood to coagulate. Meanwhile the porous active carbon, formed during the process, can help arresting bleeding. The further research about it needs to be done, so that we can well realize and use the carbon medicine.

References

- [1] “*Chinese Pharmacopoeia*”, Guangzhou Science and Technical Publisher, Guangzhou, 1995, 225.
- [2] Zhou, T. D. *Chinese Herbals* **1989**, 11(12), 18.
- [3] Li, S. Z. “*the Compendium of Material Medical*”, People’s Sanitation Publisher, Beijing, 1997, 448.
- [4] Huang, G. X. “*Seeking Original Characters of Herbals*”, People’s Sanitation Publisher, Beijing, 1987, 218.
- [5] Pei, Z. X. “*Comments on the Proof of Blood*”, People’s Sanitation Publisher, Beijing, 1980, 52.
- [6] Ye, H. L. J. *Traditional Chinese Medicine* **1998**, 5, 27.