In Praise of Tea

By: Peter Deadman

Keywords: tea, green tea, black tea, oolong, catechin, antioxidant, Shen Nong.

Abstract

Tea is - after water - the most widely consumed drink in the world, thus making the leaves and buds of Camellia sinensis the most widely consumed herb in the world. It has a long and fascinating history, is deeply infused into the cultures within which it is drunk, and - as numerous studies have shown in recent years - has remarkable health benefits.

'Surely every one is aware of the divine pleasures which attend a wintry fireside; candles at four o'clock, warm hearthrugs, tea, a fair tea-maker, shutters closed, curtains flowing in ample draperies to the floor, whilst the wind and rain are raging audibly without.' - Thomas De Quincey

Introduction

Tea - the leaves and leaf buds of the Camellia sinensis plant - is considered one of the seven necessities of Chinese life (along with firewood, rice, oil, salt, soy sauce and vinegar). In the millennia since tea was discovered in China, much of the world has come to think the same way. After water, tea is the most widely consumed drink in the world - its consumption equalling all other manufactured drinks (including coffee, chocolate, soft drinks and alcohol) combined.[1] What is it about this herbal brew that has persuaded so many of us to choose it as the friend and companion to our daily life?

A brief history of tea

Tea drinking originated in China and it is the semi-legendary emperor, scholar and herbalist Shen Nong who is credited with its discovery. Shen Nong (the second Celestial Emperor, known as the Divine Farmer or Divine Husbandman) dates back to the third millenium BCE. He is considered the father both of agriculture (inventing the plough and the rake, and sowing the five grains) and of Chinese medicine and pharmacology.[2] He is renowned for having personally tested hundreds of different herbs before finally dying from a toxic overdose. According to legend, Shen Nong always boiled his water before drinking it, and it was when leaves from a wild tea bush fell into the simmering pot that he discovered the delights and virtues of tea.

Another popular story ascribes the discovery of tea to the Buddhist monk Bodhidharma. In the seventh year of continuous meditation he is said to have fallen asleep. He was so angry with this lapse that he cut off his eyelids and where they fell to the ground the stimulating, sleep-countering tea bush sprang up. Bodhidharma, however, lived during the fifth and sixth centuries and historical records of tea consumption in China reliably predate this by several hundred years.

This earliest use of tea in Chinese culture appears to be as a medicine, with records suggesting its consumption as far back as the Zhou dynasty (first millenium BCE). By the Tang dynasty (618-906 AD), however, tea was widely drunk for pleasure, indeed by then it had become the national drink of China. It was during the Tang that Lu Yu (perhaps the only person in history to run away from a Buddhist monastery to join a circus) wrote the Cha Jing, The Tea Classic. This - the most famous book on tea ever written - describes the history of tea, the tools needed to harvest and prepare it, the twenty-eight utensils required to brew tea, the different kinds of water to make it with, and of course how to drink tea - with an emphasis on mental preparation and the cultivation of tranquillity. From Lu Yu's time, tea drinking in some Chinese and Japanese traditions has been practised as an art form and a kind of active meditation.

'Its liquor is like the sweetest dew from Heaven.' - Lu Yu, *The Tea Classic*[3]

'The afternoon glow is brightening the bamboos, the fountains are bubbling with delight, the soughing of the pines is heard in our kettle. Let us dream of evanescence, and linger in the beautiful foolishness of things.' - Kakuzo Okakura, *The Book of Tea*.

In the early days of tea drinking in China - during the Han dynasty (206 - 220 CE) - whole tea leaves were infused to make a medicinal brew, but by Lu Yu's time it was being prepared by steaming, drying and compressing into easily-transportable cakes - to be crushed and powdered for tea making and often mixed with substances such as onions, salt, ginger peel etc. It was not until the Ming dynasty (1368 - 1644 CE) that the fashion for loose leaf tea returned, which led to the great flowering of teapot and teaware design.[4]

Although tea-drinking had long spread from China to countries such as Mongolia, Turkey and Japan, it was not until 1606 that the first European

tea shipment arrived in Amsterdam. Despite a price that initially limited its consumption to the wealthy, tea drinking slowly spread through Europe over the next two hundred years, finding a particularly strong welcome in Britain and Russia. In fact Britain now leads the world in per capita tea consumption with 2.2kg per person per annum (Turkey is second with 2.1kg, Russia fifth with 1.3kg, Japan tenth with 0.9kg and China sixteenth with 0.6kg).

Because its expansion into Europe coincided with the Chinese transition to whole leaf tea brewed in teapots, this was the style that was adopted, and since black tea keeps and travels better than green tea, it was black tea that rapidly came to predominate.

No mention of British tea history can neglect to mention the shameful Opium Wars. During the eighteenth and nineteenth centuries the British East India Company came to dominate Sino-European trade. However the goods Europe desired from China (mainly tea, porcelain and silk) were not matched by any equivalent Chinese demand for European goods and they therefore had to be paid for in hard cash (silver). To remedy this unhappy situation, the East India Company supplied Chinese smugglers with ever-greater quantities of highly addictive opium (for which it held a monopoly in India), fortuitously paid for in silver. When the Qing emperor stamped down on the smoking of opium and its importation into China and even blockaded British traders, the first of two Opium Wars broke out. The wars culminated in Western dominance of China, its collapse and humiliation, and subsequent widespread opium addiction.

During the first half of the nineteenth century the first British tea plantations were established in Assam in India. This improved ease of access to tea and reduced its price, resulting in the tripling of British tea consumption by the beginning of the twentieth century. The vital role that tea played in the morale of the British was reflected in the government taking control of tea supplies during the first and second world wars.

Principal varieties of tea

All true tea (and there are ten thousand different varieties) comes from the tea plant - Camellia sinensis (also known as Thea sinensis). The plant is sub-divided into Camellia sinensis sinensis, originating in China, and Camellia sinensis assamica, a native of north-eastern India. Tea loves moisture and is therefore best grown at altitude (ideally 4000 to 6000 feet) in misty, humid regions. The sinensis variety is grown as a bush, tolerates cold and can be cropped for up to 100 years. The assamica variety grows as a tree, loves heat and dampness and crops for up to 40 years.

'Better to be deprived of food for three days than tea for one.' - Chinese proverb

[Image courtesy of The Wellcome Trust].

Image 1: Camellia sinensis

As with wine, different varieties of tea vary enormously in terms of appearance and flavour, and this is reflected in their price (generally the better the tea, the higher the price). Sadly, many people tempted to try green tea because of its reported health benefits soon lose interest, unaware that the cheap, tasteless tea they are drinking is the equivalent of trying to appreciate the delights of wine by buying the very cheapest cooking variety.

Green (unoxidised) tea

After picking, green teas may (or may not, depending on variety) be withered by laying out on bamboo trays and exposed to sunlight or warm air for one to two hours. They are then heated by pan-firing, oven-firing or steaming to prevent oxidation and preserve

freshness, and finally rolled and dried. The leaf may be left whole and will uncurl into its full size when brewed.

Black (oxidised) tea
Known as red tea in China, black teas are heavily oxidised teas. The leaves are first withered for up to 18 hours, then either machine-rolled to break up the plant cells and start oxidation, or mechanically processed in a macerator or hammer mill to produce the much smaller and quicker-brewing leaf used in tea bags and some blended teas. This is followed by a further short period of oxidation and then drying (traditionally in a hot wok or oven) to arrest the process. Black tea is often drunk with milk.

Oolong (semi-oxidised) tea
Oolong teas lie somewhere between green and black teas. They vary greatly in their degree of oxidation - from 10 to 70 per cent - with the lightest kinds resembling green tea and the heaviest closer to black tea. The processing method varies according to the type of oolong desired.

White (unoxidised) tea
White tea is simply made from young leaves and immature tea buds, picked and sun-dried. The buds have a silvery appearance and are also known as Silver Tip.

Puerh tea
The exact method of manufacture of puerh tea varies according to its different types, but all are made from oxidised green tea and it is the only tea that can be truly said to be fermented. Puerh is mostly pressed into blocks or cakes of different shapes and is traditionally laid down to mature, therefore also being the only kind of tea that improves with age. Some sources suggest that puerh manufacture goes back to the time of the Han dynasty, the compressed cakes being the ideal way to transport tea while travelling or for trade. Between 2004 and 2007, matching the soaring Chinese economy, the price of the best puerh teas rose to dizzying heights. Compressed discs were selling at up to 12,000 dollars apiece, and puerh cakes made in the 1920s at close to 20,000 dollars. The bubble burst in spring 2007, bankrupting thousands of farmers and dealers who had jumped on the bandwagon. Apart from Puerh, all teas deteriorate with age. They should be kept in airtight containers and kept away from the light.

Blended teas
Most commercial tea is blended from a large number (up to 35) of different teas. This is usually done to ensure that despite variations in season and availability, the product always tastes the same. Blended teas may be medium range (for example English breakfast teas) or low range (cheaper tea bags).

Tea and health

'Drinking a daily cup of tea will surely starve the apothecary.'
- Chinese Proverb

'If you are cold, tea will warm you. If you are too heated, it will cool you. If you are depressed, it will cheer you. If you are excited, it will calm you.'
- William Gladstone

In China, in Han and pre-Han times, tea was consumed for health reasons, indeed the legends tell that Shen Nong regularly drank tea as an antidote to the toxicity of any of the herbs he was testing. Tea was thought to alleviate drowsiness and increase concentration, restore energy, benefit the digestion, counteract depression and lift the spirit.

A modern textbook of Chinese dietary therapy[5] classifies tea as sweet, slightly bitter and cool, entering the Heart, Liver, Stomach, Bladder and Large Intestine channels. Its actions are to refresh the mind and eyes, relieve thirst, aid digestion and induce urination. As far as tea varieties are concerned, green tea is cooler, and red/black tea is warmer.

Taken to excess, strong tea can cause phlegm and diminish zhong (central) qi.

In Britain and Europe, although the early popularity of tea-drinking generated fears of harm to health (it was thought, in excess, to lead to weakness and melancholy),[6] the realisation that it was a healthy drink (and a good alternative to alcohol for the temperance movement) gradually gained ground. This is reflected today in the names of famous British teas. Typhoo took its name from the Chinese for doctor (daifu), whilst PG Tips is a shortening of its original name of Pre-Gestee, suggesting it benefitted digestion if drunk before meals.

In the last decade or two there has been an explosion in tea health research that has so clearly demonstrated the benefits of tea drinking that it seems fair to call it the single healthiest drink available to us. A good example is a six-year study[7] of fourteen thousand elderly residents (64 to 85 years old at baseline) in Shizuoka province[8] in Japan. It found that those who consumed more than seven cups of green tea a day had a 55 per cent reduced all-cause mortality rate and a 75 per cent reduced cardiovascular disease mortality rate compared to those who drank less than one cup, as well as a reduced colorectal cancer mortality.

Recent studies[9] suggest that drinking tea regularly can reduce the risk of coronary heart disease by almost a third, protect the brain against Alzheimer's diseases and other forms of dementia, protect the eyes against oxidative stress, reduce the carcinogenic effect of smoking, reduce depression in the elderly, promote healthy bones, gums and teeth, reduce the risk of breast cancer in younger women, lower cholesterol, reduce type 2 diabetes, reduce the risk of stroke, increase arterial dilation, reduce the risk of developing advanced prostate cancer and so on.

These extraordinary health benefits are thought to derive from the antioxidant catechins tea contains, principally gallocatechin (GC), epigallocatechin (EGC), epicatechin (EC) and epigallocatechin gallate (ECGC). Tea also contains caffeine, tannins, theanine (which promotes relaxation and reduces caffeine edginess due to its role on the GABA functioning of the brain), theobromine (mildly diuretic and stimulant, relaxing the smooth muscles of the bronchi), and small amounts of theophylline (a cardiac stimulant, smooth muscle relaxant, diuretic and vasodilator).

A word about caffeine

Caffeine which is present in varying amounts in tea, acts as a mild stimulant, increasing heart rate, alertness, physical endurance, urination and secretion of stomach acids. People who regularly consume caffeine quickly become tolerant to its effects. It is, however, recommended that caffeine consumption be reduced in cases of insomnia and anxiety, while the UK Food Standards Agency recommends that pregnant women restrict their consumption to 200 milligrammes per day. Although tea contains more caffeine per dried weight than coffee, much smaller quantities are required in brewing. Thus while a cup of percolated coffee typically contains 100 milligrammes or more of caffeine, a cup of black tea more will contain about 33 milligrammes (50 milligrammes if brewed longer). Factors that affect the caffeine content in different kinds of tea include the following:[10] the highest caffeine content is found in young leaf tips and buds, thus white tea is high in caffeine; assamica types have higher caffeine levels than sinensis; tea plants grown with nitrogen-rich fertilisers have higher caffeine content.

A word about tea and hydration

Some people fear that because of the diuretic effect of caffeine, tea drinking can lead to dehydration. However a number of studies[11] have demonstrated that this is not the case and that tea is only likely to have a diuretic effect on caffeine-naive individuals or in doses of at least 360 milligrammes at a time. A study carried out at altitude (where the body is subjected to greater loss of fluid) found no difference in urine output or hydration status between tea and non-tea drinkers.

Green versus black tea

By far the greatest number of health studies have been carried out on green tea, yet it is probable that green and black teas have similar benefits and the smaller number of studies carried out on black tea bear this out. Both types of tea contain a similar amount of flavonoids, although their chemical structure differs. Green teas contain more catechins, while the oxidisation that takes place in the manufacture of black tea converts these simple flavonoids into more complex theaflavins and thearubigins. Research by the U.S. Department of Agriculture has suggested that levels of antioxidants in green and black tea do not differ greatly, with green tea having an oxygen radical absorbance capacity (ORAC) of 1253 and black tea an ORAC of 1128.[12]

Making tea

'I always fear that creation will expire before teatime.' - Sydney Smith

Given the many centuries of development, the hundreds of varieties of tea, the different cultures in which it is drunk, and the subtle and elegant input of the Asian traditions, it is no surprise that the simple act of making tea can appear desperately complex.

I was brought up in the British tea style. This required tea to be made with fresh water brought to boiling point, poured onto loose-leaf black tea in a warmed teapot (so that the temperature did not drop), brewed for at least five minutes (often with a tea cosy[13] - a woollen jacket - over the teapot) and drunk with milk. This method is suitable for the most robust kinds of black tea, and the high water temperature and long brewing ensures the extraction of the maximum amounts of tea antioxidants which do not appear to be affected by the addition of milk.[14] However more fragrant, delicate teas, especially white, green and oolong, benefit from lower water temperatures and shorter brewing times, and this is where the subject can become quite complex.

I feel it is useful to distinguish between utilitarian tea drinking and more cultivated tea drinking. Personally, I drink tea all day long and do not normally have the time or inclination to go for more complex methods. I am happy - like the majority of Chinese people - to add some green or oolong tea to a lidded Chinese cup, pour on hot (but not boiling) water, wait for the leaves to settle and/or open, and drink - topping up with more hot water for as long as the tea retains flavour.

However, at other times, when sitting with friends or resting at the end of the day, there is great pleasure to be found in making tea more elaborately - for example with repeated short infusions in a ceramic or clay teapot.

The generally accepted guidelines for making tea are as follows:[15]

- Water should be fresh (not water that has sat around in a kettle) and filtered. Spring water is perfect.
- Where temperatures of less than 100°C are required, the boiled water can be left to sit or cold water can be added. It is also possible to buy temperature-controlled kettles. However if the boiling water can be watched in action, the traditional Chinese classification of bubble size can be used - shrimp eyes (70° to 80°), crab eyes (80° to 85°), fish eyes (85° to 90°), rope of pearls (90° to 95°) and raging torrent (100°).

- Tea can be brewed in a large lidded cup, a small lidded cup (gaiwan), infuser or teapot.
- The recommended temperature for each variety of tea will generally be stated on the packet if bought from a high quality supplier. The more fragrant and delicate the tea, for example, the lower the water temperature (black teas can generally take high temperatures). Since lower water temperatures may not be sufficient to cause the leaves to sink, these teas are best made in a teapot or gaiwan.

Conclusion

Green, black, oolong, white ... with or without milk ... at breakfast, noon, tea-time or all day long, tea is a wonderful, refined and health-giving drink. It should never be confused with herbal tisanes such as chamomile or peppermint, however delicious they may be, especially when those who reject tea in their favour do so because they think them somehow healthier. Now, as I sit here, rubbing my brow, reflecting on what further words I can say in praise of tea, those of the 19th century English essayist Thomas de Quincey come to mind instead:

'For tea, though ridiculed by those who are naturally coarse in their nervous sensibilities, or are become so from wine-drinking, and are not susceptible of influence from so refined a stimulant, will always be the favoured beverage of the intellectual.' ■

Peter Deadman is founder and assistant editor of *The Journal of Chinese Medicine*. He is co-author of *A Manual of Acupuncture* and an enthusiastic tea drinker.

References

1 Macfarlane, A, Macfarlane, I. (2004). *The Empire of Tea*. The Overlook Press. p. 32.

2 The most well-known work attributed to Shen Nong is The Divine Farmer's Materia Medica (Shen Nong Ben Cao), first compiled some time during the end of the Western Han Dynasty - several thousand years after Shen Nong might have existed.

3 Trans. F. Carpenter.

4 How strange, therefore, that despite centuries of teapot design, across the length and breadth of Britain - in hotels and tea shops - teapots still manage to pour their contents over the table rather than into the cup.

5 Liu, J, Peck, G (1995). *Chinese Dietary Therapy*. Churchill Livingstone, pp133-134.

6 For example, "I view tea drinking as a destroyer of health, an enfeebler of the frame, an engenderer of effeminancy and laziness, a debaucher of youth and maker of misery for old age. Thus he makes that miserable progress towards that death which he finds ten or fifteen years sooner than he would have found it if he had made his wife brew beer instead of making tea." William Cobbett in Cottage Economy (1821).

7 Suzuki, E., Yorifuji, T., Takao, S., Komatsu, H., Sugiyami, M., Ohta, T., Ishikawa-Takata, K., Doi, H. "Green tea consumption and mortality among Japanese elderly people: the prospective Shizuoka elderly cohort." Ann Epidemiol. 2009 Oct;19(10):732-9.

8 Shizuoka province has the highest production of green tea in Japan.

9 References for all these studies and the key points of many more are available at http://www.jcm.co.uk/tea-shop/tea-health-research

10 Taken from http://chadao.blogspot.com/2008/02/caffeine-and-tea-myth-and-reality.html

11 All references available from http://www.tea.co.uk/nutrition.

12 Nutrient Data Laboratory et al. "Oxygen Radical Absorbance Capacity (ORAC) of Selected Foods – 2007". Webcitation.org. 2009-05-23.

13 'Never trust a man who, when left alone in a room with a tea cozy, doesn't try it on.' Billy Connolly.

14 Kyle JA, Morrice PC, McNeill G, Duthie GG. "Effects of infusion time and addition of milk on content and absorption of polyphenols from black tea." J Agric Food Chem. 2007 Jun 13;55(12):4889-94.

15 Taken from The Canton Tea Company website http://www.cantonteaco.com/tea-school/how-to-tea-guides-simple-guides-to-enjoying-china-tea/how-to-brew-chinese-tea.html.

Hübscher M, Zech A, Pfeifer K. (2010). "Neuromuscular training for sports injury prevention: a systematic review." *Medicine & Science in Sports & Exercise*. 42(3), 413-21