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Know Tea, Know Life-(P1-162) -三改pr2-J.indd 1



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Foreword 1

As a sort of beverage, tea constantly appears in literary works and always plays a part in people's everyday life. Drinking tea has been reckoned as a healthy life habit, and tea itself has become a widespread drink all over the world via the Tea-horse Trails, the China-Russia Tea Route and the Maritime Silk Road.

This is a kind of magic plant with numerous benefits. It has survived millenniums and become popular across the globe, being an inseparable part of living to alleviate the world's poverty. China Tea Science Society (CTSS) has long been a dedicated agency to provide tea science popular readings to advocate tea culture, facilitated tea production and encouraged tea consumptions. The Chinese version of *Know Tea*, *Know Life* in 2020 was a proven success, and therefore we decided to, under the patronage of China Association for Science and Technology (CAST), prepare an English version to share tea stories with the world and discover tea legacies together.

Know Tea, Know Life is an encyclopedic book concerning tea knowledge in seven aspects, namely the origin of tea, the production areas, tea sorts, tea ingredients, the health benefits, tea customs, tea brewing methods, etc., and an outlook on future tea technologies. The well translated work will go worldwide for tea enthusiasts to learn more about it. It gives an easier access to basic tea knowledge and tea storing, steeping and drinking skills, which can all ensure a quality life.

We also hope more people around the world, either living on tea or fans of tea, may work together to advertize tea as a natural, green and healthy drink. This will also be of great significance to our progress in health and civilization.

Jiang Yongwen, Chairman of CTSS

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February, 2022

4



Foreword 2

Tea, made from the leaves of the plant *Camellia sinensis*, has been used in China for thousands of years. It was propagated to Japan and Korea in the 9th century and then to other parts of the world. In modern times, green and black tea are popular beverages consumed worldwide in 170 countries (or regions). Black tea is the most common type of tea consumed, mostly in Western countries, whereas green tea is more popular in Asian countries, such as China and Japan. Tea was described in many classical writings. As early as in the 8th century in the Tang Dynasty, Lu Yu, the Saint of Tea in his seminal book *The Classic of Tea* described the history, cultivation, processing, brewing and drinking of tea systematically.

In this book, *Know Tea, Know Life,* written and edited by top tea scientists in China, follows the tradition of Lu Yu and describes various aspects of tea in detail. Chapter 1 is a comprehensive description of the origin and spread of tea in China, as well as the historical development of tea culture, reflected in the numerous tea poems and descriptions of tea in the Chinese literature. Chapter 2 depicts the current geographic distribution of tea production and the most renowned types of tea in China. In addition to the popular green tea, black tea and oolong tea, this chapter also describes white tea, dark tea, yellow tea and jasmine tea. For each type of tea, the sensory characteristics, history and cultivation areas are described in detail. The sensory properties of Chinese teas, including color/appearance, aroma/fragrance and taste/aftertaste, as well as the principal ingredients are also discussed in Chapter 3, which also includes tea utensils and tea ceremonies. Chapter 4 describes the customs of tea consumptions in different areas and different ethnic minorities of China, highlighted with interesting photos. Chapter 5 illustrates the ways to cook, brew and store Chinese teas, and Chapter 6 expounds the status quo and future of tea science.

In the Ming Dynasty (16th century), Li Shizhen, a great Chinese physician and pharmacognosist, in his renowned book *Ben Cao Gang Mu* (*Compendium of Materia Medical*), described in detail the medicinal value and beneficial health effects of tea.



Know lea, Know Lije

During the past decades, the possible health beneficial effects of the different types of tea have been studied extensively using modern scientific methods, and the results have been published in scientific journals. The book *Know Tea, Know Life* covers some of the new research information; however, this subject is not rigorously treated. This is understandable because it is difficult to explain complicated scientific investigations to readers. Readers may consult current review articles in reputable journals on this topic.

Overall, this book *Know Tea, Know Life* is excellent in introducing to readers the history and cultivation of different types of Chinese tea, as well as their sophisticated sensory properties. This book is almost like an encyclopedia, providing a rich source of information on tea. It also provides the readers with the joy of knowing the rich tea culture and the incentive to appreciate the beautiful color, smell and taste of tea. Indeed, it helps us to know tea and know life.

Csymy

Distinguished Professor, Rutgers, The State University of New Jersey, Piscataway, NJ, USA February, 2022





Preface

Tea, coffee and cocoa are the top three non-alcoholic beverages in the world, and among the three people consume tea most. Containing catechins, theanine, caffeine, vitamins, minerals, polysaccharides and other components, tea can help refresh minds and digest heavy foods, and even deliver antioxidants. Either for living or entertainment, tea has been a deeply integrated part of human life and a hallmark of noble lifestyle.

The English version of this popular reading about tea science, thanks for the support of China Association for Science and Technology, was prepared by CTSS's twenty-six tea experts and scientists. The book surviving 80 plus rounds of revision comprises sixteen sections from six chapters in total, providing answers with absorbing stories in a plain language for readers eager to learn the origin of tea, the premium types of tea, the tea customs, the health effects of tea, the ingredients of tea, tea-brewing methods, and tea science in the new era.

To satisfy global readers and meet their demands, the contents are based on editors' views and the concerns of tea enthusiasts from abroad we collected through questionnaires. Any critical or corrective comments from our colleagues and readers worldwide are welcome and highly anticipated.

Finally, we are grateful to CAST for its top-level design of this *Sciences in Our Life* series, for the unselfish assistance of Service Center for Societies of CAST, and for the advices and comments of Prof. Chen Guang, Prof. Lyu Jianhua and Prof. Fei Xinbei. Our gratitude shall also be extended to all our tea experts for spending much time preparing this book, and Mr. Jiang Yongwen, CTSS's Research Fellow and Prof. Chung S. Yang from Rutgers University for writing the preface. Moreover, our appreciation shall also go to CTSS overseas stations, the Tea Association of Canada and Malaysian Tea House for their generosity and assistance.

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7



Contents

Chapter I The Origin and Spread of Teas

Section 1 Looking for the Origin of Tea Plants / 12

- I. Initiation of tea plants / 12
- II. The origin of tea plants / 12

Section 2 How Does Tea Spread from Its Origin to the Rest of the World / 15

- I. From its origin to other parts of China / 15
- II. From China to the rest of the world / 16

Section 3 Chinese Tea in Ancient Classics and Literature / 17

- I. Historical records about tea / 17
- II. Literature about tea / 18
- III. Poetry about tea / 25

Chapter II Where to Find Premium Teas in China

Section 1	Teas on the Map of China / 30
	I. Tea area in Southwest China / 30
	II. Tea area in South China / 31
	III. Tea area in South of Yangtze River / 32
	IV. Tea area in North of Yangtze River / 33
Section 2	Essence of Teas / 34
	I. Examples of quality green teas / 35
	II. Examples of honored black teas / 45
	III. Examples of revered oolong teas / 48
	IV. Examples of esteemed white teas / 52
	V. Examples of prominent dark teas / 55
	VI. Examples of well-known yellow teas / 59
	VII. Scented tea / 61



Chapter III The Universe in A Cup of Tea

Section 1 Sensory Properties of Chinese Teas / 66

- I. Colors of teas / 66
- II. Aromas of teas / 72
- III. Tastes of teas / 75
- IV. Appearences of teas / 77

Section 2 Teas, A Daily Must-have to Keep Fit / 79

- I. Healthy benefits of teas in the historical Chinese medicinal classics / 80
- II. The healthy benefits proved by modern science / 83

Chapter IV Tea Customs

Section 1 Tea Customs in China / 90

- I. Chaozhou Gongfu tea / 90
- II. The long-spout-pot tea ceremony / 93
- III. The "qingdoucha" customs / 94
- IV. The "three-course tea" custom / 96
- V. The Mongolian milk tea / 98
- VI. The "leicha" custom / 100
- VII. The "dayoucha" custom / 101

Section 2 New Trend in Tea Beverages / 103

- I. Ready-to-drink canned tea / 103
- II. Instant tea / 104
- III. Order-to-go / 104

Chapter V Ways to Cook, Brew and Store Chinese Teas

Section 1 Tea Utensils / 108

- I. The past and present of "china" / 108
- II. Evolution from ancient pottery to purple clay pottery / 114



Know Tea, Know Life

III. A great tea needs quality teawares / 115
Section 2 Water for Teas / 116

I. How that water is valued in history / 116
II. Proper selection of water for teas / 117

Section 3 Ways to Have A Nice Brew / 120

Zhucha / 120
Zhucha / 120
Diancha / 123
Cuopao / 125
IV. Blended tea / 136

Section 4 Storage of Teas / 137

Why tea spoils / 138
How to store teas / 140

Chapter VI Status Quo and Future of Tea Science

Section 1	The Science of Tea / 144
	I. The history of tea studies / 144
	II. Progress in tea science / 146
Section 2	The Future of Tea Science / 153
	I. New special varieties / 154
	II. Functional teas / 154
	III. Innovative application of teas / 155
	IV. Tea and artificial intelligence / 156
	V. The combination of tea culture and our health / 157 $$
Section 3	The Benefits of Tea to Society Development / 157
	I. Economic benefits of tea / 157
	II. The benefits for people's health / 158
	III. The global cooperation / 159

References / 161





Tea, originated from China, has brought benefits to the whole world. As a beverage with positive effects on the human body and mind, it has long been a subject of study and research. Discovery of tea comes as a result of mankind's exploration of nature. The utilization and research of tea reflect the interaction between people and nature, creating drinks that ultimately contribute to health. The following will be a brief account of the popular beverage, detailing its discovery, utilization and dissemination and its presence in Chinese literature and classics.

Section 1 Looking for the Origin of Tea Plants

China is home for tea plants. The utilization of tea plants has a long-standing history since its discovery thousands of years ago. It originated from the southwest of China, specifically Yunnan Province. Whether past or present, people are very interested in the scientific questions about the origin and evolution of tea plants.

I. Initiation of tea plants

Tea plants as we know were not what they are now. Like many living organisms, tea plants evolved and mutated from their ancestor as time passed and the environment changed. Therefore, which species tea plants evolved from and where and how the evolution took place are questions scientists aim to answer. Chen (1994) reported that tea plants may have evolved from the genus *Camellia* L., which existed over 40 million years ago.

II. The origin of tea plants

The "original location" of tea plants refers to where tea plants as we know are



naturally grown, prior to domestication. Some scientists believe that the "original location" is the same as the center of origin of tea plants. Tea plants originated from China is a longstanding belief, but this belief is challenged when wild tea plants were discovered in India in 1824. However, in reality, there are no real wild tea plants in Assam, India.

The vast majority of scientists think that tea plants originated from China, while few believe the origin of tea plants is India or southeast Asia. Mr. Wu Juenong, founder of modern Chinese tea revitalization and development, believed China is the origin of tea plants, based on Chinese tea industry's thousands of years of history, ancient literatures about tea and results from studying tea germplasms. Renowned taxonomist, Chang Hong-ta reported that the tea plant in India was the same as the widely distributed and cultivated large leaf tea plants in Yunnan Provtnce after careful investigation. Furthermore, there is no documentation about tea plants in Indian historical records. Thus, there are more evidence supporting the claim that tea plants originated from China, based on the geographical distribution and history of utilization of tea plants.

Although tea plants originated from China, specifically where in China is debated among



Wild tea plants (Yunnan Province)



Wild tea plants (Guangxi Province)



Wild tea plants (Guizhou Province) (Photos by Chen Liang)



scientists. Chang (1981), who specialized in the study of the family Theaceae and other families, reported that over 90% of the Camellia species were distributed in southwest of China and southern China, specifically Yunnan, Guangxi and Guangdong provinces and other regions that lied on the Tropic of Cancer. These areas are considered the center of origin for the Camellia species. Yu (1986) proposed Yunnan Province as tea plants' center of origin, according to the results from studying tea germplasm, the origin of species theory, the quantity of species found in Yunnan Province, the discovery of new species, the horizontal and vertical species distribution patterns, and the morphological characterization of species within the Sect. Thea (L.) Dyer in Yunnan Province. He further indicated that based on the geological history and concentrated distribution of primitive species of the Sect. Thea in the southeast of Yunnan Province, the long and narrow region along Wenshan and Honghe prefectures (southwest of Yunnan Province), located at 22°40'-24 °10'N, 103 °10'-105 °20'E, was the center of origin of tea plants. Another famous taxonomist specializing in the family Theaceae, Min (2000) stated that the Sect Thea evolved from the Sect. Archecamellia Sealy. Thus, the subtropical limestone area of southeastern Yunnan Province, western Guangxi Province and southwestern Guizhou Province is the center of origin of the Sect. Thea plants.



Cultivated tea plants



Chapter 1 The Origin and Spread of Teas

More scientific evidence revealed Yunnan Province to be the center of origin of tea plants. Yunnan Province has high levels of species diversity (wide distribution of tea plant and its wild related species) (Chang 1981; Yu 1986; Min 2000); tea plants from Yunnan Province have high levels of phenotypic diversity (Yu 1986), high levels of diversified biochemical components (Jin et al., 2014) and high levels of DNA genetic diversity (Yao et al., 2012), particularly on the whole genome level (Wang et al., 2020).

In conclusion, the southwest of China, specifically Yunnan Province, is the center of origin of tea plants.

Section 2

How Does Tea Spread from Its Origin to the Rest of the World

The spread of tea includes both the domestication of tea plants and tea drinking from the center of origin, Yunnan Province, to other tea-growing regions within China and from China to the rest of the world.

I. From its origin to other parts of China

China has the most abundant and diverse tea plant species and genetic resources in the world because of China's extensive lands and also tea plants' natural genetic mutation and human-driven genetic selection. Yunnan Province is the center of origin of tea plants. The dissemination pathway from Yunnan Province to other tea-growing areas in China is proved by chemical experimentations and examining DNA markers.

(Linalool+Linalool oxides)

The ratio of linalool and geraniol (terpene index, $TI = \frac{1}{(\text{Linalool+Linalool oxides)+Geraniol}}$

in tea is used to explain the origin and dispersion of tea plants (Tadakazu et al., 1992). The tea plants growing in Yunnan Province have a TI of near 1.0, and the TI of tea



plants from other areas of China decrease gradually, from near 1.0 in Yunnan Province to almost zero in eastern China. Scientists proposes four possible dispersion routes from Yunnan Province to the rest of China. ① The spread occurs along the sea, from Yunnan to Guangxi and Guangdong, from Fujian to Zhejiang Province. ② Tea plants spread from Yunnan, pass Sichuan and end up in Shaanxi Province. ③ The spread starts from Yunnan and travels to Sichuan, Hubei, Anhui and Jiangsu Province along the Yangtze River. ④ The dispersion goes from Yunnan to Sichuan to Guizhou, Hunan, Jiangxi and Zhejiang Province.

Yao et al. (2012) used SSR (simple sequence repeat) DNA markers to analyze the genetic diversity of 450 accessions of Chinese tea germplasms. The genetic diversity (H) and polymorphic information content (PIC) decrease as distance from the center of origin (Yunnan Province and the neighboring Guanxi Zhuang Autonomous Region) towards the north and east regions increase. Lower allele numbers, H and PIC are observed as farther away from Yunnan and Guangxi Province.

II. From China to the rest of the world

Now a worldwide distribution, tea plants along with the production technology are spread either directly or indirectly from China. As early as the 9th century, the seed of tea plants was brought to Japan and Korea by Buddhists and their emissary. Tea plants did not appear in India until late 18th century and was later spreaded to other Asian countries (Sri Lanka and Turkey) and several South American countries in the 19th century. During the 20th century, tea plants and the production technology were distributed to Africa and other parts of Asia, such as Guinea, Mail, Algeria, Pakistan, etc., by the Chinese government (Chen et al., 2012; Ma and Chen, 2018).

Other routes that helped spread tea to around the world include the Land and Maritime Silk Roads, where goods like silk and china were also traded.



Chapter 1 The Origin and Spread of Teas

Section 3 Chinese Tea in Ancient Classics and Literature

The versatility of Chinese tea refers to, on one hand, the quantity and diversity of tea categories, and on the other hand, many uses of tea that effect people's everyday lives. Tea's aforementioned versatility can be found in Chinese ancient literatures.

I. Historical records about tea

Before the Tang Dynasty (618-907 AD), written records about tea were scattered, appearing mostly in literary works and medical books. It was in the Tang Dynasty that books specifically on tea and the study of tea were firstly published. By the Qing Dynasty (1636-1912 AD), there were more than 130 tea-themed books, but only around 60 remained due to social unrest, natural disasters and wars.

The number of poems about tea, based on incomplete statistics, reached nearly 7,000 in the Tang and Song Dynasties together, and the figure may exceed 10,000 after accounting for those composed in the Ming and Qing Dynasties. There were also around 500 tea-themed paintings during the same period. In short, there exists a myriad of literature and artworks that solidify tea's important existence in history.

Documentation on tea culture and science in the aforementioned masterpieces and other works are divided into the following aspects:

① The history of tea in China and the economic and legal changes driven by the tea industry;

(2) The different tea-brewing methods and skills, the various teawares and the philosophy behind them;

③ Technology and skills required in tea agriculture, production and quality management.

There are three books that touch upon these topics that have had a global impact: The first one is *The Classic of Tea*, written by Lu Yu, a masterpiece dating back to the



8th century. The book, as the first of its kind, details tea's extensive history, important figures in tea history and tea-making and drinking methods. It particularly focuses on explaining the cake-shaped tea that prevailed during the Tang Dynasty. *The Classic of Tea* is considered the most important writing in the history of Chinese tea culture.

The second one is *Notes of Tea for Health*, a book written by master Eisai from Japan in the 12th century. This is a detailed record based on the author's life in China and his firsthand experience in making tea. His book explained the health effects of Chinese tea. It played an important role in spreading Chinese tea culture and had a significant impact on Japanese tea customs and culture.

The third book is a monograph written by Emperor Huizong (Zhao Ji) of the Northern Song Dynasty (960-1127 AD). The monograph, *Grand Sights on Tea* (or *Treatise on Tea in the Era of Daguan*), was completed in 1107 and consisted of 20 chapters. It is a detailed account of the origin, harvest, production and quality of ball-shaped teas, which was the trend to press tea leaves together to form a ball shape. The book also described tea contests held in Huizong's era. A chapter named "diancha" is especially insightful. *Grand Sights on Tea* was a collection of the history, customs and techniques of tea from various perspectives, and thus, it has had a significant impact on tea studies of later generations.

These three classics on tea document the long-standing tea culture, tea's impact on health and globalization of tea. They are people's invaluable heritage. Besides books, there are poetry that portray tea-drinking and tea arts, which historians can study to reveal the tea culture during those times. These literatures played an irreplaceable role in the recording, dissemination and study of Chinese tea culture.

II. Literature about tea

The different Chinese tea varieties, tea production, tea-tasting reviews and characterization of each tea's unique qualities are all meticulously and systematically documented in the classics. We hereby take *The Classic of Tea* by Lu Yu and *Grand*



Chapter 1 The Origin and Spread of Teas

sights of Tea by Emperor Huizong as examples that demonstrate the knowledge of tea and tea culture in ancient China.

1. Chinese tea portrayed in Lu Yu's literary work

Lu Yu (733-804 AD), or Hongjian (style name), is the author of *The Classic of* Tea. He was a native of Jingling or today's Tianmen in Hubei province. The "Classics", as the world's first book dedicated to tea, holds a significant place in the history of tea culture because it marked the beginning of China's traditional tea studies.

During his time, tea as a commercialized product came in four different forms: unrefined tea, loose leaf tea, powdered tea (matcha) and cake tea. Taking into account the large scale of tea production, cake tea became the most preferred form due to storage and exportation concerns, since the Three Kingdoms (220-280 AD).

Therefore, the "Classics" discusses mostly about steamed cake teas, which came in multiple shapes including square, circle and others.

With roughly 7,000 characters, The Classic of Tea has 10 chapters that span three volumes. It is an encyclopedia and a historical record. It is a book of literary excellence filled with valuable tea knowledge. Historical data and records found in Lu's book gave a vivid depiction of Chinese tea culture's extensive history, accumulated knowledge about tea and its importance in people's daily lives. When analyzing



Classics of Tea (excerpt) by Lu Yu (733-804AD)



tea attributes, the author also found correlations between tea and character development. Hence, Lu suggested in his book to pursue humility and decorum and impose high moral standards. His own aesthetic standards and aspirations are also reflected in his comments and reviews on tea varieties and teawares.

The Classic of Tea gives a full account on Chinese tea's origin, name, characters, plant-related attributes, environment and qualities. In addition to these, the book explains techniques and methods of tea harvesting and brewing utensils. It explains tea refining, production, quality control, health benefits and tea variety identification in the Tang Dynasty. Particularly, its records on tea-growing areas, premium tea varieties, tea processing and tea brewing providing a whole picture of the tea industry and market back in Lu's era.

(1) Tea-growing areas

The "Classics" clearly documents nearly 80 tea-growing prefectures of that time, such as Jiannan, Qianzhong, Jiangnan and Lingnan. These regions are also classified into grades according to the quality. The book also mentions some areas that the author had never been to, but had tea from. According to Lu, they were "excellent in flavor". Tea-growing areas are found in 13 provinces, which include Hebei, Hunan, Shaanxi, Henan, Anhui, Zhejiang, Jiangsu, Sichuan, Guizhou, Jiangxi, Fujian Guangdong and Guangxi, and these provinces make up the four main tea-growing regions (Jiangnan, Jiangbei, Southern China and Southwest China).

(2) Premium teas

The "Classics" provides a list of famous teas the author learned from ancient records, like Yuyao's Pubu Tea, Bashu Tea, Wuchang Mountain Tea, Yanxian Tea, Bagong Mountain Tea, Badong Tea, Wushe Mountain Tea, Whenshan's Tribute Tea and Yongjia White Tea. There are some tea varieties that do not have names but are made in different forms such as unrefined tea, loose leaf tea, powdered tea, cake tea and infused tea. In the eighth chapter, which discusses the origin of tea, the author mentioned other teas cited in written records from the same era. These teas includes Bijian, Mingyue, Fangrui from Xiazhou, the Cactus from Jingzhou and Zisun from



Zhejiang. While the teas may differ in quality, they are all premium teas of their time.

(3) Production process

The Classic of Tea also gave a detailed account on the production process of steamed tea that were eventually molded into cake tea. Production steps included harvesting, steaming, pounding, patting, roasting, stringing and sealing; the necessary tools for each step were also documented. Considering Lu's residence was in the city of Huzhou, where the famous tribute tea Zisun is produced, it is safe to assume that the processes that Lu recorded are the classic ways of making tribute tea in his dynasty. Lu in his records also gave an impressively detailed explanation of the correlation between tea's physical properties (shape and color) and tea quality, which proved very helpful for today's tea studies.

(4) Tea brewing

Lu recorded a meticulous description of the "24 utensils" used in tea brewing and drinking, and the description included the utensils' material, sizes and functions. In selecting teawares, the author offered an analysis from a cultural and aesthetic point of view. In the "Classics", Lu also set forth criteria for the water used in tea-brewing, including water source, water temperature and material used to boil water; he also set forth criteria for temperature (control and brewing time during the brewing process. Traits that defined a quality tea were also recorded. Lu suggested "to drink while tea remains hot" because it was the method he believed necessary to acquire a true understanding of tea. On tea customs, the book depicts, combined with facts and data, the important figures, legends and events throughout the history of tea, from Shennong's time to the Tang Dynasty. The book portrays the long and profound history of Chinese tea culture.

2. Tea in an emperor's eyes

The Song Dynasty was the golden era in the history of Chinese tea, and there were two signs of this. First, the quality of tribute tea was unparalleled during this era, and secondly, even an emperor wrote a book about tea.



The author of "*Grand Sights of Tea*" (or *Treatise on Tea in the Era of Daguan*) is Huizong, or Zhao Ji (1082-1135 AD), the eighth emperor of the Song Dynasty. As a master of tea, the emperor constantly made teas himself and gave them to his ministers. The book was named after the period in which it was completed. Huizong, in the preface of his book, called tea a symbol of elegance, peace, social stability and clean governance. He concluded that tea had the ability to sooth, refresh and relax people's mind and believed in tea's role in self-cultivation of one's personality and morality.

(1) Tea cultivation

The emperor Huizong gave several innovative ideas and perspectives in his monograph. He partially agreed with Lu Yu's arguments that tea fields must be located away from sunlight, yet he stressed the importance of sunlight to the soil. He came up with his own theory that emphasized a "balanced state" between shade and sunlight.

湿 常 刻 亦 1 進 Ŧ 意點之妙 \pm 视 求秋 係乎時之汗隆 廿 原 2 騎 候 謂 王鮮金吸英里華較值舊之精爭紊載之明靈 院 而 A 而 深洽 天下 新 狩 茶 H 所名冠 骑 儒 歳之 布之流冰浴 版 亦 泉之千 故 山間 用 供 f 氯 地 \mathbf{v} 近歲以来承擇之精製作之工 皋 莫不盛造 得 人情 稍 鍾 舒 Pj this 海内 1. 11. 天 前 得 山 迫 倒 宋 寒 単 汲没营求 F 好 川之雲 而 生. 腳 物 而 時武邊 志清 青澤. 晏然 尚矣 所 應 而 知 P 、稅效 其 圓 叙 矣 11 脉 11 宗 南京 I 白鏡 供 常 係 薰 垂 浙之 奉 中 人 惟 述 清問 豪也 IL 朝之與 低 陶 拱 祛 須 德化 品 物之 求 翁 :만: ٨ 寄 襟 ŕ itis 被劳 亦自 間服修索之玩 滌 勿 索 至 背 E 不遵依茶 者 盛以 歲 修 若 幸 刑 興 領 酒 知 共 茶之 常须 省 榨 致 此 廢 高 致 類 而盛 魏 图 则 周 雅尚 無 致 清 不 久 14 翁 渓 뉅 万 贡 Ĥ -11 向 佰 延 第 相 细 狈 目 行 之 潮 着 资 顶 4.5 4 紳 及 贡 淮 非 謂 制 89 乳 头 钪 P.X 膨 4 ÷ 旕 F 不 伙 济 九 揠

Grand Sights of Tea (excerpt) by Zhao Ji (1082-1135AD)



Chapter 1 The Origin and Spread of Teas

(2) Harvest and production

The importance of hygiene and cleanliness to tea harvest and production are emphasized in the book, especially since harvesting skills and harvest time may affect tea quality. The emperor gave more explanatory details regarding the collection of fresh leaves, the amount of pressure applied in pressing cake teas and the appropriate roasting time. In the section named "white tea", Huizong mentioned a mutated species of tea plant that developed albinism and its properties and rarity. He also wrote about the different premium teas from various regions.

(3) The study of water

Huizong delved deeper into Lu Yu's discussion on water which was used in teabrewing by proposing more criteria, which included "purity, lightness, sweetness and cleanliness". He also suggested improved methods for controlling water temperature based on the belief that water temperature affect water quality. This enhanced the theory of water proposed in the Tang Dynasty.

(4) Diancha

"Diancha" (stirring) dates back to the Song Dynasty, and the steps include tea warming, grounding, powder-sifting, teacup-heating, dripping and adding (small amount of) boiled water. The water should be divided and added separately seven times while stirring the mixture with a special whisk until a thick frost takes shape. The frost is preferred to be cotton-white in color and must last for a long while. Huizong described this procedure in his book, and he especially went into the details about the skills involved in "diancha" since how the motion, water intake and speed of stirring could affect the quality and aesthetics of the brew. It was Huizong himself who invented the skill, naming it "seven-time infusion".





"Wen-Hui-Tu" (detail), by Zhao Ji (1082—1135AD)



III. Poetry about tea

As a form of literature, tea-themed poems have their own charm and style. Some of them are profound and embedded with cultural values, thus taking on a special role in the spread of Chinese tea culture. Here listed two poems as examples. The first one proposes, for the first time in history, the term "chadao" (the truth or philosophy of tea). The second poem depicts how tea enhances people's spirituality.

1. Jiaoran's poem in which "chadao" was first proposed

The booming tea industry and the widespread tea customs in the Tang Dynasty led to tea becoming a must-have in people's daily lives. Scholars explored the philosophy of tea and made tea a theme of their literary work. The Tang Dynasty was a dynasty that birthed many great poets who in total, wrote hundreds of poems about teas. Some of their works are now considered classics and a major contribution to Chinese tea culture.

One poem named *Ode to Tea for Governor Cui*, written by master Jiaoran (730-799 AD), is the first literature in history to propose the "truth in tea" concept. The author was a native of Huzhou (Wuxing county of today's Zhejiang). His given name was Zhou and surname Xie before he converted to Buddhism. He was a renowned figure in his time. In his later years, Jiaoran returned to his hometown and became a close friend of Lu Yu.

Ode to Tea for Governor Cui

Someone left me great tea named Shanxi, and with fine teaware I brewed the sprouts of tea. I saw the emerald infusion against the snow-white porcelain, how it looked like heavenly drink only for the celestial being. The first brew made me feel so refreshed, and another brew cleaned my thoughts like a sudden rain. With the third I seemed to acquire the ultimate truth,

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Know Tea, Know Life

that worldly troubles were all manmade and meaningless. Few people might know it as a noble existence, instead they were just cheating the life by taking spirits. I recalled Bi Zhuo falling asleep all night by the liquors, and Tao Yuanming chanting under the influence a great verse. Even Cui my friend would sing loud in cheers, as he loved too much the intoxicants with no will to cease. Anyone could understand in tea all of the final truth? Well probably only the immortal Dan-qiu-zi.

The poem was an impromptu work when master Jiaoran met with Cui Shi, the governor of Huzhou at that time, to try the aforementioned Shanxi Tea from Yuezhou prefecture. The author gave a vivid review of the tea and how it could rouse one's state of mind. The legends of Bi Zhuo and Tao Qin he quoted served to reaffirm the elegance of tea. The term "chadao" people use today appeared in the last two verse, "Anyone could understand in tea all of the final truth? Well probably only the immortal Dan-qiu-zi."

Jiaoran's proposed "chadao", or "the final truth in tea", which is a benchmark for Chinese tea culture of all generations. His poem even had an impact on people's understanding of tea in Japan and South Korea. Jiaoran's astounding words actually opened a new path to ultimate self-awareness, a path that seeked and acquired the truth of elegance and freedom through a cup of tea, ultimately helping people reach spirituality.

2. An anthem of tea to elevate spirituality

Lu Tong (795-835 AD), self-named Yuchuanzi, was a native of Zhuo county of Hebei Province. The imperial court ordered him twice to take office, but he declined both times. A masterpiece of Lu presented an extraordinary account of his feelings about tea-drinking. His poem is also known as *The Anthem of Seven Bowls*.



On the Tribute Tea My Friend Meng Left Me

It was a high noon when I was still asleep very tight, someone knocked on the door and waked up me from dream. He brought a letter of my friend Meng from the court, together with a package sealed with white silk and three stamps. I read between lines as if to see my friend's face, and in the package I saw three hundreds tea-made cakes. Every early spring I knew farmers were to pick fresh tea inside mountains, a season when insects were bothered and breeze was about to go. The emperor was awaiting this prefect tea to first arrive, thus all plants were in standstill to let the tea grow and bloom. Brought with the breeze there were new tea sprouts, it turned out the golden buds even before spring allowed. I picked the fresh buds and had them carefully baked and wrapped, knowing this is of excellent taste and a rare pack. The tea was offered only to the noble class besides the emperor, and how come it could belong to an average tea maker? I closed the firewood door and emptied the room, with a kerchief on the head and I made tea just for myself. The emerald tea brew was steaming hot, and the froth floating neat on the surface of the pot. The first brew eased my lips and throat, by the second brew I felt no boredom. The third was an inspiring and awesome brew, that nothing left in me but a myriad of classics I had all leaved through. By the fourth I somewhat sweated, and all bad things I remembered started to out spread. By the fifth I became refreshed all over the body,



and by the sixth it seems to fly talking to the heavenly gods. O' I can't take the seventh, just feeling the breeze under armpits to lift me onto the paradise. So where is the Penglai? I would fly there on such soothing breeze. The immortals ruling this earthly realm had their residences too high above, how could they know farmers' hardship on the other side of the cliff? Allow me to ask my friend, by the way, would it be possible for them to have a break, anyway?

This is a narration of the top-quality premium Yangxian tribute tea. Lu Tong, an ordinary peasant, understood the hardships tea farmers must endure in the early spring. He felt really lucky to have such precious tea and could not wait to savor a brew. The poem paints a vivid imagery of the mental stages the author experienced as he drank one cup after the other. The evolution of his state of mind is something that many tea enthusiasts can relate to. His poem is proved to be a great success.

Overall, this is a poem of realism. It is brilliant in narrating the author's feelings via the "seven bowls", and it is very accurate in how tea can help enrich people's consciousness and improve their aesthetic tastes. The poem has a huge and wide influence over the worldwide tea community. It is considered the only one in the Tang Dynasty that could rival Jiaoran's *Ode to Tea for governor Cui*.

Chapter II Where to Find Premium Teas in China



Tea grows across most parts of South China. The country can be geographically divided into four tea-growing regions, and each region have different tea kinds that are unique in their characteristics. We may find in each region premium teas that are considered as local "treasures".

Section 1 Teas on the Map of China

Looking at the map of China, tea farms cover more than 1,000 counties from twenty provinces, cities or autonomous regions, accounting for one third of China. This is a vast expanse of land, bordering Cuona County of Tibet on the west, Yilan County of Taiwan on the east, the City of Sanya of Hainan Province on the south, and Penglai District of Shandong Province on the north, spanning over 31 degrees in longitude and 20 degrees in latitude.

Considering factors like geography, climate, tea plant species, species distribution, and tea varieties, China can be divided into four major tea-growing regions, which include Southwest China, Southern China, Jiangnan and Jiangbei.

I. Tea area in Southwest China

Southwest China, also known as the highland, is the tea-producing region that has the longest history in China. It is located in southwestern China, spanning Guizhou, Sichuan Province, Chongqing municiplality, the north and central parts of Yunnan Province, and the southeast of Tibet Autonomous Region. The subtropical monsoon climate in Southwest China is quite friendly to tea plants, giving birth to a large variety of tea plant species. Tea plants can come in the form of shrubs and trees, and they are widely distributed in this region. Tea plants with a diverse range of leaf sizes are commercially cultivated there.



Green tea, black tea, dark tea, yellow tea and scented tea are the major tea kinds produced in Southwest China. According to historical records, the Southwest was the

earliest region in China to grow and use tea.



Tea garden in Southwest China (Yunnan Province, photo by Chen Linbo)

II. Tea area in South China

Southern China, also known as Lingnan (south of the "five ridges"), is the southernmost tea-growing region in China. Covering Hainan, Taiwan, the south and central parts of Fujian and Guangdong Province, and the south of Guangxi Autonomous Region and Yunnan Province, this area has the most ideal conditions for growing tea plants thanks to its warm and humid climate. The local temperature and annual precipitation of Southern China surpass all the other three areas in China,





Tea garden in South China (Guangdong Province, photo by Chen Hanlin)

making itself the habitat of large-leaf tea shrubs and trees.

Southern China is home to almost all tea kinds like green tea, black tea, oolong tea, dark tea, white tea and scented tea. In the southernmost province Hainan, the tropical climate allows tea to be produced all year round.

III. Tea area in South of Yangtze River

The so-called Jiangnan area refers to the region located at south of the middle and lower reaches of the Yangtze River, spanning Zhejiang, Jiangxi, Hunan, the north of Guangdong Province and Guangxi Autonomous Region, the north and central parts of Fujian, and the south of Hubei, Anhui and Jiangsu Province. The mild climate, humidity, distinct seasons and abundancy of rainfall during spring and summer make Jiangnan suitable for growing tea plants. Jiangnan is home to tea shrubs and small tea trees.

We can find all the tea kinds in Jiangnan (i.e., green tea, yellow tea, white tea, black tea, dark tea, oolong tea and scented tea). It is also the area to produce and export the most amount of green tea.





Tea garden in Jiangnan (Zhejiang Province, photo by Liu Lei)

IV. Tea area in North of Yangtze River

Jiangbei, also known as the Central and Northern China, is the northernmost teaproducing area in China. North to the middle and lower reaches of the Yangtze River, Jiangbei covers a vast territory of the north of Hubei, Anhui and Jiangsu Province; the south of Gansu, Shaanxi and Henan Province; and the southeast of Shandong Province. The annual precipitation in this region is quite low and uneven. Compared to the other tea-growing regions, Jiangbei has considerably colder days during the winter. The lifespan of tea sprouts in Jiangbei is shorter due to lower temperatures. Being very vulnerable to frost damage because of the low temperature and drought in wintertime, mostly tea shrubs with mid- and small-size leaves grow in this region.

Jiangbei produces mostly green tea. Black tea and dark tea are also produced there, though in low quantities.





Tea garden in Jiangbei (Shandong Province, photo by Liu Lei)

Section 2 Essence of Tea

Chinese tea is highly valued because of their ideal growing environment, refined production, distinctive features, abundant kinds and cultural significance. Different tea regions give rise to different teas, like the renowned Dianhong (Congou from Yunnan Province), Pu'er and yellow tea in Southwest China; the famous Fenghuang Dancong and jasmine tea in Southern China; various green tea, white tea and black tea kinds in Jiangnan; and the green teas unique to the Jiangbei area.



I. Examples of quality green teas

Green tea was the first variety that people consumed. Enzyme inactivation, a process that halts fermentation, is a step necessary in producing all types of green teas. All tea-producing regions in China grow green teas of distinctive quality.

1. West Lake Longjing

West Lake Longjing (Dragon Well tea) grows in the Xihu (West Lake) District of the City Hangzhou. It is traditionally a premium tea with a history of 300-400 years.



West Lake Longjing (green tea)

(1) Environment

Most tea plantations in Xihu District are located on sloping fields 30 meters above sea level. To the northwest are Baiyun Mountain and Tianzhu Mountain that block chilly winds during the winter, and to the southeast is the expansive "Jiuxi-Shibajian" (nine creeks and eighteen gullies). Here, the warm monsoon climate of the northern subtropical zone provides an annual average temperature of 16.2°C, a frostfree period of about 250 days, an annual sunshine duration of 1,900 hours and a sunshine rate of 43%. The Xihu District has an annual precipitation of 1,398.9 mm, averaging 150-160 rainy days per year, and the relative humidity is above 80% all year along. It is often drizzling and foggy in the season of spring (teas that are harvested in spring). The soil here is acidic and red, composed of yellow mud, white sand, yellow soil and oily red mud. The depth of the soil layers makes the soil permeable. White sand covers 20% of the soil mixture, and its pH value is 4.6-5.0. The unique quality of West Lake Longjing can be attributed to an environment blessed with springs and streams, mild climate, abundant rainfall and four distinct seasons.

(2) Qualities

Production of West Lake Lonjing utilizes original/"qunti" Longjing and select



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newly cultivated Longjing species. Longjing is graded as "superior, first, second, third, fourth, fifth" and is best known for its beautiful color, flavor, taste and shape". The tea leaf appears smooth, even, straight and like a staple, and its color can be either emerald or yellowish green. The brewed tea has a mellow, soothing and refreshing smell that is long-lasting. Longjing tastes fresh and slightly sweet, with a lingering aftertaste like fresh olives.

(3) History

West Lake Longjing is named after its geographical origin. The core Longjing plantation is located in a village named Longjing. The "Eighteen Imperial Tea Groves" named by the Emperor Qianlong of the Qing Dynasty (1636-1912 AD) are still alive in this village. The skill of hand-making West Lake Longjing is now one of the world's intangible cultural heritage, and the tea itself is also a "national gift" presented to diplomatic guests worldwide.

2. Biluochun

Biluochun grows on Dongting Mountains and its neighboring areas in Suzhou, Jiangsu Province. It was created between the late Ming Dynasty and early Qing Dynasty. It is also a historically renowned tea kind.



Biluochun (green tea)

(1) Environment

Dongting Mountains is located close to Taihu Lake, southwest of Suzhou, Jiangsu Province and is divided into the Eastern Mountain and Western Mountain. Here, the monsoon climate of northern subtropics features warm and humid weather, sufficient sunshine and abundant precipitation. Its annual average temperature is 15.8°C, and the mean annual precipitation reaches 1,130 mm. The rainfall usually spans a long while from April to September. The region is exposed to sunshine for, on average, 2,179 hours and boasts to be frost-free 233 days per year. Here, the average relative humidity amounts to 80%. In the plantations, tea is grown in the natural


Chapter II Where to Find Premium Teas in China

yellow brown soil that is rich in organic matters and phosphorus. All these features make the region very beneficial to tea groves.

(2) Qualities

Appearance of Biluochun is slender, spiral-shaped, covered with trichomes and silvery green with hints of emerald. The brewed tea color is light green and clear. The tea smells elegant and tastes mellow, fresh and refreshing, with a lingering aftertaste. The infused leaves are soft and even.

(3) History

Biluochun is best known for its elegant and lasting aroma, earning the nick name "astonishing scent". Like the verse goes, "the mountain is coated with rolling green and the air is filled with the scent of refined tea." The "tea" here refers to Biluochun. The name "Biluochun" was given by Emperor Kangxi of the Qing Dynasty when he learned the tea came from a peak called Biluo in Dongting Mountains.

3. Huangshan Maofeng

Huangshan Maofeng is produced in the City of Huangshan (the Yellow Mountain), Anhui Province, and plantation areas include the Yellow Mountain's Fengjing District, Huangshan District, Huizhou District, Shexian County and Xiuning County. It was created during the reign of Emperor Guangxu of the Qing Dynasty and has since been considered a historically renowned tea.



Huangshan Maofeng (green tea)

(1) Environment

The majestic Yellow Mountain has some of the most picturesque sceneries, and it is hailed for its "wonderous pines, unique rocks, sea of clouds and hot springs". Huangshan Maofeng's tea farms are located in the subtropics and have subtropical monsoon climate, with an average annual temperature of 15-16°C. The Yellow



Mountain has mostly cloudy, rainy and foggy weather and boasts an average sunshine of 1,810.2 hours per year, although the mountain tops experience much less sunshine than the base of the mountain. The mean precipitation atop the mountain reaches 2,395 mm, suggesting 183 days of rainfall per year, and the mean annual precipitation at the foot of the mountain is 1,500-1,800 mm. The average relative yearly humidity amounts to 71%-78%, but the humidity level is a little higher at lower altitudes. The soil below 650 meters above sea level is generally composed of yellow soil and red soil, while the soil at 650-1,100 meters above sea level is mainly yellow soil. The soil at the Yellow Mountain is deeply layered.

(2) Qualities

Huangshan Maofeng is graded as "superior, first, second and third". Tea of superior grade must be harvested before or around the Qingming Festival, and only the shooting bud with one leaf is allowed to be harvested. For tea of other grades, tea farmers harvest buds with one or two leaves or even with two or three leaves.

A superior grade Huangshan Maofeng's leaf looks slender and flat, and the shape is likened to a bird's tongue. Sometimes, a leaf will be shaped like a golden fish (commonly known as "bamboo shoot tea" or "golden tea") instead. The buds are plump, even and covered with trichomes. The color appears yellowish green and oily and is known as "ivory-colored". The brewed tea has a fresh and long-lasting aroma; it tastes fresh, rich and mellow with a sweet aftertaste. The brewed tea infusion looks clear and bright, and the infused leaves are light yellow and even. The "golden fish leaves" and the "ivory color" are two distinctive characteristics of the superior-grade Huangshan Maofeng that makes the tea stand apart from the other grades, in terms of appearance. Maofeng from the Yellow Mountain is considered the best type of Maofeng in China.

(3) History

The Yellow Mountain ranks among the top ten famous mountains in China. In 1990, it became a UNESCO world cultural and natural heritage. The World Heritage Committee once remarked that in the golden era of Chinese literature and art

38



Chapter 11 Where to Find Premium Teas in China

(approximately in the middle of the 16th century), and the Yellow Mountain was acclaimed as "the most gorgeous mountain in China". The superb ecology, profuse underlying cultural heritage and unique production skills make Huangshan Maofeng a premium tea variety.

4. Lushan Yunwu

This tea comes from Mt. Lushan in Jiujiang, Jiangxi Province. First created in the Ming Dynasty (1368-1644 AD), it was named "Wenlin Tea" at that time. Lushan Yunwu is also a famous tea in China.



Lushan Yunwu (green tea)

(1) Environment

Mt. Lushan has annually an average temperature of 11.5°C and precipitation of 1,249-2,359 mm. Located between the Yangtze River and Poyang Lake, the mountain is cloudy and foggy most days. It boasts an average of 191 foggy days per year. During the tea-growing season (April to October), the rate of air humidity may reach over 80%. Most of the local soil are deeply layered and are composed of mountain-yellow, yellow-brown and brown soils. The soil is highly permeable and rich in organic matters and minerals.

(2) Qualities

The leaves of Lushan Yunwu are compact and sturdy. The buds and leaves are stout, coated with trichomes and emerald green, and they have an orchid-like aroma. The tea has an enduring mellow, fresh and sweet taste, and the brewed tea infusion is bright and clean. The infused leaves are soft and have a tint of light green and yellow.

(3) History

It was in the Eastern Han Dynasty (25-220 AD) that people began to grow tea on Mt. Lushan. The City of Jiujiang later became a tea hub during the Tang Dynasty (618-907 AD). In his long poem *Song of the Lute Player*, poet Bai Juyi wrote "he went to Fuliang to buy some tea last month". This depicted the life of tea traders



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commuting between Jiujiang and Fuliang (today's Jingdezhen).

5. Enshi Yulu

Produced in the City of Enshi, Hubei Province, this widely known variety was first created around 1680.

(1) Environment

Enshi is located in Mt. Wuling, southwest of Hubei Province, around the middle and upper



Enshi Yulu (green tea)

reaches of Qing River. It enjoys an agreeable climate, dense forests, rich vegetation and four distinct seasons. There are no severely cold days during winter and no sweltering hot days during summer. The city is also blessed with an average annual temperature of 16.4°C, a frost-free period of 282 days, sunshine duration of 1,298 hours, relative humidity of 82% and mean precipitation of 1,525 mm. The deeply layered and fertile soil here is mostly a sandy yellow soil, 4.6-6.0 in pH value. The city is quite an ideal place for growing tea plants.





Chapter II Where to Find Premium Teas in China

(2) Qualities

Enshi Yulu is one of the few Chinese teas in history that utilizes steam fixation (enzyme inactivation). The traditional tea production process involves steps like steam fixation, fanning, first shoveling, rolling, second shoveling, shaping, glossing and screening. With today's mechanized mass production, Enshi Yulu's unique characteristics of "steam fixation" and "needle shape" have remained to ensure that the quality remains on par with traditional Enshi Yulu.

The tea leaves look compact, round, smooth, straight, trichome-covered, and oily green. The brewed tea infusion is light green, clear and bright, and it tastes fresh, mellow and sweet with a lingering aftertaste. The infused leaves are light green, bright and even.

(3) History

Steam fixation, a classic tea-making method in the Tang Dynasty, has been replaced by modern technology, leaving Enshi Yulu a rare tea variety that still uses this method.

6. Anji Baicha

Originating from Anji County of Zhejiang Province, Anji Baicha is an elite green tea kind newly created in the 1990s. The Anji Baicha is made from buds and leaves of the naturally albinic tea cultivar, 'Baiye 1'.



Anji Baicha (green tea)

(1) Environment

Anji County is located in the north of Tianmu Mountain, which is situated in northwest of Zhejiang Province. Anji County belongs to the northern subtropical zone and has a monsoon climate. Forest coverage in this county reaches 69%, and the mild climate brings four distinct seasons and sufficient sunshine and rainfall. It has an annual average temperature of 15.5°C and an accumulated temperature (for days when temperature $\geq 10^{\circ}$ C) of 4,932°C·day. The county also boasts a frost-free period of 226



days, mean precipitation of 1,510 mm, relative humidity of 80% and annual sunshine duration of 2,000 hours. Mostly acidic, sandy yellow soil and incense ash soil is found in this tea-growing region. The soil used for growing Anji Baicha is deeply-layered and fertile, containing high amounts of organic matter.

(2) Qualities

Anji Baicha leaves are fine and delicate, like phoenix feather. The leaves are frost white and bright and have an oily luster. The brewed tea infusion appears light green and bright, and it tastes fresh, mellow and sweet. The infused leaves are a frost white while the stems are jade green, and on the whole, the leaves are intact and even in size.

(3) History

Tea plants contracted with albinism were first recorded in Grand Sights of Tea along 900 years ago and were treated as a rarity. What makes Anji Baicha special in its natural albinic characteristics, yet this tea variety undergoes the processing methods used for making green tea. As such, Anji Baicha is different from traditionally defined white tea and is considered a green tea kind.

7. Lu'an Guapian

Lu'an Guapian, named after its shape, is a renowned tea created around 1905. This tea variety mainly grows in the province of Anhui, specifically the City of Lu'an's Yu'an District, Jinzhai County and Huoshan County.



Lu'an Guapian (green tea)

(1) Environment

The tea grows in the north of Dabie Mountains, which is a part of the Huai River system, where the rolling mountains and dense forests make the four seasons distinctive. This region has monsoon climate that constantly brings fog and clouds. The temperature here is mild in general, but there is a sharp difference between day and night time. Annually, the local average temperature is 15°C in areas with an

42



Chapter II Where to Find Premium Teas in China

altitude of 100-300 meters above sea level, and lower than 14°C above 300 meters above sea level. The mean precipitation is 1,200-1,400 mm, averaging 126 rainy days per year. The relative humidity reaches 80% all year round. The deeply layered soil is mostly yellow and brown type. Among the Lu'an Guapian plantations in Lu'an, the ones from Qiyun Mountain, Jinzhai County have the best quality.

(2) Qualities

The tea leaves are shaped like sunflower seeds: flat and oval, even in size and bright green in color. Once brewed, Lu'an Guapian has a fresh aroma and mellow and sweet taste. The brewed tea infusion is clear with shades of yellow and green, and the infused leaves show soft green.

(3) History

Lu'an Guapian is quite unique in its leaf shape. In the past, the tea was subdivided into Tipian (the best in terms of quality; harvested before Grain Rain), Guapian (harvested after Grain Rain) and Meipian (harvested during Grain Rain).

8. Xinyang Maojian

Xinyang Maojian is a historically renowned tea that originates from Xinyang, Henan Province. This tea is named after the traits of its leaves: sharp and trichome-covered. Xinyang has been a tea-producing hub since the Tang Dynasty, and Xinyang Maojian is a premium tea that was first made in the late Qing Dynasty.



Xinyang Maojian (green tea)

(1) Environment

Xinyang Maojian mainly grows in the north of Dabie Mountains, which sits between the northern subtropical zone and temperate zone. The tea groves are grown between valleys that have an altitude of 300-800 meters above sea level. Here, the seasons are distinctive, and rainfall comes with summertime. It is blessed with an average temperature of 15.2-15.5°C and annual mean precipitation of 1,120 mm, and



75% of the local rainfall occurs from April to September. The annual humidity is about 75%. This region also enjoys, on average, 2,169 hours of sunshine, a frost-free period of 217-229 days, and a foggy period of 100-130 days a year. The soil is mostly composed of yellow-brown soil and yellow-cinnamon soil may also be found. The deeply layered soil is rich with organic matters and nutrients, and it is loose and highly permeable.



Tea garden of Xinyang Maojian origin



(2) Qualities

A leaf of Xinyang Maojian is slender, round, smooth, straight trichome-covered and emerald-colored. The brewed tea infusion looks bright and clean. With an enduring fragrance, it tastes rich and mellow and has a sweet aftertaste.

(3) History

Xinyang Maojian is a widely revered tea in the Jiangbei area. It won a gold medal in the Panama Pacific International Exposition in 1915. It remains quite popular in northern China.

II. Examples of honored black teas

Black tea is widely produced in countries like China, Kenya, India and Sri Lanka. Although each country's tea plant and production process may differ, fermentation is a process that all black teas must undergo. The methodology of making black tea originated from Wuyi Mountain, and China's black teas are highly recognized in the global market.

1. Xiaozhong black tea (Souchong black tea)

This historically renowned black tea comes from the City of Wuyishan, Jianyang County and Guangze County, all of which are located in the Fujian Province. Tongmuguan, situated at the north of Wuyi Mountain, is the core production area of Xiaozhong. This tea was first created in the late 18th century.



Xiaozhong Black Tea

(1) Environment

Xiaozhong black tea groves are situated 1,000-1,500 meters above sea level, where the yearly average temperature reaches 18°C and the mean precipitation amounts to 2,000 mm. Here, the winter is warm, and the summer is refreshing.



Between spring and summer, the area is constantly surrounded by fog and clouds. The soil here is fertile and deeply layered.

(2) Qualities

Xiaozhong or Zhengshan Xiaozhong (superior grade Xiaozhong), is stout, tight and straight in shape and black in color. The crimson tea infusion has a pine soot fragrance and a mellow taste, somewhat resembling the taste of longan infusion. The pine soot fragrance, longan infusion flavor and honey date flavor comprise Xiaozhong's main characteristics. Adding milk gives the tea a special sweet and refreshing taste.

(3) History

Xiaozhong was the first black tea variety in history. Harvested from local original/"qunti" tea plants, Xiaozhong is heated on an open fire using pine wood as firewood during the process of heating and withering, which gives the tea a unique pine soot fragrance. It may taste more balanced, and at no cost of its own flavor, with some milk. As early as in the 17th century, the black teas from Wuyi Mountain, especially Xiaozhong, became popular in Europe.

2. Qimen black tea (Keemun black tea)

Qimen black tea, or "Qihong" in short, is a well-known tea produced from Qimen County, Anhui Province and its surrounding areas. It was first created in 1875 during the first year of Emperor Guangxu's (of Qing Dynasty) reign.

(1) Environment

The core production area of Qihong is covered with dense forests, which makes the local weather warm, humid and constantly foggy and cloudy. This region also features deeply layered soil. Annually, the place enjoys, on average, a temperature of 15.6°C, a frost-free period of 220-230 days and an accumulated temperature (for days with temperatures higher than 10°C) of 4,900-5,000°C · day. It has an annual average sunshine duration of 1,861.6 hours, mean precipitation of 1,600-1,800 mm and humidity of 80% in spring and summer. The soil here is composed of yellow-brown soil, yellow-cinnamon soil and limestone soil.

46



Chapter II Where to Find Premium Teas in China

(2) Qualities

The original tea plant species grown in Qimen are rich in nutrients and have high levels of enzyme activity. Thus, Qihong is suitable for making Gongfu (Congou) black tea.

The tea features slender leaves and visible golden trichomes on the buds, but the tea is mainly in a glossy dark color. The brewed tea infusion is red and clear, and its aroma is long-lasting, fresh and similar to the fragrance of apples and orchids. This aroma is famously known as "Qimen Aroma". The tea tastes sweet and mellow, and the infused leaves are red and bright.

Qihong is considered a premium tea in the global market. It can be made both as a pure brew and a mixed brew with milk or sugar. The latter is rendered a shade of pink while the tea flavor remains.

(3) History

Qimen black tea is one of the three most fragrant black teas in the world. It is also called Gongfu black tea because of its fine and meticulous production process. The name "Gongfu black tea" has later become a synonym for premium black teas. Qihong won a prize at the Panama Pacific International Exihibition in 1915 and became a favored tea of the British royal family, who praised and called it "the most fragrant of all".

3. Yunnan Dianhong (Gongfu black tea from Yunnan Province)

Dianhong is a type of Gongfu black tea, and it was created in 1938. Dianhong mostly comes from Lincang, Baoshan, Dehong, Pu'er, Dali and



Dianhong's infusion



Xishuang Banna, all of which are located in Yunnan Province.

(1) Environment

The tea grows in undulating mountains at altitudes of 1,000-2,000 meters above sea level, shrouded by mists and clouds. The climate of Yunnan Province consists of the rainy season and the dry season. It has an average annual temperature of 15-18°C, but there is a sharp temperature fluctuation between day and night. The soil, deeply layered, is mostly yellow-brown soil, yellow-cinnamon soil.

(2) Qualities

Dianhong has tight, stout and fat leaves that are glossy and dark-colored with visible golden trichomes. The brightly-colored tea infusion has a long-lasting aroma, and it tastes mellow, fresh and stimulating. The infused leaves appear red, even and tender. Dianhong's unique qualities are its obvious red trichomes and its rich aroma.

(3) History

Dianhong was created in the 1930s by several Qihong producers, who used Qihong's production method on fresh leaves from the local large-leafed tea plants in Fengqing County. Dianhong turned out to be totally different from the medium- and small-leaf tea plant species in terms of flavor. It is a well sought-after tea in both the domestic and global markets.

III. Examples of revered oolong teas

Oolong teas are famous for their profuse and refreshing aroma. To make oolong tea, the freshly harvested tea leaves need to go through numerous processes, including sunning, rocking, stir fixation, rolling and hot air drying.

1. Dahongpao (Red Robe tea)

Dahongpao (Red Robe tea) is a widely-revered oolong tea from Wuyi Mountain of Fujian Province. It was created during the period between the late Ming Dynasty and early Qing Dynasty. The local tea oolong teas are nicknamed "rock teas" because



Chapter 11 Where to Find Premium Teas in China

of the vastly rugged region that produce such varieties. Of all the Wuyi Mountain oolong teas, Dahongpao is the most revered in China.

(1) Environment

Wuyi Mountain is widely considered a mustsee attraction in southeastern China. The mild



Dahongpao (oolong tea)

climate is warm in winter and refreshingin summer and offers an average temperature of 18-18.5°C and precipitation of around 2,000 mm per year. Foggy all year round, the local air humidity reaches approximately 80%. The soil in this region is mainly composed of sand, gravel and grayish yellow sandy loam.

(2) Qualities

Leaves of Dahongpao look stout and even in shape and glossy brown in color. On the surface, they have sandy grains and white spots commonly known as "toad back". The brewed tea infusion usually has a rich, orchid-like aroma, which is deep and long-lasting. The viscous brew tastes thick and mellow and has a sweet aftertaste, completely free from bitterness. The infused leaves are green in the middle and red around the edges. Dahongpao is labeled as "a tea of thick taste and flowery aroma".

(3) History

Dahongpao used to be the most famous tea species from Wuyi Mountain. In 2012, the name "Daohongbao" was given to the tea cultivar and to the made tea as well. It belongs to the category of oolong tea. The parent plants of Dahongpao grow on the hillside of the cliff called Jiulongke. It was first noted in *A Miscellany of Records*, a classic written by Zheng Guangzu in 1839, that "...Fujian Province is the place for growing 'hongpao' and 'jianqi', both of which are prevailing tea for the past 50 years". It was assumably in 1789 when Dahongpao started to gain popularity, a time between the reign of Emperor Jiaqing and Daoguang of the Qing Dynasty.



Know Tea, Know Life

2. Tieguanyin

Tieguanyin is a premium oolong tea from Anxi County, Fujian. Created during the reign of Emperor Qianlong (1736-1796 AD), it has been considered a very popular tea in China since then.



Tieguanyin (oolong tea)

(1) Environment

Anxi is neither severely cold during winter nor scorching during summer. This county basts an average temperature of 16.4-21.2°C per year, and the accumulated annual temperature (for days when temperature is higher than 10°C) amounts to 5176-7315°C. Here, the frost-free period exceeds 256 days. The county, boasts an annual mean precipitation of 1,500-2,000 mm and humidity higher than 76%. The soil within the tea groves is either red laterite or mountainous red soil.

(2) Qualities

Unlike other teas, Tieguanyin allows harvesting ripe shoots with two or three fresh leaves, and this type of harvesting standard is called "open-plucking".

Tea leaves of Tieguanyin look twisted, stout and heavy, like dragonfly heads. The leaves have a shiny luster and is sandy green in color with red dots and hoarfrost on the surface. The brewed tea infusion, thick and clear, is golden yellow like amber, and the infused leaves are thick and shiny with a silky luster. Tieguanyin tastes mellow and sweet and has a fruit-like sweet aftertaste that is long-lasting. Moreover, the tea smells like orchids. Tieguanyin is particularly known for its long-lasting aroma and supposedly "retains the aroma even for the seventh brew".

(3) History

Amongst Anxi's oolong teas, Tieguanyin is the most widely admired and soughtafter tea. "Tieguanyin" is both the name of the cultivar and the made tea. It was discovered in Xiping Town (within Anxi County) between 1725 and 1736 some 300 years ago. In Anxi, the origin of Tieguanyin remains disputed. Specifically, people debate whether it was the man surnamed Wei or the man surnamed Wang who found



Chapter 11 Where to Find Premium Teas in China

the parent grove. Today, we may find both versions of the legend in the new "Annals of Anxi County".

3. Fenghuang Dancong

This popular oolong tea variety originates from Fenghuang Mountain of Chaozhou. It was created in the Ming Dynasty.



(1) Environment

Fenghuang Dancong (oolong tea)

Fenghuang (phoenix) Mountain is one of the most high mountains in eastern Guangdong Province. Blessed with rolling hills, canyons and springs, the mountain range has a moderate climate featuring a long summer and a short winter. Annually, the average temperature reaches 21.4°C. This is a region that has an annual sunshine duration of 1,997 hours. Here, the mean precipitation is 1,668 mm and the air humidity ranges from 75%-85%. The soil here is deeply layered and fertile and typically yellow and red in color.

(2) Qualities

Fenghuang Dancong's leaves are straight and stout in shape and tawny in color, like that of eel skin. When brewed, the tea infusion has a floral aroma and tastes rich, mellow and refreshing. The infusion is clear, like tea oil, and the infused leaves are mostly green and red around the edges. Fenghuang Dancong is considered an extraordinary tea because of its strong and rich fragrance, along with other distinctive characteristics.

(3) History

Records of tea production in the Chaozhou area was first observed in historical records dating back to the reign of Emperor Jiajing of the Ming Dynasty, indicating a history of at least 400 years. Tea farmers separate and nurture the tea plants by quality. Then, they separately harvest and produce tea from each individual plant, thus the name "Dancong" (which means "single bush"). It became an imperial tribute during the Ming and Qing Dynasties. The excellent quality of Fenghuang Dancong



also popularized the tea-drinking custom in Chaozhou and Shantou. The local custom of "Gongfu tea" can even be seen overseas.

IV. Examples of esteemed white teas

White tea is named after its white trichomes. It is neither fried nor rolled during the production process in order for it to maintain a sweet and mild flavor that can be widely accepted by the public. The supply and demand of white tea have been on the rise over recent years.

1. Baihao Yinzhen (silver needles)

This tea is mainly produced in Fuding and Zhenghe, Fujian Province. In 1796, during Emperor Jiaqing's (of Qing Dynasty) reign, Fuding locals used the robust buds of "caicha" to successfully create Baihao Yinzhen. It is a kind of traditional tea.



Baihao Yinzhen (white tea)

(1) Environment

The temperature of the tea-growing area is on average 18°C, where the mean frost-free period reaches 280 days per year. The mean precipitation exceeds 1,730 mm, the air humidity reaches 82%, and the duration of sunshine is 1,804 hours per year. The soil here is either red or red podzolic soil.

(2) Qualities

The leaves of Baihao Yinzhen are stout, covered in white trichomes, straight like needles and white like silver. The Baihao Yinzhen produced in Fuding is thickly covered in white trichomes, and its infusion has an apricot color and tastes refreshing. On the other hand, the tea produced in Zhenghe tastes mellow and fragrant.

The way to brew Baohao Yinzhen is similar to that of green tea, but it requires a longer brewing time since the tea leaves are not rolled during the processing process. Thus, the flavor of the tea needs more time to unfold.

52





White tea farms in Fuding

(3) History

The fresh tea leaves and buds used to make Baihao Yinzhen are from the tea plants in either Fuding or Zhenghe. As the tea buds here are several times stouter and longer than those of "cai-cha", Shen Kuo, a scientist from the Song Dynasty, said in his classic *Mengxi Bitan* (*Dream Pool Essays*) that "plants in the south are greater in quality since they are growing in fertile soil, and the fresh buds are also longer". In the tea plantations where the two varieties are concentrated and grown, in spring, we may find the tea groves capped with a vast layer of shiny silver. The imposing "frosts" can be a rare and picturesque sight.

2. Baimudan (white peony)

Each white trichome-covered bud of Baimudan is shaped like a flower and when



Know Tea, Know Life

brewed, unfurls like a growing blossom. Hence, the produced tea is called Baimudan (white peony).

(1) Place of origin

Baimudan was first made in Jianyang. Since 1922, the County of Zhenghe was the main production area of this tea. Today, Baimudan is



Baimudan (white tea)

widely being grown in Zhenghe, Jianyang, Songxi and Fuding. The tea leaves for making Baimudan should be covered with white trichomes and appear tender and stout. The traditional harvesting standard is one bud with two new leaves during the first round of spring tea harvest. The bud should be the same length as the leaves, and both should be covered with white trichomes.

(2) Qualities

Baimudan can be graded as "superior, first, second and third". On each sprout, there is a tender bud cradled by two new leaves, and the leaves are either dark green or moss-like green. The leaves are stout with white trichomes on the back, and the bud and leaves are from the same sprout. The brewed tea infusion is apricot- or orange-colored. It has a refreshing aroma, and particularly the "aroma of trichomes" is obvious. Taste wise, the tea is thick and mellow. The infused leaves have a yellowish shade of green, and the leaf veins are slightly red.

(3) History

The tea was first made in Shuiji (formerly belonging to Jian'ou County) before 1922. As recorded in "Annals of Jianou County", "the white-haired tea was widely grown in Xixiang and Zixi... covering a vast expanse of area." Baimudan was first made in Zhenghe County in 1922. As a specialty of Fujian, it was shipped to Vietnam. Now it is exported to Hong Kong, Macao and Southeast Asia. Baimudan is a drink suited for summertime, as it is able to dispel heat, according to the traditional Chinese medicine.



Chapter II Where to Find Premium Teas in China

V. Examples of prominent dark teas

Dark tea has a longstanding history. It has been a daily necessity for nomads since the 7th century. It played an important role in tea-horse trading. Dark teas from different regions vary in properties and qualities, and they differ greatly from other tea varieties in terms of the "aged and pure" flavor.

1. Pu'er (ripe) tea

Pu'er tea is a specialty of Yunnan Province. After the Tang and Song Dynasties, Yunnan-made teas were mostly processed and packaged in Pu'er Prefecture (a historical administrative jurisdiction) before exporting. Thus, the teas were named Pu'er. Today, the so-called Pu'er (ripe) tea refers to the Yunnan dark tea that has undergone aging.



Pu'er (Ripe) Tea

(1) Environment

Pu'er production region covers both sides of Lancang River, including Pu'er, Xishuangbanna, Lincang, Wenshan, Baoshan and Honghe. High-quality Pu'er is mostly found in mountainous areas with altitudes of 1,500-2,000 meters above sea level. The production area of Pu'er, with a plateau humid monsoon influenced tropical climate, has an average temperature of 15-20°C, an accumulated temperature (days when the temperature is over 10°C) of 6000-8000°C·day, a mean precipitation of 1,200- 2,500 mm and an average humidity of 75%-80%. The soil here is mostly red, yellow, red laterite and latosolic red, which is considered fertile and rich in organic matters. The soil has a pH of 4-6, which is ideal for growing tea. Due to the difference in topographic height and vertical climate, the dry and wet seasons are distinct all year long.

(2) Qualities

A Pu'er tea leaf looks stout and brownish or grayish white. The brewed tea





Tea growing villages in Yunnan Province

infusion is red, thick and bright with a unique "aged" aroma. The infused leaves are a chocolate brown. The tea has a mellow and sweet aftertaste. Pu'er Tuocha is shaped like a bowl, each weighing 100g or 250g each. Pu'er Fang-cha is shaped like a brick with dimensions of 15cm in length, 10cm in width and 3.35cm in height, weighing a total of 250g. "Qizi" is a special cake-shaped tea, which looks like the full Moon, and means more children and wealth.

(3) History

In ancient times, Yunnan-Guizhou Plateau, where today's Yunnan Province is located, was an isolated place that was almost inaccessible. It would take at least half



Chapter II Where to Find Premium Teas in China

a year, sometimes even a year, to transport the local tea by foot or horse to Tibet, Southeast Asia, Hong Kong and Macao. Tea polyphenols would continue to oxidize in such warm and wet climate, which created the special quality of Pu'er tea. "The fragrance and flavor come from miles away to my cup." This is a eulogy to the tea's origin and quality. Today's well-developed transportation systems have substantially shortened shipping time. A new type of Pu'er was created in 1973 by fermenting the sun-dried tea under high temperature and humidity. This new type was created to satisfy the growing demand for the special flavor of Pu'er tea. It is known as Pu'er Shoucha (ripe tea).

2. Anhua Dark Tea

This renowned dark tea comes from Anhua, Hunan. It was first made during the end of the 16th century. Anhua dark tea has three main types, which are "sanjian", "sanzhuan" and "yijuan". Sanjian (three-jian), also known as Xiangjian, refers to Tianjian tea, Gongjian tea and Shengjian tea; "Sanzhuan" (three-zhuan or three-brick) refers to Fuzhuan tea, Huazhuan tea and Heizhuan tea; "Yijuan" (one-juan) refers to Huajuan tea, now called Anhua "Qianliang" tea.

(1) Environment

The tea grows in areas between 200-1,500m above sea level, where the average annual temperature is 15-18°C. The duration of sunshine reaches 1,350-1,400 hours, and the frost-free period amounts to 270-280 days. The yearly accumulated temperature (for days higher than 10°C) is 5,000-5,200°C day, and the mean precipitation reaches 1,000-2,400 mm. The soil, 4.3-6.0 in pH value, is comprised of red and yellow soil mostly made from weathered plate shale.

(2) Qualities

Tianjian and Fuzhuan are today's most well-known dark tea varieties of Anhua. The fresh leaves of Tianjian are tight, flat, straight and black. The leaves have a pinesoot fragrance. The tea infusion appears orange with a rich and strong taste. The infusion leaves are tawny or dark brown, tender and even. Fuzhuan's appearances



look flat, smooth, well-cut and even in thickness. The black brown surface has no sundry fungus, only "golden flowers". Fuzhuan usually has an aged fragrance that slightly smells like fungus. The tea infusion is either yellow or orange and tastes quite

(3) History

Anhua is the core production area for Hunan's dark tea. As a daily necessity of the nomads, the province's dark tea was sold to the northwest regions during the reign of Emperor Wanli of the Ming Dynasty as an "official tea" exclusive to the imperial court. It was an important commodity in the government's "tea-for-horse trade" to maintain peace at the borders. It became be a popular tea in the "Tea Route of Eurasia" in 1853. Today, the techniques of making Qianliang and Fuzhuan have become China's intangible cultural heritages.

3. Liubao Tea

Liubao Tea is produced in Wuzhou City, Guangxi Autonomouse Region.

mellow. The infused leaves are tawny and even in size.

(1) Environment

Cangwu, a mountainous range with an altitude of 1,000-1,500 meters above sea level, is home to Liubao Tea. The tea groves generally



Liubao Tea (dark tea)

grow on the hillside or in the canyon. Here, the yearly average temperature is 21°C, and the annual rainfall reaches about 1,500 mm. The place also features a foggy and cloudy weather all year round.

(2) Qualities

The dried tea leaves are brown, black and glossy, and the leaf strips are bonded into blocks, with yellow fungus spores in between. The tea tastes mellow and delicious. The tea infusion is a dark purplish red but clear and bright, while the infused leaves are red with spots of black and have a shiny luster. Areca fragrance, areca flavor and areca-colored infusion are the characteristics of high quality Liubao Tea.



Chapter II Where to Find Premium Teas in China

(3) History

First made in the Qing Dynasty, Liubao Tea has a history of more than 200 years. It comes in two forms: loose leaf tea and compressed tea. The aged Liubao Tea is often used to cure dysentery and eliminate malaria. It is also used to treat poisons. Liubao Tea is a traditional tea that is popular in Southeast Asia.

VI. Examples of well-known yellow teas

With the lowest production among all tea categories in China, yellow teas are mostly processed and made along the Yangtze River, around a latitude of 30-degree north. Similar to the production process in making green tea, the process of making yellow tea includes spreading, fixation and drying. However, it is the unique "yellowing" technique that gives yellow tea its color and enriched mellowness and helps reduce the tea's astringency.

1. Junshan Yinzhen

This is a long-established tea from Yueyang of Hunan Province. It is processed and made via the unique "double baking / wrapping" technique.

(1) Environment

Junshan is the name of an island on Dongting Lake. It has an altitude of less than 80 meters



Junshan Yinzhen (yellow tea)

above sea level. Junshan faces the renowned Yueyang Tower to the east and neighbors the vast and picturesque Dongting Lake to the west. With a total area less than 1 km², the island enjoys an average annual temperature of 16.8°C and mean precipitation of 1,340 mm. It is usually cloudy during spring and summer, and the relative humidity there reaches 84%. The soil here is fertile and mostly composed of sandy loam.

(2) Qualities

A leaf bud of Junshan Yinzhen is stout, straight, golden and coated with white



trichomes. The orange-yellow infusion has an alluring aroma and tastes mellow and sweet. The infused leaves have visible buds and look tender and yellow.

(3) History

Junshan island has a long history of tea production, and amongst the teas produced in Junshan, Yinzhen has the best quality. It was nicknamed "gold embedded in jade" and became a tribute tea in the Qing Dynasty. As recorded in "Annals of Baling County", "tea from Junshan are as tender and green as the lotus heart", and "since the Qing Dynasty, every year, 9 kg of Junshan tea is delivered as tribute tea to the court." Prior to the season of Grain Rain, the county magistrate would have local monks pluck the first sprouts and buds. The sprouts and buds are all covered in white trichomes, so the tea became commonly known as "white hair tea". Another local annals records, "it is similar to Longjing in color and taste, yet the leaves are slightly broader and greener." Our ancestors described this tea as "green conches in a silver plate".

2. Mengding Huangya

This is a kind of yellow tea that grows in Mingshan District of the City of Ya'an City. It is made via a unique "wrapped yellowing" method using stout buds.



Mengding Huangya (yellow tea)

(1) Environment

Mt. Mengding has a mild climate, and there are no chilly days during winter and no scorching days during summer. The average annual temperature here reaches 14-15°C. The mountain is known for its constant rainy, foggy and cloudy weather. The annual mean precipitation is around 2,000-2,200 mm and the number of cloudy and rainy days reaches 200 days per year. The night-time rainfall accounts for over 2/3 of the total, and there are 280-300 foggy days a year. The deeply layered soil has a pH value of 4.5-5.6, which is ideal for growing tea plant.



Chapter II Where to Find Premium Teas in China

(2) Qualities

In the production process for Mengding Huangya, there are nine steps: fixation, initial wrapping, re-frying, re-wrapping, third-time frying, spreading, fourth-time frying, baking and packaging.

The tea leaves are flat, straight and light yellow. Brewed Mengding Huangya smells sweet and rich, while the tea infusion is yellow and bright. The tea tastes fresh and mellow with a sweet aftertaste. The infused leaves have intact buds that are a shade of light yellow. Huangya is the best tea produced in Mt. Mengding.

(3) History

There is a saying that "we must have a nice brew of tea from Mt. Mengding and water from the Yangtze River". For over two thousand years, the custom of growing and making tea in Mt. Mengding never ceased. Teas from Mt. Mengding have been considered a tribute to the imperial court from the Tang Dynasty to the Ming and Qing Dynasties, and Huangya is considered the best in quality.

VII. Scented tea

Scented tea, such as jasmine tea, belong to the reprocessed tea category. There are many different flowers ideal for making scented tea. Different tea varieties can also be used to make scented tea, like green, black and oolong tea. Of



all the scented tea, jasmine tea is the most popular. It is refined with baked green tea and jasmine flowers. This combination is considered the perfect match.

(1) Origin

Jasmine tea is mostly produced in Guangxi, Sichuan, Fujian and Yunnan Province, and the City of Hengzhou, Guangxi produces the largest amount. Statistics shows that for every ten jasmine flowers in the world, six come from Hengxian. The





Jasmine production center



Chapter 11 Where to Find Premium Teas in China

city is located in the southeast of Guangxi Autonomouse Region, in the middle reaches of Yujiang River. This region has a subtropical climate that gives an average temperature of 21.5°C and precipitation of 1,427 mm yearly. Being sunny and almost frost-free all year round, the city is suitable for growing jasmine outdoors. In addition, the city is especially known for its early flowering season (earliest in mid-April), long flowering period (7 months from April to October) and high yield (over 9,000kg/ha).

(2) Qualities

The leaves of Hengzhou's jasmine tea are compact, neat and coated with trichomes. It has a strong aroma and tastes mellow, and the infused leaves are even and tender. The tea can be repeatedly brewed. Jasmine tea demonstrates a good match between the scent of flowers and the flavor of tea. The fresh, rich and lasting fragrance is the high quality of jasmine tea that makes it so popular.



Jasmine flower



(3) History

The earliest records of scented tea are from the literature dating back to the Song Dynasty. In 16th century China, techniques were well-developed to make scented tea. During the reign of Emperor Xianfeng of the Qing Dynasty, traders from Tianjin and Beijing started to produce large amounts of jasmine tea in Fuzhou and sold them to northern and northeastern China. This boosted the scented tea industry. Cities like Jinhua and Suzhou later followed suit, and the way of making jasmine teas began to spread to the west of China.



64

Chapter III The Universe in A Cup of Tea

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A cup of tea can be a daily necessity because it can be consumed with meals; it can be a wellness product because it can bring happiness and serenity; it can also be a medium for spiritual pursuits because it has an important role within traditions. We may find, undoubtedly, a cup of tea to have many uses.

Section 1 Sensory Properties of Chinese Teas

When drinking tea, the first question people wonder is whether the tea is of good quality. What are good teas? How can people evaluate the quality of teas? The first thing is to understand the composition of teas when determining quality. Good teas can bring people a wonderful experience, and appreciating tea starts from examining its color, aroma and physical attributes.

I. Colors of teas

The color of the tea commonly refers to both its color and luster. The color is determined by looking at tea leaves and the color of tea infusion under white light. People's judgments on the color of tea may be affected by their surroundings.

The color and luster of different kinds of tea greatly differ. The rich diversity of colors precisely demonstrates the diversity and uniqueness of teas.

1. Source of tea colors

The color of dry tea leaves, tea infusion, or infused leaves, depends on their chemical composition. These chemical compounds can be divided into water-soluble pigments and fat-soluble pigments that can only be dissolved in organic solvents. Fat-soluble pigments found in tea include chlorophyll, xanthophyll and carotene, which influence the color of dry and infused leaves. Water-soluble pigments include



theaflavin, thearubigin, theabrown, flavonoids and anthocyanin, which help determine the color and luster of tea infusion.

2. Evaluation of tea colors

As defined in chromatics, color has three properties: hue, lightness and saturation. Hue is the base color (i.e., blue, red, yellow, etc.); lightness refers to the degree of light reflected (how light or dark a color is); and saturation is the purity/intensity of a hue. The combination of the three attributes creates the diverse colors of tea.

(1) Dry tea leaves

During the physical evaluation of tea, the color of dry tea leaves is a factor of consideration. The formation of color depends on two main types of compounds: fatsoluble pigments, like chlorophyll, and water-soluble pigments, like tea polyphenols (TP). The luster of dry tea leaves reflects the freshness of tea leaves.



Green tea

Black tea

Oolong tea Dark tea Shapes of the six tea categories



White tea

(2) Tea infusion

The flavor of tea comes from the tea infusion, and the tea infusion itself is judged and evaluated, falling under the category of infusion color evaluation. The judging criteria include hue, lightness and turbidity. Hue refers to the base color of the tea infusion; lightness simply means the brightness of tea infusion; and turbidity refers to the purity of the tea infusion. These criteria reflect how well each step is carried out



during production, the freshness of tea and the sanitary conditions during harvest and production.

Tea infusion color is determined by its soluble tea polyphenols and other watersoluble pigments. The lightness depends on the oxidation degree of TP. The higher the oxidation degree of TP is, the darker the color of the tea infusion will be.



(3) Brewed tea leaves

The main constituents of the color for infused leaves (the residual leaves after brewing) are also fat-soluble pigments that are insoluble in water, which include chlorophyll, and any remaining TP that have not been dissolved into the tea infusion.

3. What tea colors say about tea

The different environment, tea plant species, horticultural technology and production processes are the factors that result in the different characteristics of various teas. The color of tea leaves is reflective of these factors.

(1) The color of green tea

Green tea, of course, should be green, and the color of the tea leaves should be



Chapter III The Universe in A Cup of Tea

uniform. The green hue of dry leaves and infused leaves is mostly due to chlorophyll, while the color of infusion is formed primarily by tea polyphenols.

Common colors of dry green tea leaves include yellow green, emerald green, moss green and dark green. Regardless of color, leaves that have a shiny luster are considered good quality. A dull luster indicates that the leaves are not fresh enough. Staleness may also darken the color of dry leaves. For some green teas that are processed with albinic or yellow-leafed tea cultivars, the dry leaves will show mixed colors of emerald and golden yellow, and sometimes even a shade of orange-yellow. For some teas, the white trichomes on their new shoots are called "silvertrichomes", and it is also an integral part of the physical attributes of green tea. The more trichomes there are and the whiter they are, the more tender the tea leaves will be.

Green tea infusion should be green, bright and clear. If it looks dark and turbid, the tea is of low quality. An exception is that if the opaqueness is caused by the trichomes suspended in the tea infusion. This means that tea is still of good quality because trichomes are a sign of tenderness.

The color of infused green tea leaves ranges from green, yellow-green to yellow, and the difference in color reflects the different tea cultivars and tea-making techniques. After brewing, tender tea leaves will look lighter and brighter, while older leaves will look darker. The older the green tea is, the darker the color of brewed leaves appears.



(2) The color of black tea

During the production process, the color of black tea leaves becomes reddish



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brown, brown or even black due to the complete enzymatic oxidation of tea polyphenols. The trichomes on the new buds will be dyed golden because of the oxidized tea polyphenols and are known as Jinhao, or "golden trichomes". The obvious golden hair on the dry black tea leaves indicates its good quality and should not be considered adulterated. Similar to green tea, whether the leaves appear lustrous or dull is an indicator of the freshness of black tea.

The infused black tea has to be bright, preferably orange-yellow, orange-red or bright red. An overly light infusion color indicates that either the tea leaves are premature (harvested too early) or the processing was insufficient. If the tea infusion looks too dark, it means the tea leaves are either overprocessed or have gone stale.

The infused black tea leaves are usually red or copper red, and the brighter the color, the better the quality of tea. Black tea is considered poor in quality if green or dark leaves are found.



Dry black tea, its infusion and infused leaves

(3) The color of oolong tea

When it comes to evaluating the physical properties of oolong tea, color is of least importance. This is because there are many variables to be considered when making oolong tea. For example, the degree of oxidation ranges from 15% to 65%. As such, the colors of dry tea leaves, tea infusion and infused leaves will vary greatly. Therefore, no definite relationship between the quality and color of oolong tea can be established. However, the requirements for the luster of dry leaves and the brightness of tea infusion and infused leaves are consistent for all tea varieties.

Dry oolong tea leaves may appear emerald green, sand green, greenish brown,



tawny or dark green, depending on the degree of oxidation. Oolong tea infusion colors range from honey green, honey yellow, golden, orange-yellow to orange-red. The brewed oolong tea leaves are a mix of red and green, specifically green in the middle and red on the edges.



Dry oolong tea, its infusion and infused leaves

(4) The color of yellow tea

It is the step called "yellowing" in processing yellow tea that creates the yellow hue of the dry tea leaves, infusion and infused leaves. If unfamiliar with yellow tea, people may confuse yellow tea with stale green tea. Yellow, however, is normal for this tea category. Apart from its tenderness and luster, the quality of yellow tea should be evaluated based on its components.



(5) The color of white tea

Traditionally, white tea does not undergo frying or rolling during the production process. The white hue is valued because the abundant white trichomes on the buds indicate the tea's tenderness and luster. The amount of trichomes begins to decrease as the leaves grow and ripen, and the leaves' color will turn from light to dark, from green to brown. Likewise, the infused tea color will turn from light and green to



apricot-like yellow and then to orange-yellow. For the color of infused white tea, the lighter the better. The color of stale white tea or tea made from older leaves, will look yellow and brown, and the tea leaves lack luster.



Dry white tea, its infusion and infused leaves

(6) The color of dark tea

Whether loose leaf tea or compressed tea, the color of dark tea is mostly dark due to the processing methods. The use of overly ripe leaves may also cause the color of dry tea leaves to be greenish brown, tawny or even dark brown. For infused dark tea, the color may appear orange-yellow, orange or ruby, while the infused leaves are mostly tawny or copper-red. For both the infusion and infused leaves, the brighter the color, the better the quality.



II. Aromas of teas

The aroma of one tea has a great influence on its quality. Due to the characteristics of aroma compounds, a tea's fragrance is either a single aroma or a combination of several aromas.

72


1. Components of tea aroma

Previous studies have shown that there are more than 700 kinds of aroma compounds found in tea, and the types and quantities of aroma compounds in different teas vary. There are many types of aroma compounds, but the quantity is quite low. Aroma compounds generally account for only 0.005%-0.03% of dry matter weight. Although a tea's aroma is "invisible and intangible", the different quantities of aroma compounds, the interaction of different aroma compounds and even different spatial structures of the same aroma compound may bring about changes in aroma. In addition, amino acids may also affect a tea's aroma.

2. Evaluating tea aroma

The evaluation of tea aroma generally starts from assessing the aroma type, richness, durability, and freshness. The aroma of each tea category, especially its aroma type, is distinct. Aroma type is influenced by tea plant species, planting region and production process. In general, a tea's aroma is required to be pure, pleasant and long-lasting. The saying "a lingering fragrance of cold tea" refers to the abundance of tea aroma compounds. Finding an unpleasant odor means that the tea leaves have gone stale. The tea is of poor quality if the aroma is ephemeral, faint, dull, acerbic (caused by insufficient fixation) or crude (from processing old tea leaves).

3. Criteria for tea aroma

(1) Green tea

The aroma of green tea is generally required to be fresh. Green teas are preferred to smell like flowers, fruits or nuts, trichomes-coated leaves and tender and fresh leaves. Teas that smell faint, dull, raw, over-burnt (excessively processed), stale or crude will be considered of low quality.

(2) Black tea

Sweetness should be one of the key characteristic of black tea aroma. Specifically, black teas of good quality should smell like fruits, nuts, flowers,



trichomes or wood. Teas that smell faint, dull, raw, over-burnt, stale or crude will be considered of poor quality. A special black tea named Xiaozhong is best known for its pine-soot fragrance.

(3) Oolong tea

The aroma of oolong tea varies substantially depending on the tea products. Those with a delicate, gentle and fruity smell are considered premium, while those with a faint, over-burnt or crude odor are considered inferior.

(4) Yellow tea

Yellow tea should also preferably have the smell of flowers, fruits, trichomes and fresh leaves. Yellow teas smelling raw, dull, stale and crude are of poor quality.

(5) White tea

The traditional aroma of white tea is pure. White teas with trichome-like, fresh, sweet, floral and fruity fragrances are preferred. Those with a raw, fermented or dull smell are undesirable.

(6) Dark tea

Unlike the other tea, the aroma of good-quality dark tea should be "aged" and free from adulterated odors. Please note that the so-called "aged aroma" is not the same as a "stale odor". People sometimes confuse these two. These two terms are sometimes used interchangeably, but they are actually two terms representing two different smells. Staleness means spoilage, which is an offensive smell and can harm the human body, while the "agedness" can evoke pleasant feelings and memories of life experiences.

(7) Scented tea

For all scented tea, aroma is the key to quality. While there are dozens of flowers and plants that can be used to make scented tea, the criteria for good-quality aroma are consistent. Good teas smell fresh, fragrant, rich and balanced. If the aroma is absonant, insufficient and stale, or if the tea has a dull and strange odor, the scented tea is of poor quality.



(8) Deeply-processed Tea

All deeply-processed teas are preferred to retain their natural, original aromas.

III. Tastes of teas

Taste as the core attribute of tea has become a consensus as people further their understanding of tea and its quality. Tea, after all, is a beverage. Thus, the taste is the most critical aspect for the evaluation of quality.

1. Compounds comprising the taste of tea

The taste of tea is created by the interaction of dozens of water-soluble inorganic and organic compounds. The main taste compounds include tea polyphenols, amino acids, caffeine, soluble sugar, etc., which are dissolved in the tea infusion to create fresh, sweet, bitter, sour and astringent tastes and a sense of stimulation. The overall taste of tea is formed when all these tastes are integrated.

TP are the most important taste compound in tea and contribute to the taste of tea. TP is the general term for a class of polyphenols, and TP usually accounts for 24%-36% of dry matter weight. Tea polyphenols can affect the semi-fluidity of cells and produce a sense of astringency by combining with protein molecules in the cell membrane on the surface of the mouth and tongue. At the same time, the distinctive bitterness of tea polyphenols can help produce a unique sense of stimulation.

Free amino acids are the main source for the taste of freshness, and freshness is an indicator of good quality in terms of taste.

In tea, caffeine only accounts for 3%-5% of dry matter. As one of the defining properties of tea, caffeine is used to discriminate real teas from fake teas. Caffeine tastes bitter, but it becomes fresh and mellow when mixed with theaflavin.

The soluble sugars in tea are sweet. Aside from contributing to the taste of tea, the sugars also play a role in the formation of tea aromas, giving teas a sweets-, caramel- or chestnut-like aroma.



2. Evaluating the taste of tea

We may describe the taste of tea in terms of purity, richness, mellowness, astringency and freshness. Generally, good teas should taste pure, mildly stimulating, flavorsome and balanced. A desirable taste does not necessarily mean the richness of flavor. Any unsavory taste will affect the balance, and a thin, raw, crude, dull, sour or bitter taste is considered undesirable. Different tea varieties may vary in their requirements for the freshness or "agedness" of their taste.

3. Criteria for the taste of tea

(1) Green tea

The taste of green tea should be fresh, mellow and refreshing. A thin, raw, dull, overly heated, stale or crude taste is considered undesirable.

(2) Black tea

Gongfu black tea tastes fresh and sweet. Different tea varieties will have different richness in terms of taste and can vary from mild to normal to very rich. It is normal for the black tea Xiaozhong to have a pine-soot flavor. Broken black tea tastes rich, strong and fresh, and preferably, it should evoke a strong sense of stimulation. For all black teas, a thin, dull, raw, overly heated, stale or crude taste is considered of poor quality.

(3) Oolong tea

The taste of oolong tea is influenced by both its variety and processing techniques. Even though the leaves are relatively ripe, oolong teas should have a subtle, smooth and rich texture. Premium oolong teas, when brewed, have a lingering sweet and mellow taste. A dull, excessive, rough or thin taste is considered undesirable.

(4) Yellow tea

Yellow tea should taste tender and mellow with a sweet aftertaste. A raw, dull, stale or crude taste is considered of poor quality. However, an over-burnt taste can be found in Huangdacha and is considered normal.



(5) White tea

Traditional white tea tastes mellow and sweet. A raw, fermented or dull taste is unwelcome and indicates poor quality. For the "aged white tea", a prevailing trend in recent years, it should taste "aged" but free from any unpleasant tastes.

(6) Dark tea

A good dark tea should also have a mellow and sweet taste. Moldy and fishy tastes indicate poor handling during the production process and improper storage. A stale, adulterated, over-burnt or crude taste is considered low quality.

(7) Scented tea

Scented tea should taste balanced, having both the rich floral aroma and the mellowness of tea leaves. For all scented tea, a dull, strange, crude or stale taste means the tea is of poor quality.

(8) Deeply processed tea

For all deeply processed teas, we prefer them to retain their natural or original tea flavor.

IV. Appearances of teas

A tea's "appearance" refers to its physical features and the leaves' tenderness. Appearance has become the basis for grade and specification rankings. Tea's appearance depends on the raw leaves and processing techniques, especially with insoluble sugars as the main body, such as cellulose, hemicellulose, starch and pectin.

1. Shapes, sizes and features

The size of tea leaves depends on the tea plant species and the ripeness of raw leaves. Different tea-making techniques also affect tea's shape, size and physical features. The solidification of shape requires tea to undergo a lengthy period of heating. Among the six tea categories, green tea completes this step best, which leads green tea to have the most diverse in shapes.



Flat (green tea)

2. Evaluating tea appearance

Evaluation criteria of tea appearance include shape (and ripeness), wholeness and neatness. Despite the diversity of tea forms and the persistent emergence of new tea varieties, the overall criteria for tea appearance are consistent: nicely shaped, even and neat and free from non-tea substances. For blended teas, the proportions of the teas of the upper, middle and lower grades must be correct. Teas that are irregularly shaped, uneven and adulterated are of poor quality.

3. Criteria of tea appearance

(1) Green tea

Common shapes and forms of green tea leaves include flat, spiral, pointy, round, bundled, strip-like (straight, bent or twisted), needle-like, conch-shaped, orchid-shaped, crescent-shaped and bird-tongues-shaped. They can even be customized to satisfy special needs.

(2) Black tea

Black tea leaves are mostly shaped like strips, needles and granules.

(3) Oolong tea

Unwrapped and unrolled oolong teas are usually sturdy and twisted such as the rock tea



Needle-like (green tea)



Stripe-like (black tea)



from northern Fujian Province, Dancong from Guangdong Province and Bao Zhong from Taiwan Province. On the other hand, wrapped and rolled teas like Tieguanyin from southern Fujian Province and Alpine Oolong from Taiwan Province, are usually a compact ball-shape.

(4) Yellow tea

Yellow teas may vary in shape. Based on the ripeness of the leaves, yellow tea leaves can be shaped like crescents, needles, bird-tongues, strips and conchs, and some come in naturally loose appearance.

(5) White tea

Among all the white teas, only Yinzhen (silver needle) looks sturdy, straight and needle-like. Baimudan (white peony) and Gongmei are required to have flattened leaves, and the buds, leaves and stem are connected; Shoumei is required to have flattened and complete leaves.

(6) Dark tea

Loose-leaf dark teas are usually firm and twisted in shape. Compressed dark teas are pressed into to be regular, compact, well-proportioned shapes that are uniform in thickness. Some compressed dark teas are made to be very compact.

Section 2 Tea, A Daily Must-have to Keep Fit

A good tea provides, aside from pleasant sensory and spiritual experiences, health benefits. The various chemical compounds found in tea play beneficial roles in people's health. Tea was first known as medicine, and its benefits were recorded by our ancestors. Over recent decades, scientists have conducted many studies on the chemical structure and biological activity of tea's functional compounds. The results provide evidence to support the therapeutic effects of tea and its wide use in nutrition and medicine.



I. Healthy benefits of tea in the historical Chinese medicinal classics

One of the most important theories in traditional Chinese medicine (TCM) is food and medicine have the same origins. Therefore, practitioners of traditional Chinese medicine use meals to maintain health. Back in the Tang Dynasty (618-907 AD), tea was already widely known for its health benefits. In his masterpiece *The Classic of Tea*, Lu Yu asserted that tea could help relieve thirst, chest congestion, headache, eye soreness, stiff limbs and joint discomfort. In *Pedigree of Tea*, which was written in the Ming Dynasty (1368-1644 AD) by Qian Chunnian and proofread by Gu Yuanqing, tea was considered a useful drink to help digest food, remove phlegm, reduce sleep time, unclog blood vessels, sharpen minds and reduce bloatedness. Moreover, tea was also considered by our ancestors an herbal medicine that can help lose weight, sober up, relieve fistulas and cure heatstroke.

Of the myriad of ancient classics on tea's health benefits, *Compendium of Materia Medica* and *Notes of Tea for Health* are two of the most detailed and widespread. The former is a magnum opus on TCM that incorporates the most knowledge on herbal medicine in the history of ancient Chinese pharmacology; the latter, being considered one of the three ancient tea classics in Japan, is a record of the



Tea table



Chapter III The Universe in A Cup of Tea

medicinal properties of tea. Now let's take a closer look at the health benefits of tea stated in the two books.

1. The Compendium of Materia Medica

We may find the most detailed documentations on the benefits of tea in *Compendium of Materia Medica*, a classic written by Li Shizhen. It contains numerous accounts of tea's benefits left by past physicians before the Ming Dynasty and includes Li's own studies, analysis and knowledge.

The book is a collection of the perspectives of Li Shizhen and past physicians. It names seven benefits of tea as an herbal medicine:

First, teas are cure for septic infections and can help promote diuresis, reduce phlegm, quench thirst, reduce sleep time, develop physical strength, sharpen minds and improve memory. ("Shennong's Recipes")

Second, teas can help improve digestion, especially when consumed with cornel, shallot and ginger (by Su Gong).

Third, teas can be used to cure fever, promote diuresis and benefit the bowel system (by Chen Cangqi).

Fourth, teas are remedy for headaches, light headedness and hypersomnia (by Wang Haogu).

Fifth, teas are effective for curing heatstroke, and when consumed with vinegar, tea is effective for curing diarrhea (by Chen Cheng).

Sixth, fried or cooked teas can help cure dysentery, and when consumed with *Ligusticum striatum* (chuan xiong) and shallot, tea can help ease headaches (by Wu Rui).

Seventh, strongly cooked teas can be an herbal medicine used for colds, cough or phlegm (by Li Shizhen).

In addition, Li Shizhen used the "Yin and Yang" and "five elements" theories to analyze the medicinal properties of teas. Being bitter and cold in nature, teas were categorized under "Yin", and thus theorized to help eliminate excessive "fire" in the human body. In TCM philosophy, "fire" is the source of several diseases, causing harm to the head, face, heart and chest. Drinking teas can eliminate the "fire" to help



people stay happy, sharp-minded and clear-headed. Tea can also be helpful for curing hangovers.

2. Notes of Tea for Health

A Zen master from Japan, named Eisai, visited China (during the Southern Song Dynasty) twice and wrote a book about tea at age 71. Titled *Notes of Tea for Health*, the historical literary masterpiece is popular even in today's Japan and is considered one of the three greatest tea classics. According to Professor Murakami, Master Eisai spent two years and five months residing at Wannian Temple of Mt. Tiantai from April of 1187 to September of 1189. During his stay in China, Master Eisai traveled to the tea plantations at Mt. Tiantai, Mt. North and other areas every spring to learn about tea farming and producing techniques and to conduct field investigations on local tea customs. This paved the way for him to write the classic *Notes of Tea for Health*.

Master Eisai firmly believed teas' health benefits, and his book begins with the claim that teas are heavenly drug for people's health. In his view, healthy organs are the key to longevity, and of all the human organs, the heart is the core. He asserted that "it could be of magical effect to drink teas for a good heart." He referred to the Tantric canons that the "five organs" (liver, lung, heart, spleen and kidney) are the source of life, and he also believed in the traditional Chinese "five elements" theory. In Master Eisai's eyes, the bitter taste of teas is the optimal cure for heart diseases. Being the most important organ, a well-performing heart means the proper coexistence of the five organs, which leads a person's life to be in the perfect state. Corresponding to the five organs are the "five tastes", which include sour, spicy, bitter, sweet and salty. The heart corresponds to bitterness, a taste found in teas. Thus, drinking teas must be helpful to people's physical and mental health. Master Eisai also claimed that Japanese people had a shorter life expectancy than Chinese people because they did not have tea-drinking habits. In his Notes of Tea for Health, Master Eisai stated, "Teas are nectar for health and longevity. The valleys growing teas are the places of the gods, and people who bring teas back to drink will live longer. Tea is



Chapter III The Universe in A Cup of Tea

a treasure in the eyes of people from India and China, and now the Japanese people love it too. Teas are really something we must have in our lives."

Master Eisai also collected many ancient Chinese classics (*Guang-ya*, *The Natural History, Shennong's Recipes, Hua-tuo, Materia Medica Supplements*, etc.) that describe teas' health benefits. One description claimed that "tea-drinking in the long term can increase energy."

II. The healthy benefits proved by modern science

Evidence procured from current research can prove many of teas' effects, knowledge that was acquired by our ancestors simply from firsthand experiences. Teas' benefits are due to teas' biologically active ingredients. Teas and tea extracts are now being used and tested for the prevention and treatment of various disorders. It should be noted that such benefits of teas are limited, and teas are not a miracle cure for all diseases. Only appropriate tea consumptions can benefit health.



1. Skin protection

Anti-oxidation is achieved by curbing the production of free radicals, removing free radicals or activating antioxidant enzymes in the human body. Teas contain compounds that have excellent anti-oxidant effects such as tea polyphenols, theanine, polysaccharides, aroma compounds, etc., and of which, tea polyphenols play a vital role.

Teas are able to suppress the formation of free radicals. Skin exposure to ultraviolet rays from the sun will produce profuse free radicals, causing skin to dim, loosen and darken. Tea polyphenols can absorb large quantities of ultraviolet rays (280-320nm in wavelength) to prevent free radicals producing and thus reduce skin



damage. Metal ions, as a free radical catalyst, may mediate the seneration of enormous amounts of free radicals. Scientists have proved that the excessive amounts of free radicals caused by excessive iron deposition in brain tissue may increase the risk of Alzheimer's disease. Tea polyphenols can lead to the chelation of metal ions, which would block metal ions' catalytic effects and decrease the generation of free radicals.

Tea can directly scavenge free radicals. Black tea and green tea extracts from hot brews are proved to be effective in scavenging superoxide anion free radicals, hydroxyl free radicals and nitric oxide free radicals. Similarly, tea polyphenols, can remove peroxy groups, superoxide anions and hydroxyl free radicals.

Teas can also activate the antioxidant enzymes in the body. Green tea extracts can drastically activate several hepatic antioxidases in a acute liver injury mouse model, resulting in reduced liver damage. Tea polyphenols can alleviate the Co-bo irradiation-induced decrease in serum antioxidant enzymes and the increase in peroxide levels in mice, resulting in reduced physical damage caused by radiation.

In addition to being an effective antioxidant itself, tea interacts with some other antioxidants and displays synergy. Elimination of hydroxyl free radicals, for instance, is significantly enhanced when tea polyphenols are combineds with carotenoids.

2. Lipid reduction and weight loss

Epidemiological surveys show that in urban areas, incidence of obesity is higher in seniors who do not have the habit of tea-drinking compared to seniors who have tea-drinking habits. Clinical reports also prove that overweight patients, by taking green tea extracts for 12 weeks, can on average, decrease their weight by 1.31 kg.

Teas help inhibit lipid absorption. Usually, lipids from foods are emulsified by bile salts and hydrolyzed by lipase before being absorbed. Chemical compounds in tea are able to bind bile salts to disrupt lipid absorption, increase excretion of lipids and bile salts in feces, drive the synthesis of new bile salts from cholesterol in the liver and increase consumption of cholesterol. This is why teas can help lower cholesterol.

Teas also have an inhibitory effect on lipase. Pancreatic lipase is the key enzyme



Chapter III The Universe in A Cup of Tea

in the absorption of lipids from foods, and its activity can be suppressed by different kinds of tea. Among them, oolong tea performs the best with a half-maximal inhibitory concentration of 0.97 μ g/mL.

Teas can affect adipocytes. White adipocytes in the human body are responsible for storing fat, and brown adipocytes consume the stored fat by producing calories. Tea extracts can suppress the proliferation of adipocytes and decrease the mass of white adipocytes in animals with high-fat diets. Tea extracts have the same effect on humans, stimulating brown adipocytes to consume more fat.

Teas can also regulate lipid metabolism. Liver is the key organ in lipid metabolism, and tea extracts can reduce lipid synthesis in the liver, raise the level of lipid oxidation and decomposition and facilitate the convertion of cholesterol into bile acids.

Another effect of teas is lowering blood glucose. Teas helps suppress the activity of amylase and α -glucosidase, slow down the decomposition and absorption of starch in food and reduce the increasing rate and level of postprandial blood glucose. In Nagao's research (2009), providing beverages rich in catechins to diabetic patients for

12 weeks restored the serum insulin levels in their blood vessels. In addition, teas can regulate the insulin signaling pathways, which is beneficial for improving insulin resistance. It can also help facilitate glucose uptake from blood, thus reducing blood glucose.



Tea polysaccharide Theaflavins (Photos by Jiang Heyuan)

3. Teeth and oral protection

There has been a long-standing belief that drinking and chewing teas is good for oral health. Nowadays, there are many tea-containing oral care products such as toothpaste, mouthwash and breath fresheners.

Teas have an anti-cavity effect. In 1982, Doctor Zhou Dacheng and his associates from Beijing Stomatological Hospital found that gargling green tea (0.4-0.6 mg/kg) every day for a year reduced the number of cavities among elementary school students



by 54.5%. Tea polyphenols and fluorine are important ingredients against cavities. Tea polyphenols can suppress the secretion of acidic compounds by cavity pathogens and relieve tooth enamel damage and inflammation. As tea plants are rich in fluorine, they have become a good source of fluorine for people living in low-fluoride areas. When applied on tooth enamel, fluorine can help harden the teeth to protect against acid erosion and repair damaged enamel. A survey of 3,264 residents in the City of Hangzhou, a typically low-fluoride area, demonstrated a sharp difference in the rate of cavities between people who regularly drink teas and people who rarely drink teas (65.1% vs 80.9%).

Teas can relieve periodontitis, which is the main cause of tooth loss among adults. Tea polyphenols and tea pigments are able to kill bacteria causing periodontitis and relieve gum inflammation. Clinical reports show that the intake of tea polyphenol tablets for two weeks (0.2g per dose, three times a day) could significantly reduce dental plaques and relieve gum bleeding and swelling among patients with chronic periodontitis. The effects are of no difference from using tinidazole.

Teas can freshen people's breath. Some oral bacteria can produce odorous volatile sulfides, which is the main cause of halitosis. All kinds of teas can help eliminate the bacteria responsible for bad breath. In addition, catechins can reduce the formation of odoriferous substances such as hydrogen sulfide.

4. Intestinal protection against bacteria

Zhang Zhongjing of the Eastern Han Dynasty (25-220 AD) stated in his classic *Treatise on Febrile and Other Diseases* that tea was a very effective drug for curing pus and blood in stool. Current studies have shown that tea can help regulate intestinal functions by activating intestinal bacteria.

Teas can inhabit a good variety of intestinal pathogenic bacteria. Different kinds of tea varieties have different extents of inhibitory effect on the growth of intestinal pathogens, including *Escherichia coli*, *Staphylococcus aureus*, *Salmonella*, etc. Tea polyphenol is considered the most effective bacteria killer. Moreover, teas are very effective in inactivating bacterial toxins. Enterotoxin B secreted by *Staphylococcus*



Chapter III The Universe in A Cup of Tea

aureus can induce acute gastroenteritis, and green tea extracts, particularly EGCG, can reduce the effects of enterotoxin B.

Teas are good for increasing probiotics in the intestinal tracts and raising the level of short-chain fatty acids in intestinal lumens. The short-chain fatty acids are acidic and can stimulate intestinal motility, promote bowel movements and diminish harmful metabolites such as methylindole. In a study conducted in Japan, healthy volunteers aged 22-48 took 1.2g of tea polyphenols per day for 28 days in a row, and the results showed an impressive decrease of harmful bacteria and an increase of beneficial bacteria in the volunteers' stool. In addition, their bowel movements became more regular.

Teas help maintain the balance of gut microbiota. Recently, scientists have found that tea can alleviate gut microbiota diseases caused by high-fat diet, antibiotics, acute colitis and aging. Teas can also enhance intestinal immunity and promote healthy intestines.

5. Benefits for mental health

Aside from being able to quench thirst, teas are wonderful beverage that can meet both physical and psychological needs.

Some of the chemical compounds found in teas can help people stay in a positive mood. Small doses of caffeine (50-200 mg) can make people feel happy and relaxed and increase memory performance. A number of experiments show that theanine helps subjects generate alpha brain waves, which is a sign of physical relaxation and calmness. Theanine has a rapid onset that usually starts to take effect in 30-45 minutes. Some of teas' aroma compounds have the effect of relaxing the mind, relieving anxiety, and promoting feelings of comfort.

Tea can also be a source of joy and enrich people's lives. Historically, teas have been considered to embody Chinese culture, spirituality and philosophy. Chinese tea culture embraces the concepts of "harmony" "quietness" "clarity" "beauty" and "truth", believing them to help relieve the tension from today's fast pace of life and work pressure. We may slow down our lives by making a nice cup of tea. We can



relish its color, aroma and taste and bask in the peacefulness from cleaning teawares, appreciating tea and boiling water. By doing so, we can experience the Daoism within teas, unifying our mind, body and spirit, remaining calm and content.

6. Quantity and appropriate consumption

Although teas are thought of healthy drink, improper intake of teas may cause discomfort and even damage people's health. It is important to drink teas at the right time and the right amount. Finding and consuming the right tea is also significant for bringing about teas' health benefits.

The amount of caffeine intake should be controlled. Caffeine can increase alertness and promote diuresis, but it may also cause insomnia and generate more urination at night. Therefore, it is not recommended to consume teas containing high amounts of caffeine at night. Excessive intake of caffeine (daily intake of more than 400mg or a single intake of more than 200mg) may cause symptoms like rapid heart rate and hand tremors. For people not used to drinking teas or coffee, they should drink light tea for the first time and should drink it in small amounts. People susceptible to effects of caffeine can have decaffeinated or low-caffeinated teas. Moreover, caffeine should not be consumed with certain drugs, so it is not recommended to consume medicine and tea simultaneously.

Consumption amount of tea polyphenols must be taken into consideration. Tea polyphenols easily bind with ferrous ions. Previously studies demonstrated that profuse intake of teas before and after meals may cause a decrease in iron absorption. Therefore, patients with iron deficiency, vegetarians or pregnant women should avoid excessive tea drinking before and after meals. Since tea polyphenols can deactivate several digestive enzymes and react with protein in food, they may affect the digestion and absorption of nutrients. Therefore, people with a high level of nutrient needs and those who are malnourished should not drink too much tea before and after meals. People should not drink teas before or after having foods rich in protein since teas may cause indigestion. In addition, tea polyphenols may be incompatible with certain drugs, so people should not drink or limit tea intake when on medication.





In China, tea drinking customs vary from place to place, each having unique local traditions. This is due to China's vast territory, changing geological conditions and different living environments and conditions, which give rise to diverse ethnic groups, traditions and beliefs. As time goes by, Chinese tea also pursues new trends as both a beverage and a dish.

Section 1 Tea Customs in China

Pure tea and blended tea are the two main ways of tea-drinking that are popular among all social classes. Tea customs across China have also become customized, localized, ritualistic and diversified.

I. Chaozhou Gongfu tea ceremony

As a city of historical and cultural importance, Chaozhou, located in the east of Guangdong Province, is a place blessed with a myriad of intangible cultural heritages. One of which is the local tea custom known as "Chaozhou Gongfu Tea", and its ceremony was listed second on the "national intangible cultural heritages" in 2008.

1. Origin

Chaozhou has a long tea history. Back in the Song Dynasty (960-1279 AD), tea from the local Fenghuang Mountain was considered a tribute for the emperor in "Annals of Chaozhou Prefecture". The unique geological conditions of the mountain produce quality Fenghuang Dancong, that is very popular among the locals because of its aroma and mellow, refreshing and sweet taste. According to legends, gongfu tea ceremony first appeared among the noble class in the Ming Dynasty (1368-1644 AD) and became a common practice by the middle of the Qing Dynasty (1636-1912 AD).



Yu Jiao, in his writings, said this ceremony was first seen in Lu Yu's *The Classic of Tea* and required exquisite and fine teawares: "The stove in the shape of truncated barrel was some 25 cm high and made of fine white clay... First, we should put some spring water in a kettle, heat it on fine charcoal till the water boils, and infuse the tea-filled teapot with the hot water. It is necessary to water the teapot with boiled water from top to bottom before pouring the brew and drinking." Over recent decades and as quality of live increases, Gongfu Tea ware has become a household furniture in the Chaoshan area, and the ceremony became an elaborate custom.

2. Tea and teawares

Tea: Fenghuang Dancong (oolong tea)

Teawares: The "four treasures" are must-haves for making Chaozhou gongfu tea: kettle, clay stove, teapot and tea cup. There should also be some other tea-making utensils and fire-making tools as well.



3. The ceremony

Teawares for Chaozhou Gongfu tea (Photo by Chaozhou Tianyu Gongfu Tea Culture Exchange Center)

A typical Chaozhou's

Gongfu Tea ceremony is elaborate and has many steps: kindling fire (with charcoal) on a clay stove, using kettle to boil water, adding tea to the teapot, adding boiled water to the teapot with the kettle held high, scratching foams with the teapot lid, watering teapot with boiled water, pouring tea, appreciating the tea aroma, drinking tea, inhaling the tea fragrance in the tea cup, etc.



Know Tea, Know Life



Boil water



Fill the pot with fine tea



Warm teapot



Infuse with hot water



Scratch foams



Lower the teapot for brewing Serve the guest with the tea Chaozhou's Gongfu tea ceremony (Photos by Chaozhou Tianyu Gongfu Tea Culture Exchange Center)



Warm cups





II. The long-spout-pot tea ceremony

Long-spout-pot is a tea-making instrument unique to China. Performances with a long-spout-pot are prevalent and popular in local Sichuan Province as a form of folk art and an intangible cultural heritage.

1. Origin

Long-spout-pots first appeared in the teahouses in Chengdu, along the banksides of Tuo River and Yangtze River during the late Tang Dynasty (618-907 AD) and the Five Dynasties (907-960 AD). Sichuan Province was, and still is, a huge tea producer. As the saying goes, "It is perfect to make tea picked at the top of Mt. Mengshan with the water transported from the Yangtze River." Teahouses were everywhere. The riverside teahouses, usually at the river ports, gathered travelers, boatmen and merchants in a rush, either departing or arriving. During summer and autumn, when tides rose, the teahouses became over-crowded. To keep business booming, the teahouse owners and attendants had to do their utmost to satisfy customers. Thus, the long-spout-pot was invented. Teahouses in Chengdu used copper teapots with spouts of 20-40 cm long, while teahouses along the Tuo River, Yangtze River and Jialing River preferred to use pots with even longer spouts. Today, for entertainment and

economic needs, the pot spout is mostly around a meter long. As more people start drinking tea, and as the local tea culture becomes more widespread, the long-spout teapot ceremony is both a form of art and convenient tea-brewing method.

2. Tea and teawares

Tea: Jasmine Tea Teawares: A long-spout copper



Long-spout-pot teawares (Photo by Zhang Jing)



pot is necessary, regardless of the variation of the Sichuan tea ceremony. Apart from the pot, a covered bowl, glass tea cups and other utensils are also part of the ceremony.

3. The ceremony

The long-spout-pot tea ceremony is diverse and has many variations. The following pictures show parts of the whole procedure of a ceremony named "A Good Tea to the World".



A top down brew



A sideways brew





A back bending brew A brew from the above head Long-spout-pot tea ceremony (Photos by Zhang Jing)

III. The "Qingdoucha" customs

Qingdoucha, also known as baked pea tea, sesame tea or seven-flavor tea, is a popular traditional tea custom in the Jiangnan area (the south of the lower reaches of Yangtze River). It can be either a beverage or a "dish".



1. Origin

"Qingdoucha" has a history of more than 200 years in the Wujiang and Nanxun regions. In many historical records, scholars praised this tea. There is a folklore about "Qingdoucha". Some 4,000 years ago, there was a state named Fangfeng, situated between the basins of Qiantang River and Taihu, located in today's Deqing, Changxing and Anji Counties in Huzhou. During the time when King Dayu was relieving the flood, a man named Fangfeng became the head of the state and a hero for controlling the flood around Zhejiang Province. To help him dispel dampness and cold, local villagers made a blended tea with orange peel, sesame and other ingredients and asked him to consume it with baked peas. Fangfeng, not a man of patience, poured all the peas into the tea and devoured the concoction. The blended tea made Fangfeng invulnerable to cold, and he fought even better against the flood. The practice of "mixing tea with snacks" soon became a custom that prevailed in Hangzhou, Jiaxing and Huzhou.

2. Teawares and ingredients

Tewares: As a popular drink in around Qiantang River and Taihu, "Qingdoucha" is usually brewed with common household utensils such as small porcelain bowls or glass cups.

Ingredients: "Qingdoucha" requires green tea and baked peas, coupled with fried sesame, sun-dried shredded carrots and orange peels. Perilla seeds, osmanthus, dried bamboo shoots, dried tofu, wolfberries, pickled ginger slices and salt can also be added to enrich the flavor.



Teawares and ingredients for "Qingdoucha"



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3. The ceremony

It is quite simple to make "Qingdoucha": first, fill a small bowl with green tea and ingredients; then, add hot water to 1/3 of its capacity; and finally, shake the bowl to steep the tea and ingredients. Add more hot water into the bowl until nearly full, and "Qingdoucha" is ready to serve.



Tea and ingredients for "Qingdoucha" ceremony



Add hot water



Shake and steep





Add more water to brew the tea Serve and taste the tea "Qingdoucha" ceremony (Photos by Li Yali)

IV. The "Three-course tea" custom

The "Three-course tea" is a custom of the Bai ethnic group used to greet honored guests. It is best known for its myriad of flavors: first bitter, then sweet and finally a



lingering mellow. There are three steps in the tea-serving ceremony. The first course tastes bitter and strong, symbolizing "no pain no gain". The second course is sweet, demonstrating that gain come after pain. The third course has a mellow but slightly spicy taste, representing the ups and downs people experience in life.

1. Origin

Tea production and drinking of the Bai ethnic group boasts a history of more than 1,500 years. Their ancestors preferred to drink teas with cooked pepper, ginger and cinnamon over a millennium ago, as recorded in the "Stories of Minorities" from the Tang Dynasty. The custom became widespread in the Song and Yuan Dynasties. By the Ming and Qing Dynasties, the Bai ethnic group developed the habit of drinking roasted tea with family, serving guests with sweet teas and holding the "Three-course tea" ceremony during grand occasions, like weddings. Today, the custom has become a welcome ceremony for honorable guests at wedding parties and other festivals.

2. Teawares and ingredients

(1) Teawares: Clay pot, tea bowls, stove, strainer, kettle, tea tray, etc.

(2) Ingredients: tea, goat cheese, walnut, sesame, brown sugar, pepper, ginger, cinnamon, honey, etc.



Teawares and ingredients for the "Three-course tea" ceremony (Photo by Li Yali)



3. The ceremony

The "Three-course tea", as the name implies, includes three tea courses. To make the first course, "bitter tea", the clay pot is heated before adding the tea into the pot. When the tea is fully roasted, steep the tea with a small amount of hot water. For the second course, fill the tea bowl with shredded goat cheese, walnut, sesame and brown sugar, and then add the brewed hot tea. To make the third course, boil pepper, ginger and cinnamon in a jar, pour the mixture into the teapot and fill it with brewed hot tea. The concoction can be supplemented with honey, and the blended tea is ready to be served.

Usually, there are six tea bowls on a tray. Six is an auspicious number and means to pray blessings for the guests. The filled tea bowl should be given to guests with both hands to show the host's respect. Local snacks are served to go with the "bitter course".



Ingredients for "Three-course tea" (Photo by Li Yali)

V. The Mongolian milk tea ceremony

Mongolians like to drink salted milk tea made from brick tea because of Inner Mongolia's four distinct seasons and scarce rainfall. The saying goes, "we can survive a day without food but not without tea", which shows the importance of milk tea in their daily lives.



1. Origin

Historically, Mongolians survived through nomadic farming, and their diet consisted mostly of meat and dairy products. Although high in nutrition, the proteinpacked meals were hard to digest. Tea helped boost their metabolism and digest food, thus preventing them from diseases. In the Yuan Dynasty (1271-1368 AD), tea from the Jiangnan area (the south of the lower reaches of Yangtze River) spreaded to the grasslands as a tribute, and it later became a popular drink among the Mongolians.

2. Teawares and ingredients

(1) Teawares: Copper pot, ladle, strainer, kettle, tea bowl, prep bowls, etc.

(2) Ingredients: Brick tea, fried rice, salt, milk, etc.

3. The ceremony

A strong fire is needed to make Mongolian milk tea. First, fill the pot with water and add shredded brick tea, fried rice and salt. Then, heat the mixture until it is boiling. Boiling time should be around 10 minutes. Next, stir mixture with the



Teawares and ingredients for the Mongolian milk tea ceremony (Photos by Wang Liying)

ladle, and when the color of the concoction turns dark, take the tea and fried rice out, and add some fresh milk. Stir until tea and milk are evenly mixed, and add fried rice, salt and butter. Stir again until the fragrant milk tea is ready.



VI. The "Leicha" custom

The Tujia ethnic group live in the mountainous areas of Jiangxi, Hunan, Sichuan and Guizhou Province. The Tujia's unique "Leicha" custom, which has been in existence for generations, is their way of showing hospitality.

"Leicha" is actually a boiled tea infusion made of fresh tea leaves, ginger and uncooked rice. Peanuts, soybeans, sesame, walnut, mung beans and other ingredients can also be added to enrich the flavor.

1. Origin

Legend has it that during the Eastern Han Dynasty (25-220 AD), a general named Ma Yuan passed by Wutou Village (today's Taoyuan, Hunan) with his army during their southern expedition. The soldiers fell ill one after another due to a rampant plague. The local people offered an ancestral recipe for a medicinal soup, and the soup magically cured the disease. The recovered soldiers were thus in high spirit and returned from battle victorious. To show his gratitude, General Ma ordered his men to build stone chambers as shelters for the locals, and in return, the villagers offered "Leicha" to the soldiers.

Today, "Leicha" is a very common custom in Hunan, Fujian and Taiwan Province. In cities like Anhua and Taojiang of Hunan Province, people drink "Leicha"

all year round, especially during occasions like weddings, funerals or visit from guests.

2. Teawares and ingredients

(1) Teawares: Pounding stick, grinding bowl, cauldron, wooden spoon, wooden basin, bowl, etc.

(2) Ingredients: Tea (fresh or dry as required), rice, sesame, ginger, peanuts, salt, etc.



Ingredients for "Leicha" (Photo by Zhu Haiyan)

100



3. The ceremony

To make "Leicha", first add all the prepared ingredients into the grinding bowl. Grind and pound the ingredients while adding water, until the ingredients become a paste. Then, fill the bowl with hot water and stir the paste with a pounding stick. Salt can be used to enrich the tea's flavor. The host will present a bowl full of the blended tea to guests with both hands as a sign of respect.



Teawares and ingredients for "Leicha" (Photo by Zhu Haiyan)



Grind and pound the ingredients (Photo by Zhu Haiyan)



Fill with stir and pound (Photo by Liu Junwei)



Serve the tea (Photo by Zhu Haiyan)

"Leicha" tea ceremony

VII. The "Dayoucha" custom

The Dong ethnic minorities live in Hunan, Guizhou Province and Guangxi Autonomous Region, where the climate is suitable for tea farming. Therefore, The tea is an integral part of the locals' daily diet. "Dayoucha" is an example of this. Tea, tea oil and glutinous rice are the three key ingredients. Other ingredients, like fried tofu, minced meat and ciba (deep fried mochi), can also be added since the locals' quality of life increased. "Youcha" can be both a beverage and a meal and is symbolic of their ethnicity and culture.



1. Origin

The Dong ethnic minorities used to live in mountains where the freezing weather and dangerous wildlife constantly endangered their lives. During a time when

medicine was in short supply, "youcha" was both food and medicine to dispel evil spirits and the cold. It became a traditional custom for the locals.

"Dayoucha" also is a form of socialization. It plays a vital role in building friendships between neighbors and even villages. The tea is a must-have during local festive events, like collective dating nights, family gatherings, completion of new residences and wedding parties. It is considered a token of friendship, harmony, respect for the elders and a shared life.

2. Teawares and ingredients

(1) Teawares: Iron pot (with handles and a spout), wooden spade, bamboo strainer, tea bowls, chopsticks and tea tray

Ingredients: tea, tea oil, fried rice, peanuts, green onions, ginger, garlic and salt

3. The ceremony

To make "youcha", first stir-fry the tea, shredded green onion and garlic. Then, grind and pound them in the pot with a wooden spade, add water and boil the mixture. When



Ingredients



Grind and pound the ingredients



Pour tea infusion into bowl "Dayoucha" ceromony (Photos by Li Yichen)

102



pouring, the brew should be filtered with a bamboo strainer. Fried tofu, peanuts, fried rice, shredded green onion and salt can be added, and "youcha" is ready to be served.

Section 2 New Trend in Tea Beverages

The different ways of consuming teas are constantly changing. In modern times, people pursue fads that are trendier, more convenient and healthier. In addition to the traditionally brewed teas, now we may find on the shelves more industrialized tea products, like canned, instant and a variety of blended teas. They have become increasingly popular among the younger generation.

I. Ready-to-drink canned tea

Canned (bottled) tea is made from blending tea extract, concentration or tea powder with fruit juice, dairy products, plant (grain) extract or other ingredients. Being all-natural, convenient and healthy, canned tea is favored by young consumers and is among the most popular soft drink beverages.

Tea beverages in China can be classified into several categories: tea beverages, flavored tea beverages and blended teas. Tea beverages can be further broken down into black tea, green tea, oolong tea, scented tea and others. Flavored tea drinks may include fruit juice tea, fruit-flavored tea, milk tea, milk-flavored tea, carbonated tea and others. For packaging, the common types include paper-plastic aseptic packaging, PET (polyester) plastic packaging, metal cans, etc. The most produced and sold is the PET plastic packaging, which mainly comes in volumes of 350 mL, 500 mL, 1,200 mL, 1,500 mL and others.



II. Instant tea

Instant tea is usually powder or granules made from either fresh or dried tea leaves. As an instant beverage, it is healthy, convenient and sanitary. Instant tea can be brewed with milk, sugar, spices or fruit juice to produce drinks of various flavors. It is a product that has secured its place in the global tea market.

Almost all tea kinds, like black tea, green tea, oolong tea, dark tea, scented tea and white tea, can be made into instant tea. There are original instant teas (no additives) and flavored instant teas that are further divided into hot water- and cold water-soluble instant teas based on solubility.

III. Order-to-go

Order-to-go tea is a ready-to-drink beverage made on the spot. It combines tea or tea products as the main ingredient together with additives like fresh milk or dairy products (evaporated milk, condensed milk, cheese), fruit or fruit juice, sugar, spices, grains, herbs, beans, alcohol or carbon dioxide.

Over the past few years, new tea beverages that are not bottled tea drinks have entered the Chinese tea market. They diverge from the traditional tea products and consumptions and cater to the young generation with all-natural ingredients, trendy packaging and other advantages like being order-to-go and ready-to-drink. The market is expanding rapidly. By 2020, the number of order-to-go tea shops in China has hit 500,000, raking in more than 100 billion yuan, consuming over 200,000 tons of tea annually. The new style of tea-drinking meets the younger generation's pursuit of individuality, "coolness" and social trends.

New styles of tea-drinking are mostly composed of new-style milk teas, fruit teas, blended teas, new pure teas and fine powder teas.

1. Milk tea

Milk tea uses highly-fermented black tea or oolong tea as the main ingredient, supplemented with milk or milk powder, tapioca, pudding, coconut, etc. There are

104



many milk tea varieties, such as Assam milk tea, Darjeeling milk tea, bubble tea, cake milk tea, charcoal milk tea, black sugar and matcha milk tea, black tea latte and layered latte. These drinks have strong tea aromas and enduring milk flavors. They taste refreshing and rich, eliminating both the astringency of tea and the greasy aftertaste of milk. Extra milk, cheese or



Milk cap

whipped cream can be made into foam and added to the top of the milk tea, and simple patterns can be drawn on the foam. This is called "milk cap".

2. Fruit tea

This order-to-go beverage is made from fragrant tea varieties with added fruits. Fruit teas have many varieties, including Four Seasons tea, fruit tea, passion fruit tea, pineapple tea, cherry tea, grape tea, lime tea and Emerald tea. Unlike the traditional scented tea (with dried flowers and fruits as main ingredients), fruit teas are filled with fresh fruits like watermelon, apple, pineapple, lemon, passion fruit, pineapple, pear, date, orange, banana, coconut, strawberry, bayberry etc. Fruit tea uses fragrant green tea, black tea, oolong tea or white tea. They also always come in nice packaging.

3. Blended tea

Using a combination of teas, flowers, fruits and vegetables as ingredients, blended tea is also an order-to-go beverage with additives like milk, cheese, cocoa, coffee and alcohol. Varieties of blended tea include osmanthus-oolong, rose-oolong, white-peach-oolong, Yulu Chahou, cherry-oolong, etc. Herbal blended teas include vegetable and fruit tea, herbal tea, mushroom tea, etc. Cocktail teas are a mixture of tea with alcohol, fruit juice and soda. All the blended teas are made by mixing high-quality tea with flowers, fruits, milk, cheese, cocoa and other ingredients to boost the



tea's aroma and richness. They are nicely packaged, refreshing and healthy.

4. Matcha/fine powdered tea

This type of beverage has matcha or fine powdered tea as the main ingredient. Extra additives like fresh milk, cheese, whipped cream, syrup, cocoa and ice can be added. The drink is stirred and whipped, sometimes adding cracked ice, and decorated to be aesthetically pleasing. Types of fine powdered tea include matcha latte, matcha frappuccino, matcha cocoa and matcha tea milk. In general, matcha drinks are green, mellow and fragrant.



Veggie tea



Matcha latte

Chapter V Ways to Cook, Brew and Store Chinese Teas



Xu Cishu, a tea connoisseur from the Ming Dynasty (1368-1644 AD), wrote in his book *Chashu* (tea dictionary), "Tea is nourished by water, which comes in a vessel, and turns into infusion by fire. The four are interdependent, and none is dispensable." A good cup of tea is inseparable from the perfect coordination between the said four elements.

Section 1 Tea Utensils

The history of human civilization shows that the invention of pottery was of universal significance, and porcelain is a great invention by the Chinese people. Since the Eastern Han Dynasty some 1,800 years ago (the first century AD), when celadon was firstly made in Zhejiang province in southeast China, porcelain-making rapidly expanded across the country, exerting a profound influence on the development of Chinese culture. The export of Chinese porcelain and the spread of porcelain-making techniques have also contributed substantially to the world's material civilization.

In China, the evolving ways of tea-drinking have become a driving force for changes in porcelain production and advancing technologies. There are many types of porcelain-making techniques used to make good quality teawares of different shapes and sizes. Earning wide praises, kilns have remained the mainstream methods of production of teawares.

I. The past and present of "china"

Porcelain is one of China's greatest inventions, and Jingdezhen, the origin of porcelain, is known as the world's porcelain capital. Legend has it that the town was firstly called "Changnan". The porcelain-ware made there was very popular overseas, and they were called "Changnan", which is similar in pronunciation to "china". As the


Chapter V Ways to Cook, Brew and Store Chinese Teas

reputation of porcelain reached other parts of the world, Europeans began to call the country "China", with a capital "C". Thus, the popularity of china made porcelain a symbol of China. Porcelain is a treasure to people all over the world and is inseparable with the name of the country. Hence, China is considered the country of porcelain, or "China".

Porcelain teawares that are heated at very high temperatures have smooth glaze, compact body and good heat conduction, bringing out better color and fragrance of tea. As the most widely used material for teawares, porcelain is good for brewing all tea varieties. Porcelain teawares can be roughly divided into four major categories: celadon, white glazed porcelain, black glazed porcelain and colored glazed porcelain.

1. Celadon: the mother porcelain

Celadon firstly appeared in the Eastern Han Dynasty (25-220 AD) and was honored as the "mother porcelain". People across times tend to use celadon teawares primarily for the beauty of the glaze. Celadon has a color of nature which is considered the color of the East, and it also has the color of precious jade, which represents the virtues of noble men. Celadon is valued for its exquisite texture, dignified shape and elegant ornamentation, which usually are carved lotus petals, ripples, peony twigs or double fish. Celadon also have intriguing glaze crackles that look like crab claws, ice cracks or fish eggs. Using celadon teawares can bring out the beautiful color of a brew. There are many types of celadon production methods in China, including Yue Kiln, Ou Kiln, Longquan Kiln and Ge Kiln from Zhejiang Province, Hongzhou Kiln from Jiangxi Province, Yuezhou Kiln from Hunan Province, Shouzhou Kiln from Anhui Province, Yaozhou Kiln from Shaanxi Province and Ru Kiln from Henan Province.

Of the different celadon production methods, Longquan Kiln from Lishui, Zhejiang Province and Ru Kiln from Pingdingshan, Henan Province are the few that are still used, and are the country's major celadon producers.



Know Tea, Know Life- (P1-162) -三改pr2-J.indd 110

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Celadon Teaware with Refined Glaze, Contemporary (by Li Lin)

2. Black glazed porcelain: a fashion in the Song Dynasty

Black glazed porcelain, known for its black-glazed surface created at high temperatures, emerged together with celadon. During the Eastern Han Dynasty, black glazed porcelain was also produced using Zhejiang's Shangyu Kiln, a production method famous for celadon production. Later the Deqing Kiln from the Eastern Jin Dynasty (317-420 AD) became more well-known. This type of porcelain is known for its grease-like thick glaze, black color and producing rich varieties of plates, cups and pots. Most of the kilns in southern China during the Tang Dynasty (618-907 AD) also made black glazed porcelain pieces. Black glazed porcelain was mass-produced mostly tea cups during the Song Dynasty (960-1279 AD). This was the result for the prevailing tea contest of the time. A brew was judged firstly by the color and uniformity of the infusion, with clarity as a key criteria. The brew was then by the possible appearance of a water mark at where the brew contacted the tea cup, with "the absence of water mark" as the best. Therefore, black glazed porcelain teawares dominated the domestic market throughout the dynasty. The main producing areas were southern China's Fujian Province (Jianyang Kiln) and Jian of Jiangxi Province (Jizhou Kiln). In the north, the black ceramic ware was also widely made in Henan



Chapter V Ways to Cook, Brew and Store Chinese Teas

Province, Hebei Province, Shanxi Province and Shaanxi Province. Following the changes in tea-drinking habits during the Yuan (1271-1368 AD) and Ming (1368-1644 AD) Dynasties, black-glazed teawares made from Jian Kiln became out of fashion. However, they are still used in Japan.

Today, there are as many as five to six thousand black glazed porcelain workshops around Jianyang. Even with ever improving technologies, the products made are largely teawares.



Teacup in Oil Spot Design, Contemporary (by Li Da)

Rim-grooved Teacup with Mottles, Contemporary (by Wu Lizhu)

Teacup from Jizhou kyln, Contemporary (by Kongshan Chajue)

3. White glazed porcelain: the basic teawares

White glazed porcelain firstly appeared in the late Northern Dynasty (the Northern Qi Dynasty, 550-577 AD). By the Sui (581-618 AD) and Tang Dynasties, the production techniques became fairly mature. White glazed porcelain has remained popular throughout the following dynasties, and a number of outstanding porcelain creations were made. During the Tang Dynasty, white glazed porcelain made from Xing Kiln in Hebei became a popular selection among people of different social classes. White glazed porcelain produced in Henan, Shaanxi and other northern provinces was popular in northern China, while celadon was the trend in the south. In the Song Dynasty, Ding Kiln suddenly rose to rank among the top five production methods. By the Yuan Dynasty, Shufu Kiln from Jingdezhen gained great fame for its "egg white glaze", which was opaque and white like the color of goose eggs. The white glazed porcelain was produced throughout the Ming Dynasty under the reigns of different emperors. The "sweet white" of the Yongle era became representative of



the Ming Dynasty. Ceramic pieces of this kind were often thin enough to let light through, and their mellow glaze was beautiful. In the Qing Dynasty, the most famous products were made from Fujian's Dehua Kiln.

White glazed porcelain teawares include wide varieties of bowls, zhan (small cups), cups and pots. Made in intense heat, they are known for the compactness of the body, zero water absorption and chime-like acoustic properties. The smooth white glaze can reflect the enchanting color of a brew. Coupled with good heat transmission and preservation capacity, white ceramics grew to be the most common type of teawares. Such products are being made in many areas, yet those made from Ding Kiln in Hebei Province, Jingdezhen Kiln in Jiangxi Province and Dehua Kiln in Fujian Province are considered the best.



Dehua's white porcelain tea set (Photo by Deng Heying)



Chapter V Ways to Cook, Brew and Store Chinese Teas

4. Colored glazed porcelain: teawares in a riot of colors

Colored glazed porcelain is porcelain with colorful decorations. Great in variety in the history of Chinese porcelain, colored glazed porcelain can be divided by processing techniques into two major categories: under-glaze and over-glaze. The former has the color patterns under the glaze. Typical under-glazed porcelain includes the high-temperature celadon wares dating back to the Period of Three Kingdoms (220-280 AD) and the Northern and Southern Dynasties (420-589 AD); the brown under-glaze wares made from Changsha Kiln and Yue Kiln during the Tang Dynasty; pottery made from Cizhou Kiln during the Song Dynasty; and the "Qinghua" and "Red-in-Glaze" from the Yuan, Ming and Qing Dynasties. Over-glaze features color decorations are on top of the glaze, best represented by the porcelain from the Six Dynasties (222-589 AD); wares made from Cizhou Kiln during the Song and Jin Dynasties; the "iron-rust flowers" of Black Glaze from Henan Province; the "Red-

and-Greens" and "Multi-colors" from the Jin Dynasty (1115-1234 AD); the gold floral pieces made from Jizhou Kiln; the 5-colored, enameled, rose-colored and ink-colored glazed porcelain produced in Jingdezhen during the Yuan, Ming and Qing Dynasties; and the light-reddishpurple and other types of over-glazes from the ROC period. In addition, there are porcelains featuring an integration of under-glazed "Qinghua" and overglazed colors. Examples of these porcelains are the chicken cup popular during the Chenghua era and the rose-colored pieces during Emperor Yongzheng's reign.

Colored glazed porcelain teawares, a



Tea set from Jingdezhen (Photos by Deng Heying)



major category of teawares since the Ming and Qing Dynasties, include covered bowls, teacups, tea bowls, teapots, etc. The elegant designs, exquisite glaze, floral patterns and calligraphic poetry make them a great treasure for tea connoisseurs.

II. Evolution from ancient pottery to purple clay pottery

During the Ming and Qing Dynasties, when the loose-tea-brewing method firstly appeared, teawares underwent changes, and teapots made solely for brewing tea became popular. Since the mid-Ming Dynasty, purple clay teawares was extoled by the intellectuals and made a rise in popularity. Dingshu in Yixing, Jiangsu Province, is a town south of the Yangtze River. It is famous for its reserve of high quality purple clay, and it has grown into a major production center of pottery teawares.

Pottery teawares are made of clay and formed at lower temperature than porcelain. Pottery teawares have thick and porous body and high heat capacity, which make them good for thermal preservation. Pottery teawares are usually unrefined in shape, dark in color, and slightly rough on the surface. Compared to porcelains, pottery teawares can better bring out the charms of tea. It is particularly good for brewing oolong tea, dark tea and aged white tea. It can also be used to boil tea and water.

Yixing purple clay teapots are different from common pottery. Firstly, the special clay comprises kaolin, quartz and mica. The clay has high iron content and a rich variety of other minerals. Secondly, the teapots are made at the temperature between 1100-1200°C, higher than that to make ordinary pottery. The pot body composed of quartz, hematite, mica and other minerals undergo drastic changes at extremely high temperatures through decomposition, melting and contraction, producing a large number of aggregates and a small number of pores. Scientists found purple clay teapot's porosity is between that of pottery and porcelain, with a rate of water absorption less than 2%. These outstanding physical properties are unique to purple clay. YiXing purple clay teapots have high permeability and strong heat resistance and insulation, which help prevent the pots from cracking even when experiencing



Chapter V Ways to Cook, Brew and Store Chinese Teas

extreme temperatures.

Other than Yixing's purple clay, Jianshui of Yunnan's purple clay, Qinzhou of Guangxi's clay and Chongqing's Rongchang clay all boast a history of producing pottery teawares that have distinct local characteristics. In the 1950s, pottery sets from the aforementioned four regions were officially named as China's "top four" in the pottery market.

III. A great tea needs quality teawares

A workman must first sharpen his tools if he is to do his work well. Likewise, making good tea infusion requires not only proper skills but also good teawares.



Yixing's purple-clay teapot



Jianshui's purple-clay teapot (Photo by Xiang Jinxing)

Safety must be the first thing to consider when choosing teawares. Teawares should be free of odor, eco-friendly and free of any harmful substances. Fine china should be smooth and clean on the surface and flawless under light. For colored glazed porcelain, it is important to identify its coloring technique as over-glaze or under-glaze. Since teas are brewed with boiling water, teawares should be able to withstand high temperatures without releasing any harmful substances. It is generally not recommended to use teawares that uses over-glaze on the inside.

Then, the shape should be considered. Teawares come in a variety of shapes, and the shape embodies the creator's artistic intent. We can choose a favorite shape based on our aesthetic preferences and comfort in handling the teawares. Women who have small hands tend to prefer small teawares, while men tend to choose larger teawares. Oversized teawares may affect the tea's taste. Take teapots as an example. For two people, a teapot with 80-100 mL capacity is appropriate, while a teapot with 150-200 mL volume should be used when serving four or five people. If we do not feel



comfortable using a particular teaware, we may accidentally burn our hands or break the teaware.

Details also matter. Taking a teapot as an example, there should be a good ratio between its volume and weight. The handle should be easy to grab and lift. The lid should fit perfectly. The spout should produce a steady and smooth flow. These are the basic requirements for a good teapot. To evaluate a teapot, fill it to about 3/4 of its full capacity, lift the pot and slowly pour the water out. If the pot is easy to use, it means that its well-made. We can also place our index finger tightly over the tiny hole on the lid and tilt the pot forward. If no water comes out from the sprout, it means the lid fits the body well.

Overall, function should outweigh aesthetics in teawares selection. Teawares should be taken good care of for it can last longer.

Section 2 Water for Teas

Good tea must go with good water. Both historical records and modern research support the importance of water when brewing tea. Therefore, some basic knowledge of water can help make better tea.

I. How that water is valued in history

"Water is the mother of tea." Since ancient times, people have known quite well the importance of water for brewing tea. The old saying "tea from Longjing must go with the spring water from Hupao" shows how people have long established a relationship between water and tea.

People from the past were particular about the water used for teas and studied it as a form of science. Some even wrote books on this topic. Xu Ciqian of the Ming



Chapter V Ways to Cook, Brew and Store Chinese Teas

Dynasty stated in his *Tea Comments* that "the fine fragrance of tea had to be released via water, and without the latter, any good tea was out of the question." Zhang Dafu claimed in his *Essays from Plum Blossom Cottage* that the essence of tea stemmed from water, and water contributed 20% of the fine quality of tea. It is clear that people from the past believed that the quality of water directly affects teas in color, aroma and taste.

They also proposed standards for water selection. Lu Yu ranked in his *The Classics of Tea* an order of high to low quality choices: mountain spring is best, followed by river water, with well water to be the least desirable. Zhao Ji, Emperor Huizong of the Song Dynasty, in his book *Grand Sights of Tea*, summarized the criteria for ideal water into five words: "clear" "live" "light" "sweet" and "cool".

II. Proper selection of water for teas

1. Indicators and requirements

Modern scientists indicate that the purity of water, whose composition and ionic contents have significant impact on the quality of tea infusion. First of all, the water for brewing tea should meet the necessary safety and hygiene requirements, as well as the sensory properties such as "colorless, tasteless and odorless". In China, water for tea should comply with the Sanitary Standard for Drinking Water (GB 5749-2018): clear, colorless, odorless and free from any visible dregs. Good water for tea should be drinkable and low in minerals, hardness and alkalinity. To brew premium green teas, the water must contain a total of inorganic ions less than 100 mg/L, Ca²⁺+Mg²⁺ less than 15 mg/L and a pH value lower than 6.5-7.0. With these standards in mind, water should be picked from high-quality sources. Flowing water from natural sources that are rich in oxygen is the best.

2. Water fit or unfit for tea

People today mainly drink tap water treated by urban pipe networks or bottled



water such as pure water, mineral water, natural spring water, natural drinking water, etc. Few people consume water directly from clean natural sources.

(1) Water fit for tea

Pure water, natural spring water, natural drinking water, and water with low mineralization for clean sources are ideal for teas because they are clean and relatively low in metal ions, which will have little negative impact on the tea flavor.



Pure water

Natural (spring) water N (Photos by Yin Junfeng)

Natural mineral water

Tap water

a. Pure water: Mostly free of all other substances, pure water is typically colorless, tasteless and odorless. It usually has a pleasant texture. Pure water from a good source tastes slightly sweet and can better reflect the original taste of teas.

b. Natural spring water and natural drinking water: Most of these types of water is of good quality. Low in minerals, hardness and alkalinity. With the appropriate ionic composition, they are often good choices for brewing teas.

c. Clean source water: Water quality may vary greatly due to geographical differences. Usually, water from clean sources in high mountains or deep wells has low mineralization and proper ionic composition, which is good for teas.

(2) Water unfit for tea

Natural water with high mineral content, tap water tasting salty or like disinfectants, highly mineralized water and water from unclean sources are unfit for teas.

3. Personalized selection of water

Tea quality and personal needs should be considered when selecting water.



Chapter V Ways to Cook, Brew and Store Chinese Teas

(1) Matching water to tea

Chinese teas are known for their rich variety, and each tea has distinct physical qualities, flavor and style. Therefore, the water used for brewing should meet the quality requirements of different teas in order to maximize the teas' desirable tastes. For instance, green tea has a fresh, tender fragrance and refreshing taste. It is therefore appropriate to choose pure water or natural (spring) water with a low mineralized content (total dissolved solids less than 30 mg/L). Oolong tea is characterized by floral fragrances and mellow tastes, while Gongfu black tea has sweet, floral aromas and strong mellow tastes. For these, natural (spring) water with medium and low mineralization (with total dissolved solids less than 70 mg/L) is suitable. Since dark tea features lasting aromas and milder mellow tastes, it is recommended to use natural (spring) water with medium and low mineralization (total dissolved solids less than 200mg/L) to heighten the mellowness of the tea.

(2) Matching water to personal needs

As a beverage, teas are subject to people's preferences. For instance, people who like the original flavor of teas may choose pure or distilled water, but those who prefer strong aromas and mellowness may select low mineralized natural water or natural spring water.

The quality of bottled drinking water is generally stable and safe and is becoming a daily necessity. We may select water to match the certain tea and our preferences (see the table below). Generally, high quality pure or distilled water is the top choice. Those with a picky tongue may select water to match tea kinds and personal needs. For them, water that meets the "three lows" (low degree of mineralization, hardness and alkalinity) is usually preferred. Both medium and highly mineralized natural spring water and mineral water have a substantial impact on the taste of teas. Thus, they are suitable for mellow teas like Pu'er and dark tea. For any tea, highly mineralized natural spring and mineral water are not recommended.



Suitability of selecting bottled drinking water categories

Water type	Characteristics	Target population	Target tea categories
Pure water and distilled water	Reflect the original tea flavor	People are ready to taste the original flavor	All categories
Low mineralized natural spring water (total ion content < 100 mg/L)	Properly expand or modify brew flavor (with different effects owing to water quality)	People with higher requirements for the flavor (careful selection of water is required)	Basically all categories
Highly mineralized natural spring water or natural mineral water (total ion content ≥200mg/L)	Substantially modify the flavor of a brew	People with a sensitive tongue for tea stimulation (or temporarily unable to access a better water source)	Highly mellow teas like Pu'er and dark tea

Section 3 Ways to Have A Nice Brew

Lu You, a great poet of the Tang Dynasty (618-907 AD), stated in his verse the delight he took in preparing good tea: "I saw with good grace my tea a treasure and felt so pleased to serve you a cup of tea." Common tea-making practices, like jiancha, zhucha, diancha and cuopao, were popular in history and still prevail today. In short, making a nice cup of tea is like having a conversation with our ancestors.

I. Zhucha

Zhucha in Chinese literally means cooking tea with boiling water, a practice first adopted before the Qin Dynasty (221-207 BC) and perfected in the Tang Dynasty. Lu Yu, in his masterpiece *The Classic of Tea*, described the method, "As the water starts to boil for the first time, add some salt depending on the volume of water in the pot... As the water becomes boiling for the second time, take a spoonful of water out, stir



Chapter V Ways to Cook, Brew and Store Chinese Teas

the water with a bamboo instrument, and fill the swirling center with measured tea powder... Later when the water is boiling, add back the spoonful of water, which is to maintain the essence of the tea infusion before it becomes subsided." Our ancestors were very particular about each step of tea-cooking, transforming it to a form of art comprised of tea, water and teawares. This practice was too complicated and eventually was lost, but it paved the way for modern tea-cooking methods fit for today's fast pace of life.

People prefer cooking white or dark teas that have been stored naturally for many years because they can produce mellower tea infusion with impressively enduring fragrances. Tea-cooking is not complicated. The key is to choose the right teapot and water and to have the proper amount of tea and the right length of cooking time.

Let's take old Shoumei as an example. For safety considerations, it is suggested to use a heat-withstanding ceramic pot, glass pot, quality silver pot or stainless-steel pot. How much tea should be added depends on the number of people to be served, and there is a rule of thumb to add 1 gram per person. For each brew, add around 200 mL of low-mineral spring water. First, boil the water, add the tea and boil with tea for another few (usually 3-4) minutes. Keeping the tea on mild fire is not advised. It may take just 5 minutes to cook the second brew. The chemical compounds in tea at this phase are almost all released, and the tea will have a good texture.



Tea banquet





Tea cooking



Chapter V Ways to Cook, Brew and Store Chinese Teas

II. Diancha

"Diancha", or tea-dripping, first started in the Five Dynasties (907-979 AD) and was the way people consumed tea in the Song Dynasty (960-1279 AD). It was because the tea infusion was dripped ("dian" in Chinese) from a bottle that the name was thus given. In his *Records of Tea*, scholar Cai Xiang noted all the steps required in "diancha": warming, grinding, powder-sifting, water-preparing, teacup-heating and dripping. "Diancha" also requires teawares of various shapes and sizes, each for a specific use. For each brew, adding the right amount of tea is important. The practice involves repeatedly grinding tea into powder, adding small amounts of water to the grinded tea, and stirring the "soup" with a bamboo whisk until the tea becomes pastelike with a layer of foam on top. Emperor Huizong loved hosting and attending "tea contests", and he described in his book On Teas the instruments, water and steps of "diancha". He also imposed criteria for the color of teacups (dark is preferred), texture of whisk (aged bamboo is recommended), quality of water (should be clean and sweet), and the boiling time length (should produce foams like fish or crab eyes). If boiled for too long, "all you need to do is add some fresh water". In the emperor's eyes, it was important to make quality "tea paste" and to add hot water seven times. One must stir quickly with a heavy whisk, and by the seventh brew, "the tea foam should look thick enough to stick to the inside of the cup". This is the way a superior grade tea should be like.

While the water's temperature, amount of tea, method of adding water and number of infusions are important, the technique of manipulating the whisk outweighs

all other factors in "diancha". The tea powder can also be divided into six categories based on the raw materials used, and of which, green tea is used most. The amount of tea added usually depends on the number of people. The ideal amount is 0.5 grams per person. The teacup, filled with tea powder, should be filled with



A pattern on the tea foam





Utensils for "dian-cha"



Chapter V Ways to Cook, Brew and Store Chinese Teas

approximately 85°C hot water. Then, the mixture should be whisked in an up-anddown movement, slowly at first, and increase speed. The tea powder, air and water should be fully blended. Repeating these steps will provide a thicker and finer layer of tea foam. It is the foam floating on the surface that is shared and consumed. The tea infusion can be infused with more water and whisked until the tea is completely drained.

"Diancha" can be even more fun and interesting when characters and patterns, like animals and flowers, are drawn on the foam. This tea-drinking method becomes more appealing when people await the wonderful tea and appreciate the drawings on the foam.

III. Cuopao

This method is for loose leaf tea. "Zhucha" and "diancha" were the prevalent teamaking methods in the Tang Dynasty and Song Dynasty respectively, because tea was pressed into cakes during the two dynasties. Emperor Zhu Yuanzhang, founder of the Ming Dynasty (1368-1644 AD), gave an imperial decree in 1398 to ban cake teas and popularized loose leaf tea. This drastic change, together with the change of processing technique from steaming to stirred fixation, was a reform in the history of tea production. "Cuopao" refers to the method of filling a teacup or teapot with loose leaf tea, brewing them with boiled water and separating the infusion from the leaves. Our ancestors also invented different ways of brewing tea ("shangtou" "zhongtou" and "xiatou") according to the seasons. As Selected Works on Tea explains, "it is significant to remember the order between tea and hot water... Placing tea before pouring water is called 'xiatou'; adding tea to a half-full (of water) pot before filling it to the top is called 'zhongtou'; and filling the pot with hot water before tea is called 'shangtou'. Of the three, 'zhongtou' is for spring and autumn, 'shangtou' is for summer and 'xiatou' is for winter". Today, these methods are the mainstream, and people use covered bowls, teapots or glass cups to brew tea. Instead of tea foam, "cuopao" places focus on the separation of tea infusion and tea leaves, holding tea's color, flavor and shape to high standards. Rather than enriching flavor with salt or other



ingredients, "cuopao" emphasizes tea's original taste and aroma, thus reforming tea consumptions in the history of Chinese teas.

To make a good cup of tea, we need to first analyze what contributes to a good brew. The materials and technical, operational, and behavioral aspects of the production process are factors that affect the quality of a brew. Material factors are the basis for and the key to a good brew. The quality of the tea leaves, water, teawares (including its shape) and heat source have a decisive impact on the quality of tea. Technical parameters include water temperature, tea-to-water ratio and steeping time. These parameters, as well as their accuracy and control, help bring out the inherent quality of the tea. The operating factors are water infusion, draining, infusion separation and foam scraping. These factors should not be neglected. The behavioral factor refers to dedicating the brewer's full attention to tea-brewing. Operational and behavioral factors

are important but not essential. What really makes a difference in the quality of a brew is the material and technical parameters.

One of the most basic principles of tea-brewing is to evaluate the dry tea leaves prior to brewing. By making a preliminary judgment, we will have a general idea of the quality and characteristics of the tea. These are the questions you need to ask: How strong and enduring will its aroma be? How will it taste? Will it be fresh or stale? What will the infusion be like? How bright and clear will it be? Will there be any deficiencies in its quality? Afterwards, it is important to make a



Steeping of green tea



Chapter V Ways to Cook, Brew and Store Chinese Teas

further analysis of the tea's form, shape, production process, tea plant species, storage time and other factors. Form includes shape, ripeness, compactness and wholeness of the leaves, etc. In terms of the production process, we need to evaluate the extent of fixation, rolling and baking, etc. In terms of species, we need to know if the tea plant (in which the tea is harvested from) is the broad-leaf, the medium/small-leaf or any other specific species. An in-depth understanding of the relevant characteristics of tea is fundamental to making a good brew.

Brewing is fundamental to making good tea. The amount of added tea leaves determines the tea to water ratio. More leaves produce a stronger brew, and less leaves produce a lighter brew. The amount of tea depends on factors like the concentration of chemical compounds in the tea leaves, number of people being served, number of brews and steeping time. For tea kinds with low chemical compound concentrations, more tea is needed to make up for the shortcoming. More tea is needed when there are more people or more brews. Otherwise, there is no need to add large amounts of tea. For example, tea arts training courses generally require a light infusion. For daily consumption, more tea will be added for people who prefer stronger tea. In short, when determining the amount of tea, we should keep in mind the occasion and people's preferences.

How hot should the water be? This has much to do with the speed of infusion of the contents of tea. Researches show that the different chemical compounds in tea leaves require different water temperatures for steeping. With high water temperatures, compounds like tea polyphenols and caffeine are quickly extracted, and the tea infusion will have a bitter taste. With lower temperatures, the steeping is slower, and the bitterness is less noticeable. Amino acids can be extracted at low water temperatures. Its extraction increases along with steeping time, and the infusion will taste better. To enjoy the enchanting delicacy of green tea, you can use low or medium temperature water. When a balance is attained between the bitter tea polyphenols and caffeine and the delicious amino acids, you will have a brew that is perfect in both thickness and concentration. Water temperature is also related to the release of aromatic compounds.



This process tends to speed up in hot water, which is obvious by the stronger aroma the tea inevitably gives off.

Another factor to be considered is the brewing time, which is the length of time the tea is steeped for. The steeping time must be adequate. If it is too short, the resulting brew will be lacking in both taste and aroma. If it is too long, the tea will be too concentrated and dark in color and less fragrant because it is weakened by accelerated release of aromatic compounds. As soon as the tea is steeped, the watersoluble compounds are extracted, and the more compounds the longer the steeping time. As a result, the taste of tea gradually thickens with longer a brewing time and eventually reaches a balance point. The specific time of the balance point is determined by factors including the properties of the tea, the amount of tea added, water temperature, etc.

Based on the aforementioned tea-brewing principles, tea-brewing is made simple if two of the three technical parameters (i.e., tea-water ratio and water temperature) is fixed. Then, we only need to adjust the steeping time to achieve the appropriate thickness of each brew according to the preferences of the tea drinkers.

On this subject, a series of tests have been conducted by Zhou Zhixiu's National Tea Master Studio on each of the six major tea categories: Baimudan, Mogan Huangya, Longjing, Gongfu black tea, Fenghuang Dancong and Liubao. The following table shows their brewing parameters.

Name	Baimudan	Mogan Huangya	Longjing	Gongfu black tea	Fenghuang Dancong	Liubao
Category	White	Yellow	Green	Black	Oolong	Dark
Parameters	5g 90°C 100 mL	3g 80°C 100 mL	3g 63°C 100 mL	4g 80°C 100 mL	5g 75℃ 100 mL	5g 90°C 100 mL
First infusion	1′	1′20″	1′20″	45″	1'10"	40″

Brewing parameters by Zhou Zhixiu's Studio



Chapter V Ways to Cook, Brew and Store Chinese Teas

						continued
Name	Baimudan	Mogan Huangya	Longjing	Gongfu black tea	Fenghuang Dancong	Liubao
Second infusion	30″	50″	1'	25″	55″	30″
Third infusion	40″	1'	1′35″	40″	1'	30″
Fourth infusion	1′10″	1′40″	2'	1'40"	1′20″	40″
Fifth infusion	1′30″	2′20″	2'40"	2'30"	1′40″	1′05″

1. Brewing of green tea

On a day-to-day basis, green tea can be made in three types of teawares: tea cup, teapot or covered bowl. Materials of teawares include glass, pottery and porcelain.



Green tea ceremony



Brewing in a tea cup is the most common method, and there is no separation of tea and tea leaves. All we need to do is follow these simple steps: first, warm the cup with boiled water, and add the desired amount of tea. Please remember to control the tea-to-water ratio at 1: (50-80). Then, pour a small amount of boiled water to moisten all the tea leaves. Gently swirl the cup with both hands, and appreciate the fragrance as the tea leaves uncurl. After that, pour more hot water (85°C) onto the soaked leaves until the cup is 70% full. Finally, wait for the brew to cool to enjoy. When one third

For brewing in a teapot or covered bowl, the tea-to-water ratio should be 1: (30-40), and the water should be at least 63°C. First, warm the teapot/covered bowl. Then, add the tea leaves, and moisten them with a small amount of boiled water. For the first brew, the steeping normally takes 1-1.5 minutes. We may pour the brew into a large serving cup first before distributing to individual tea cups for people to enjoy. The second brew takes less time, but the third brew needs more time. Green tea is usually good for three brews.

of the tea infusion remains, we may make the second brew. A total of three brews can

2. Brewing of black tea

be made.

Since black tea infusion is red and brilliant, it is better to select teawares that are white on the inside to offset the color of the brew. In *The Classic of Tea*, Lu Yu made a comparison between the porcelain teawares produced from two different methods, the Xing Kiln and the Yue Kiln. Lu Yu, the "Chinese Saint of Tea", observed that the former had a silvery and snowy color, while the latter had a jade-like and icy color. He concluded that color-wise, the former was inferior to the latter for brewing tea, especially since Xing Kiln porcelain's white color brought out the red of the tea infusion, while the green color of Yue Kiln porcelain gave the tea infusion a tint of green. However, his comparison was based on the steamed green tea cakes popular in his days. With black tea, Xing Kiln porcelain offsets the tea's red color and makes the brew more appealing, while Yue Kiln products lacks such quality. As such, a cup with



white inner walls or a small transparent glass is recommended for black tea steeping. Other colors cannot fully bring out the redness of black tea.



Black tea ceremony (Photo by Meng Lei)

Control of amount of tea, brewing time and water temperature is the key to the success of a brew. The black tea is made from either the broad-leaf or the medium/ small-leaf tea plant species. The former species, like Dianhong, contains rich concentrations of chemical compounds, so not much tea is needed, and the brewing time is shorter. The small-leafed species, like Qimen black tea, is tenderer and more tightly curled, so it requires more tea leaves and a longer steeping time. The tea-towater ratio is 1:40, and brewing time is 45 seconds, using water around 80°C. The second brew should be steeped for 25 seconds. The third should be extended to 40 seconds, and the fourth and fifth should be even longer. In terms of the brewing process, Dianhong requires a cup warming process before brewing, which is why steeping time is shorter. When brewing Qihong, cup warming is completed after brewing, so the brewing time is longer.

If the black tea has a sour taste (result of excessive fermentation) or a grassy odor



(result of insufficient fermentation), avoid using overly hot water. When brewing, leave the lid slightly open, and decrease brewing time.

3. Brewing of oolong tea

Oolong tea is usually steeped with boiling water, adding a large amount of tea. Brewing time is short, and the suitable tea-to-water ratio is 1: (20-30).

Given that oolong tea (except Oriental Beauty oolong) is not harvested until the leaves ripen, the fresh leaves are not as slender or tender. A larger amount of tea leaves is required and needs to be steeped with boiling water, especially for the first brew. Oriental Beauty oolong is made from tenderer leaves and buds, so it requires 80-85°C water. Since brewing oolong tea requires large amounts of tea and boiling water, the first brew takes 15-45 seconds (depending on tea category). By the second brew, the leaves are thoroughly soaked, so the brewing time is shorter. The third brew



Tea set for oolong tea



Chapter V Ways to Cook, Brew and Store Chinese Teas

can have a longer time, around five or 10 seconds longer. Generally, tightly-curled teas need longer brewing times, and loose leaf teas need less. The goal is to make each brew have even concentration and consistency. Oolong tea retains its fragrance and flavor even after seven brews. You can estimate the number of brews the tea can produce by looking at the state of the infused leaves.



Oolong tea ceremony

Fenghuang Dancong can be brewed with boiling water. However, when brewed with 75°C water, the ester catechin extraction is less, and the infusion tends to be mellower with stronger aroma, which suits the preferences of most people. This type of tea requires a longer brewing time. The first brew should be 1 minute and 10 seconds; the second is shortened to 55 seconds; and extend the third brew to 1 minute. Brewing times are longer for the fourth and fifth brew.

4. Brewing of white tea

White tea can be brewed in a cup, covered bowl or teapot or cooked depending on the number of people being served.

Cup brewing is suitable for one person to drink alone. We may choose a 200 mL porcelain cup or glass, take 3-5 grams of tea, and brew with boiled water (around 90°C). First, moisten the tea to release the aroma, and then steep the tea with boiled water. Brewing time is up to personal preferences.

When brewing in a covered bowl or teapot, add 5 grams of Baimudan, and rinse the tea leaves with hot water (90°C) to release the fragrance. Then, like the brewing of Gongfu tea, set the time for the first brew at 1 minute. The second brew should be



Know Tea, Know Life

steeped for 30 seconds, and extend the third brew to 40 seconds. Steeping time for the fourth is 1 minute and 10 seconds, and for the fifth is 1 minute and 30 seconds.

White tea can be cooked. Heat 800 mL of water until it boils, and put in 10 grams of eight-year-old Shoumei tea. For the first brew, steep for 2 minutes, and then drain the infusion to separate the tea from the leaves. For the second brew, steep for 5 minutes, and then drain the infusion, and discard the leaves. If we want more tea, we have to put in new leaves and cook them.

5. Brewing of dark tea

To brew dark tea in a covered bowl or clay teapot, we need 5 grams of tea and 100 mL water at about 90°C. Warm the teawares first, and then put in the tea. For the first brew, wait for 40 seconds before pouring the tea infusion into a serving cup to distribute to individual teacups. The second brew takes 30 seconds, the third 35 seconds, the fourth 40 seconds and the fifth 1 minute and 35 seconds. Dark tea can be steeped repeatedly. We can have six or seven brews with each brewing time longer than the last.

6. Brewing of yellow tea

We should use a covered bowl to steep yellow tea. Take 3 grams



Steeping



Serving Dark tea ceremony (Photos by Aisin-Gioro Yuye)



Chapter V Ways to Cook, Brew and Store Chinese Teas

of yellow tea, and boil 100 mL of water to 80°C. Warm the covered bowl first, and then put in the dry leaves. Pour in a small amount of boiled water to moisten them. The first brew takes 1 minute and 20 seconds, and the tea will taste mild and mellow. Because the leaves are fully soaked, steeping time for the second brew is 50 seconds.

As the chemical compounds contained in the tea are mostly extracted, the third brew should be steeped for 1 minute, slightly longer than the first brew. By the same reasoning, the fourth brew takes 1 minute and 40 seconds, and the fifth brew takes 2 minutes and 20 seconds.

7. Brewing of scented tea

Scented tea are mostly made from a mixture of green tea and fragrant flowers, so the brewing is similar to that of green tea. It can be done in a covered bowl or teapot. In the case of the elegantshaped jasmine tea, glass teawares are good choice, so people can see the infused leaves at the bottom. Usually, the tea-to-water ratio is similar to that of green tea. It is important to cover the covered bowl while steeping to prevent the aroma from escaping.



Smelling



Set-warming Scented tea ceremony (Photos by Aisin-Gioro Yuye)



IV. Blended tea

Since ancient times in China, there have been ways to "eat tea" by blending with other ingredients. These methods come from the experience and wisdom of our ancestors, gained from their long-term struggles against nature and diseases. As quality of life increases, types of blended tea also increase and include herbal tea, fruit tea, milk tea, etc. Not only is the taste of tea enriched, but also its health benefits and aesthetics. The following are recipes of popular blended teas.

To make rose black tea, take three or four dried roses, and steep them with a small amount of boiling water for 1 minute. Then, add 2-3 grams of black tea, and add more boiling water. Some honey can be added to augment the taste.

Mint green tea requires 5 grams of green tea and four mint leaves. First, add them in the right amount of hot water, and soak them for a few minutes, and the brew is ready. We can add some ice to make the taste more refreshing.

To brew goji-chrysanthemum tea, put in a covered bowl 2 grams of green tea, three or four dried goji berries, one or two dried white chrysanthemums. Steep them with hot water for 1-2 minutes.

Making peach oolong tea requires Tieguanyin oolong tea. Brew the tea with boiling water, filter out the tea infusion and leave it for later use. Place three or four slices of honeyed peach in a cup, and pour in a small amount of the brewed tea. Swirl the cup gently to blend the mixture, and then pour in the remaining tea.

Charcoal milk tea uses charcoal-baked Wuyi Yancha (rock tea). Steep the tea with boiling water, filter out the tea infusion and let it sit. Take another cup and add sugar cubes and a small amount of tea infusion. Stir to dissolve the sugar, add milk and mix thoroughly. Finally, pour in the rest of the tea infusion, and the charcoal milk tea is ready.



Chapter V Ways to Cook, Brew and Store Chinese Teas



Mixed tea

Section 4 Storage of Teas

In his book *The Record of Tea*, Zhang Yuan from the Ming Dynasty (1368-1644 AD) said, "Refined production, dry storage and clean brewing are the three conditions for making perfect tea". "Dry storage" means tea should be kept and stored in a dry environment. The quality and value of tea will be affected if improperly stored.



I. Why tea spoils

1. Internal causes of spoiled tea

While stored, transported or brewed, tea and its attributes such as the color, aroma and taste, can change because the tea is vulnerable to the external environment, and the external environment is closely related to the three attributes of the tea.

(1) The structurally loose and porous tea leaves have strong absorption abilities

Most tea leaves have loose and porous structures. They have numerous tiny pores that act like capillaries, so tea leaves will easily absorb vapor and other gases in the air. Their strong absorption abilities increase tea leaves' water percentage, allowing for tea's rich variety of tastes.

(2) The rich sources of tea polyphenols are easily oxidized

The oxidation of tea polyphenols has a substantial impact on the color, taste and aroma of tea and tea infusion. Studies reveal that if improperly stored for one year, the amount of tea polyphenols in green tea would be reduced by 10.92%, compared to the 5% reduction under proper storage conditions. As the quality decreases, green tea will taste lighter, appear dark yellow, and smell less fresh.

(3) The main chemical compounds that constitute tea's color, aroma and taste easy oxidize and degrade

Amino acids, chlorophyll, lipids, carotene and vitamins in tea leaves are all closely related to the color, aroma and taste of tea. These compounds are vulnerable to chemical changes during storage. Theanine, glutamic acid, aspartic acid, arginine and other beneficial amino acids will be drastically reduced. Chlorophyll and other major pigment compounds will decompose and transform, while vitamin C will degrade considerably. The lipids and carotene that produce tea aromas will oxidize and degrade, producing a stale and unpleasant odor.



Chapter V Ways to Cook, Brew and Store Chinese Teas

2. External causes of spoiled tea

During storage, tea quality will be impacted by environmental factors such as temperature, relative humidity, oxygen, light and odor.

(1) Impact of high humidity

During storage, the more moisture tea leaves contain, the more evident the changes in tea quality. The water percentage of tea depends on not only the production process, but also the humidity during storage. For example, when humidity is higher than 85%, the moisture in tea leaves that are exposed to the air will increase by over 10% per day.

(2) Impact of high temperature

Generally, during storage, the higher the temperature, the faster the tea quality may change. For every 10°C warmer, the color of dry green tea and its brew will turn brown 3-5 times faster. Frozen storage at -18°C can help preserve the freshness of green tea for a long time (usually more than a year). For storage at temperatures above 25°C, the color, aroma and taste of green tea may start to change rapidly.

(3) Impact of oxygen

A low-oxygen (less than 1%) or oxygen-free environment can prevent the chemical compounds in tea leaves from oxidizing or decomposing and preserve tea quality. Scientists found that after four months, deoxygenated green tea scored 28% higher than non-deoxygenated green tea. Deoxygenated green tea's remaining vitamins are 22.8% higher than that of non-deoxygenated green tea.

(4) Impact of bright light

Light can facilitate the oxidation of pigments and lipids in tea leaves, thus wearing down the color. It may also turn leaves yellower and deprive tea of its aroma. Chlorophyll in green tea, for example, is vulnerable to degradation upon exposure to bright light, resulting in an unpleasant odor (like the so-called "sunbathed smell"). Some lab reports state that a 30-day exposure to fluorescent lamp at 25°C and 1,700lx illumination can turn green tea leaves much browner and lead to a drastic quality



decrease of its aroma and taste. Vitamin C contained in the green tea may also degrade.

(5) Impact of odors

The loose and porous structure of tea leaves can easily absorb odors from the environment. The tea aroma and taste will change when stored together with substances that have unpleasant smells, affecting the tea quality and market value.

II. How to store teas

1. Tea storage methods

There are four ideal methods for tea storage, namely refrigeration, deoxidation, dry storage and light-proof packaging.

(1) Refrigeration refers to storing tea at temperatures low enough to postpone the chemical changes. Nowadays, the easiest and most effective methods are stored in a refrigerator, freezer, fresh preservation cabinet and refrigerated warehouse.

(2) Deoxidation simply means to curb and delay the oxidation of tea chemical compounds by removing oxygen in the storage space. Air extraction (or filling with nitrogen) and using deoxidizers can help store teas.

(3) Dry storage refers to using drying agents to remove the moisture in order to maintain the freshness of tea. Silica gel and burnt quicklime are today's most used drying agents.

(4) Light-proof packaging refers to using soft and hard packaging materials such as light-proof aluminum foil, paper cans, ceramic cans and metal cans, to keep tea away from light. Overall, tea-storing methods depend on the varying properties of different teas and the environment.



Chapter V Ways to Cook, Brew and Store Chinese Teas



Tea packaging

2. Tea storage method selection

(1) Different storing methods for different teas

Different teas have different storage requirements. Thus, we need to employ different storage methods.

a. There are strict requirements for storing less fermented oolong tea (e.g., Tieguanyin) and green tea since their tastes are vulnerable to change. In general, the storage requires a dry, low-temperature, low-oxygen and light-proof space.

b. Highly fermented oolong tea (e.g., Wuyi Rock Tea), black tea and yellow tea are also quite vulnerable to changes in taste. Storage criteria are high. These teas usually need a dry and light-proof environment, and a low-temperature space is preferred.

c. Dark tea and white tea can be stored for long periods of time. They are less likely to be affected by the environment. They require a dry, cool, ventilated and odorless environment to prevent humidity and mold from growing.

(2) Household tea storage

For household storage, lime tanks and refrigerators are the two ways we typically use to store tea. It is strongly recommended to pack tea in small packages. Lime tanks are what was traditionally used for storing tea at home. Airtight containers of



appropriate volumes, like metal boxes, glass bottles or ceramic jars, are ideal for teastoring. Tea should be packed in small aluminum-lined paper bags, placed on top of lime and sealed. The lime-to-tea ratio should be 5:1 or 6:1, and the quicklime must be replaced once a year, usually in June or September. Today, refrigerators are more popular for household storage, but we still have to use materials with fine insulation (like aluminum foil) in order to prevent unpleasant odors.



Chapter VI

Status Quo and Future of Tea Science



Originating from China, tea has become a beverage that is globally consumed. Tea spread from China to the rest of the world via the ancient Land and Maritime Silk Road. The tea industry significantly contributes to the development of China's economy, technology and culture.

Section 1 The Science of Tea

China is the first country to turn tea into a science. *The Classic of Tea* was written around 758 AD during the Tang Dynasty. It is the first book about tea in the world. "*Grand Sights on Tea*" is a classic written in 1107 AD by Emperor Huizong (Zhao Ji) of the Song Dynasty. Both books are the result of tea studies and people's hands-on experiences. The emperor's masterpiece also contributed to the prosperity of the tea industry during his time when tea was considered high quality products and was a tribute for the imperial court. These classics are legacies that established tea's importance in Chinese history and paved the way for today's science of tea.

I. The history of tea studies

Although people have performed tea studies in the past, it was not a scientific discipline until recent years. The following table shows the major discoveries and breakthroughs made in the history of tea studies worldwide.



Tea garden


Key discoveries and breakthroughs made in the history of tea studies worldwide

Year	Achievements	Significance		
Warring States-the Han Dynasty (770 BC-220)	People started to drink tea	It marked the first use of tea in the human history		
The Tang Dynasty (618-907)	Lu Yu wrote The Classic of Tea	Both were the complete records of tea processing and production		
The Song Dynasty (960-1279)	Emperor Huizong wrote Grand Sights of Tea			
The Ming Dynasty (1368-1644)	Cultivation and fertilization skills were invented; loose leaf tea began to prevail	Experience-based tea production of the six tea categories were firstly established.		
The Qing Dynasty (1636-1912)	Cultivar selection, vegetative propagation and pruning skills were created			
The 1820s	Caffeine was discovered from tea for the first time.			
1929-1935	EC, ECG and EGC components were separated and identified			
1934	14 aroma compounds were identified in green tea	The chemical and biological studies of tea began to take shape		
1946	EGCG component was separated and identified			
1950 and 1964	Theanine was separated and identified; theanine synthase was identified.			
1950 and 1962	Tea theaflavins and thearubigins were separated and identified			
1931	Breeding of asexual species and vegetative propagation using shortcuttings were invented	This became an effective way to increase tea yield and improve its quality		



Know Tea, Know Life

continued					
Year	Achievements	Significance			
1940	Tea bags firstly appeared				
1943	Instant tea firstly appeared	Customs of drinking tea were changed			
1981	Bottled tea beverages firstly appeared on the shelves	and diversified			
1958	Loose leaf black tea CTC machine and Rotovar were firstly made	This marked the development of new loose leaf black tea processing technology to initiate the use of machines in tea production			
1961	Small tea harvest machines were invented				
1985-1987	Tea catechin's antioxidant attribute, which could help lower blood pressure, blood lipid and inhibit cancer cell reproduction, etc., was discovered	The discovery called on a new study of tea's health benefits			
1987	Extraction and mass production of effective compounds in tea	It marked the beginning of the deep processing of teas			
1999	The first auto-processing line for green tea was invented	This marked the IT application in tea industry			
2000	Gene of caffeine synthase in tea was cloned	Tea studies went further to become a genetic and molecular subject			
2005	Gene of theanine synthase was cloned				
2017 and 2018	Tea genome sequences was released				

II. Progress in tea science

China has spent many years on researching tea and is now taking a leading role in the field. There are more to be done in the future.

1. The identification of biological characteristics of tea plants at genetic and molecular levels

Teas are beneficial to health, and the functional properties, color, aroma and fragrance are due to their rich concentrations of catechins, theanine, caffeine, etc.

146



Chapter VI Status Quo and Future of Tea Science

Scientists started to study tea compounds and the effects of tea on metabolism a long time ago. As early as the 1820s, chemists separated and identified caffeine in tea. From 1929 to 1946, they found catechin components such as EC, ECG, EGC and EGCG. They also identified theanine in 1950 and in the 1960s, discovered theanine synthase that catalyzes the formation of theanine from glutamate and ethylamine.

Today, we have a clear understanding about the functional roles of caffeine, catechin and other compounds in tea and their metabolism. We have mapped out the main genes for synthesis and regulation. These studies help understand why and how tea produces such diverse compounds.

2. Genetic diversity of tea plants is a valuable gene bank

To ensure tea's genetic improvement, it is necessary to understand the rich diversity of tea germplasms. As tea's center of origin, China has vast lands for tea



New tea variety (Yellow color: Huangjinya, purple color: Zijuan, green color: Longjing 43) (Photo by Zhang Jianyang)



cultivation under diverse ecological conditions. It is therefore easy to acquire diverse tea germplasms. Since the 1980s, China has conducted four in-depth studies to collect tea germplasm resources. In 1990, the National Germplasm Hangzhou Tea Repository and National Germplasm Menghai Tea Repository Branch were established in Hangzhou, Zhejiang Province and Menghai, Yunnan Province respectively, preserving 2,296 and 1,199 germplasms respectively. These germplasms include medium-leaf, small-leaf and large-leaf tea plants. Some germplasms not belonging to *Camellia sinensis* but biologically close to tea such as *C. crassicolumna*, *C. tachangensis*, *C. taliensis* and *C. gymnogyna*, were also collected and preserved. The repositories have the richest tea resources both in amount and genetic diversity in the world.

Many tea genetic resources have excellent traits and are exceptionally resistant to insects, pests and cold weather. They can be used to produce superior germplasms through hybridization and create better tea plant species.

3. Ideal species are the basis of the tea industry

Ideal tea plant species are fundamental to tea production. Lu Yu from the Tang Dynasty (618-917 AD) stressed in his book *The Classic of Tea* that "the purple exceeds the green, the shape of bamboo-shoots exceeds the bud-shaped and the curled leaves exceeds the uncurled". His claims represent our ancestors' comprehension of tea plant species. Modern tea farming began in the 1930s. Yet, it was after the founding of PRC in 1949 when the systematic cultivation began. Tea plant species play a decisive role in the commercialization of tea. Cultivation is an advanced technology since it may take 20-30 years to develop the desired tea plant species. Renowned Chinese teas are mostly made from designated species; Anji Baicha is usually made from 'Baiye 1'; and premium oolong teas like Tieguanyin and Dahongpao are each made from species of the same name. Before the non-major crop variety registration system was adopted, China had 134 state-approved tea plant species, including 117 asexual species. By the end of 2017, the proportion of asexual species reached 61% of total tea plant species.



Chapter VI Status Quo and Future of Tea Science

Idea tea plant species have high yields and can generate more profit, which help secure the sustainable development of China's tea industry.

4. Sustainable agronomical technologies to increase production

Tea agronomy is a science concerning tea plants' growth, development, yield, quality formation and relationship with the environment. Experimentation with agronomic management, pruning techniques, systematic harvesting and maintenance of soil fertility led to the advancement of tea cultivation technologies, thus producing higher yields, superior tea quality, increased production efficiency and more hygienic production technologies. These new technologies were implemented from the 1970s to 1980s and still serve as fundamentals for newly optimized tea cultivation.



Peacock grass intercropped among tea rows (photo by Ma Lifeng)



In terms of fertilization, researchers are now adopting balanced fertilization and integrated nutrient management to accomplish high-quality, eco-friendly and efficient tea production. The amount of fertilizer is decided based on each tea plant species' needs and capacity of nutrient absorption. Special and controlled-release fertilizers for tea plants were developed to synchronize the nutrient supply time and plant absorption. Organic fertilizers are now used to replace chemical fertilizers in order to improve soil properties and meet nutrient demands. These technical measures can help reduce the need for chemical fertilizers, improve tea quality, increase economic benefits, increase efficiency of fertilizer use, decrease loss of nutrients and protect the environment.

Fresh tea leaves harvesting is the most manpower-consuming step. The labor cost of traditional manual harvesting accounts for more than 50% of the total cost of production. Today, we are developing technologies for automated harvesting of premium renowned green teas. To reduce workload, machines like the multi-



Green pest control techniques, including mixed-color boards and Sexual attract traps (photo by Bian Lei)



Chapter VI Status Quo and Future of Tea Science

functional manager, small-type crawler tea patrol and multi-functional micro-tillage machine, are being used in farming and fertilizing.

Overall, we are making tea farming more standardized, industrialized and ecofriendly. We have implemented regulations at every step to ensure that tea is of good quality and healthy and safe to consumers.

5. Green protection improves safety standards

The subtropical and tropical zones provide warm and humid conditions that are ideal for tea plant growth but vulnerable to insects pests, diseases and weeds. There are 430 known species of tea pests and nearly 100 diseases, causing 10%-20% yield loss while simultaneously reducing tea quality every year. The tea plant protection in China has gone through four stages. In the first stage, we relied completely on chemical pesticides. During the second stage, we employed population control, aiming for early and complete treatment to kill all the pests. The third stage was integrated pest management (IPM), which consisted of taking biological measures to control pests and maintain the eco-balance, ultimately reducing economic loss. The fourth stage now utilizes green prevention and control.

Green prevention and control tea quality and safety as the primary goal. It takes agricultural, physical and biological means for a complete control of diseases and pests. Due to the complexity of the ecosystem, the existing green prevention measures cannot fully control the outbreak of diseases and pests and thus require chemical pesticides. Therefore, how to select chemical pesticides is especially important. Tea farmers are allowed to only use chemical pesticides that have high efficiency and low water solubility, toxicity and risk. Pesticides that have high water solubility will increases the risk to the drinker due to the most pesticide residue will be extracted in the tea infusion.

6. Increasing tea quality, tea variety diversification and industrialization

Inseparable from tea production, tea processing transforms fresh tea leaves into ready-to-brew tea. In China, there are six main tea categories: green tea, black tea,



oolong tea, white tea, yellow tea and dark tea. There are also re-processed teas such as pressed tea and scented tea. Each category can be further classified. In addition, teaproducing regions differ greatly in the properties of fresh tea leaves, processing conditions and production. From 1949 to the late 1980s, other than a few renowned teas, China was mass producing green tea and black tea. The harvest standard was one bud and 2-4 tender leaves. During this period, automated tea-making machineries were invented to fry Qingmei and Mao-cha and to refine Zhenmei, Gongxi, Yu-cha and other varieties. At the same time, loose leaf black tea processing techniques involving moderate withering, rapid and strong kneading and cutting, oxygen supplied and temperature-controlled fermentation, timely drying, rapid preparation and transportation, were employed. The first refined automated mass production of black tea and green tea was developed to satisfy tea producers of all scales in different regions. The technological advance has been considered a great driving force that propelled production and export of green tea and black tea. The key technologies and machineries are still in use, especially for exported tea.

Since the 1990s, especially going into the new century, the tea industry has flourished by increasing production of premium teas. There were many innovations in terms of processing, products and production equipment. For example, the flower flavor in green and black teas was produced by incorporating steps typically used for making oolong tea. A tea rich in GABA (γ -aminobutyric acid), which helps reduce blood pressure, was invented through anaerobic processing. Nowadays, processing of premium green, black, dark, oolong and yellow teas are automated, and some production lines are auto-controlled. With the advancement of analytical instruments and biological technology, people have gained deeper and more comprehensive understanding of tea varieties and their quality characteristics.

7. Deep processing to expand production and value chains

China began to produce instant tea, tea concentrat, tea drinks and other tea products since early 1960s. However, it was not until the 1990s and early new



Chapter VI Status Quo and Future of Tea Science

millennium that breakthroughs were made in color preservation, quality assurance, anti-precipitation and aroma preservation of tea beverages, which triggered mass production to meet the demands of the market. From 2013 to 2015, the annual volume of tea drinks sold in China exceeded 15 million tons, generating a revenue of more than 100 billion RMB, accounting for more than 20% of the beverage industry. In recent years, breakthroughs have been made in producing pure tea drinks, blended tea drinks and functional teas, introducing more and more new products to our lives.

Tea seeds contain different chemical compounds comparing to tea leaves. Oil from tea seeds is an excellent vegetable oil. When hydrogenated, it can prevent tea leaves from sticking to pots, which is beneficial for tea fixation and shaping. Tea saponin extracted from seeds is an excellent non-ionic natural surfactant and foaming agent. Its natural toxicity against fish can be used to eliminate fish in shrimp farming.



Modern tea production factory

Section 2 The Future of Tea Science

Tea has become increasingly popular around the world because of its health benefits. Modern technologies are being developed and used in the tea industry, which will create more specialized, customized and functional tea products.



I. New special varieties

In recent years, several unique renowned tea plant species have gained recognition and are widely used in production. New tea plant species are being cultivated, and new mutants are being discovered, including tea plants with jadewhite, golden and purple-red leaves. Most of them have high concentrations of either free amino acids, giving tea a mellow taste, or anthocyanin, producing special health benefits. The new tea plant species are also added to drinks to produce special flavors.

New tea plant species come in a riot of colors, which make tea plantations a sight to behold. Other than 'Baiye 1', heavily promoted new tea plant species also include 'Golden Buds', 'Zhonghuang 1', 'Zhonghuang 2', 'Zhonghuang 3' and 'Zijuan'. Most of them have been widely used to make innovative tea varieties and products.

II. Functional teas

As demands from today's consumers change and diversify, the tea market must also change and constantly invent new products to meet demands. Tea varieties with special properties targeting certain populations are invented. These inventions include tea with low caffeine, high EGCG, high theaflavin, methylated catechin and other chemical compounds and special flavors. They can also be used to make various functional teas.

Low-caffeine teas satisfy people who are caffeine-sensitive and new tea consumers, since they contain low amounts of caffeine. The health benefits of tea are closely related to the biological activity of EGCG components. Therefore, teas containing high concentrations of EGCG can be more beneficial to people's health. As the compound found in black tea, theaflavin is what makes the black tea infusion red. It also helps reducing fat, contribute to weight loss and increasing blood circulation. Methylated catechin helps against allergic reactions. Teas with high methylated catechins can reduce allergic reactions, bringing about a more comfortable life.



III. Innovative application of teas

In China, tea was used as both medicine and drink, which aside from quenching thirst, benefited people's health. In modern times, tea has become a functional food/ beverage and an ingredient in medicine. Tea is now being widely used in various industries like food, beverage, medical, chemical, textile, etc., providing more conveniences in our life.

Tea food has proved to be delicacy and has found its niche in the food industry. Actived in our pursuit of health and culture, teas are used to make dishes, snacks and refreshments. Generally, tea can be added to other ingredients to prepare tea dishes, porridge, rice, etc. This embeds tea into our daily meals, making them light, delicious and chewy. Tea can also remove odors from meat, increasing the delicacy of the dishes.



Tea product in an advanced stage of processing: instant tea, tea cookies (Photo by Huang Fei)



Besides being consumed as food or beverage, teas can also have external uses. Teas are often an ingredient in cosmetics such as moisturizing creams, face masks, hand creams and sunscreen. In different ways, they can provide nutrition and active ingredients for our skin cells and can help remove free radicals on the skin surface, improving skin quality and preventing skin from aging. External uses of teas also include using brewed tea to wash face or bath.

IV. Tea and artificial intelligence (AI)

Artificial intelligence (AI) is a game changer for every field, and it is the focus of study for many scientists around the world. The progress of technology, especially the incorporation of artificial intelligence into the tea industry, helps produce more effective, safer and healthier tea products.

AI is used to help manage tea plantations and is responsible for tasks like harvesting, managing and distributing nutrition to tree plants, micro-ecosystem regulation, etc. AI is a solution to the efficiency of human labor and reducing cost of production.

In terms of tea production process, China has developed instruments and machines to facilitate automated and smart control of several key processing steps. If the production process can be automated and controlled by AI, labor costs, energy consumption and costs of production will be reduced. The automation may also help increase quality control to ensure the safety and diversification of tea products.

There are a wide range of tea products on the market. AI technology in the future may also help with quality evaluation and selection of tea products for rapid identification. In the future, we may learn the facts and data about a tea product including the origin, variety, processing methods, nutritional facts, target population, recommended use methods etc. by a simple scan with a special device or smart phone.

In terms of drinking, new machines are constantly invented and upgraded for teabrewing. They are able to select tea varieties according to our tastes or needs, boil



Chapter VI Status Quo and Future of Tea Science

purified water and hold the temperature within a desired range. As pre-programed, they can make a tea that is perfect in color, flavor and taste. Moreover, there are options to add milk, sugar and other ingredients.

V. The combination of tea culture and our health

Chinese teas have a long history and are an invaluable aspect of Chinese culture. Chinese teas have become more and more popular as people around the world strive to increase quality of life. Tea culture, as a part of China's tradition and culture, has remained in practice for thousands of years. Chinese tea culture over the recent years has been considered a part of "general health" and has become a popular term. Visiting tea houses, tea farms and tea-themed gardens have become a growing trend.

Tea is a beverage that not only quenches thirst, but also enriches our lives. Teabrewing is now considered an art. When brewing teas, we can appreciate their forms, colors, aromas and tastes. We can enjoy the cleaning, boiling and brewing process, slow down our pace and calm our minds. This is a ceremony to self-meditate and reach a peaceful state of mind.

Section 3 The Benefits of Tea to Society Development

I. Economic benefits of tea

Tea is a cash crop. Through tea farming, production, transportation and sales, many people came out of poverty. People in the tea business in China, India and other countries have reaped the economic benefits brought by the local tea industry. For example, in China, there are more than 70 million people working in the tea industry,



including 26 million tea farmers, 33 million tea harvesters and more than 11 million workers in tea production and transportation. The tea industry has become one of the most important poverty-alleviating industries in China. It is a promising industry that provides jobs for people in rural areas and frees them from poverty.

Country	Planting area (unit: K. ha)	Production (unit: K.t)	
China (Mainland)	3065.5	2799.9	
India	636.6	1389.7	
Kenya	269.4	458.9	
Sri Lanka	202.5	300.1	
Global total	5025.4	6149.7	

Production of major tea-growing countries in 2019

Source: The International Tea Committee, ITC.

II. The benefits for people's health

ITC data reveals that the top ten tea-consuming countries in the world are China, India, Turkey, Pakistan, Russia, the United States, the United Kingdom, Japan, Indonesia and Egypt. There are over two billion tea enthusiasts coming from more than 170 countries and regions, making tea one of the top three non-alcoholic drinks in the world. Tea is beneficial and will continue to be a beneficial choice for healthier lives.



III. The global cooperation

Tea trade enhances economic cooperation between countries and facilitates both global trade and economic growth. For a long time, tea trade has played an important role in the ancient land and Maritime Silk Road. The Belt & Road Initiative (BRI) China proposed also provides economic growth opportunities for countries and regions under BRI that import and export tea.

Export			Import		
Country	Export (unit: 10,000 tons)	Market share (%)	Country	Import (unit: 10,000 tons)	Market share (%)
China (Mainland)	36.66	19.30	Pakistan	20.60	11.50
India	24.39*	13.10	Russia	14.40	8.00
Kenya	49.68*	26.10	USA	11.70	6.50
Sri Lanka	28.96	15.20	Egypt	10.90	6.10
Vietnam	13.60*	7.20	UK	10.40	5.80
Argentina	7.53	4.00	Morocco	8.30	4.60
_			Iran	8.10	4.50

The world's top tea exporters and importers in 2019

Source: The International Tea Committee (ITC);

* Both imported and exported teas are included.





Yellow-leaf tea plant cultivar (Photo by Zhang Jianyang)



References

- Ruan J Y. The Science of Tea[M]. Beijing: China Science and Technology Press. 2020.
- Chang H T. *Thea*: A section of beveragial tea trees of the genus *Camellia*[J]. Acta Scientiarum Naturalium Universitatis Sunyatseni. 1981, 20(1): 87–99.
- 3. Chen L, Apostolides Z, Chen Z M. Global Tea Breeding: Achievements Challenges, Perspectives[M]. Zhejiang University Press-Springer. 2012.
- Chen X Y. The Original Location of Tea Plant—Yunnan[M]. Kunming: Yunnan People Publishing House. 1994.
- Jin J Q, Ma J Q, Ma C L, et al. Determination of catechin content in representative Chinese tea germplasms[J]. Journal of Agricultural and Food Chemistry. 2014, 62: 9436-9441.
- Ma J Q, Chen L. Ensuring the genetic diversity of tea plants. Global Tea Science[J]. Burleigh Dodds Science Publishing. 2018: 3-19.
- 7. Min T L. Monograph of the Genus *Camellia*[M]. Kunming: Yunnan Science and Technology Press. 2000.
- Tadakazu T, You X Q, Wang HF, et al. One speculation on the origin and dispersion of tea plant in China—one speculation based on the chemotaxonomy by using the content-ration of terpen-alcohols found in tea aroma composition[J]. Journal of Tea Science. 1992, 12(2): 81-86.
- 9. Wang X C, Feng H, Chang Y X, et al. Population sequencing enhances understanding of tea plant evolution[J]. Nature Communications. 2020, 11: 4447.
- Yao M Z, Ma C L, Qiao T T, et al. Diversity distribution and population structure of tea germplasms in China revealed by EST-SSR markers[J]. Tree Genetics & Genomes. 2012, 8: 205–220.
- 11. Yu F L. Discussion on the originating place and the originating center of tea plant[J]. Journal of Tea Science. 1986, 6(1): 1-8.
- 12. Cheng Q K. A Brief Analysis of Tea Chemistry[M]. Zhejiang Printing and



Distribution Technical School Printing Plant, 1985.

- Duan X Y, WANG J L, CHEN Z W. Effect of Different Brewing Condition on Water Extract Content of Pu-erh Tea[J]. Guizhou Agricultural Sciences. 2010, 38 (12): 196-198.
- 14. Tong H R, JIN X F, GONG X L. Sensory Characteristics of Tea Polyphenols and It's Effects on Astringency of Tea [J]. Journal of Tea Science. 2006, 26 (2): 79-86.
- Zhang L, Ho C T, Zhou J, et al. Chemistry and biological activities of processed camellia sinensis teas: a comprehensive review[J]. Comprehensive Reviews in Food Science and Food Safety. 2019, 18 (5): 1474-1495.
- 16. Xu Y Q, Liu P P, Shi J, et al. Quality development and main chemical components of, tieguanyin, oolong teas processed from different parts of fresh shoots[J]. Food Chemistry. 2018, 249: 176-183.
- 17. Zhou Z X, Jiang Y W, Ruan H G. Tea Ceremony and Best Practices (I, II, III) [M]. Beijing: China Agriculture Press. 2021.
- Zhou Z X, Jiang Y W, Ruan H G. Tea Ceremony and Best Practices (IV, V) [M]. Beijing: China Agriculture Press. 2021.
- Jin E. Effects of Brewing Conditions on Leaching Rules and Sensory Quality of Tieguanyin and Pu'er Tea[D]. Hangzhou: Zhejiang University. 2012.
- Hursel R, Viechtbauer W, Westerterp-Plantenga M. The effects of green tea on weight loss and weight maintenance: a meta-analysis[J]. International Journal of Obesity. 2009, 33(9): 956-961.
- 21. Lee M S, Kim C T, Kim Y H. Green tea (-)-epigallocatechin-3-gallate reduces body weight with regulation of multiple genes expression in adipose tissue of dietinduced obese mice[J]. Annals of Nutrition & Metabolism. 2009, 54(2): 151-157.
- 22. Neyrinck A M, Binderls L B, Geurts L, et al. A polyphenolic extract from green tea leaves activates fat browning in high-fat-diet-induced obese mice[J]. The Journal of Nutritional Biochemistry. 2017, 49: 15-21.
- 23. Yoneshiro T, Matsushita M, Hibi M, et al. Tea catechin and caffeine activate brown adipose tissue and increase cold-induced thermogenic capacity in humans[J]. The American Journal of Clinical Nutrition. 2017, 105(4): 873-881.

162