= Tea processing =

Tea processing is the method in which the leaves from the tea plant Camellia sinensis are transformed into the dried leaves for brewing tea .

The categories of tea are distinguished by the processing they undergo . In its most general form , tea processing involves different manners and degree of oxidation of the leaves , stopping the oxidation , forming the tea and drying it .

The innate flavour of the dried tea leaves is determined by the type of cultivar of the tea bush , the quality of the plucked tea leaves , and the manner and quality of the production processing they undergo . After processing , a tea may be blended with other teas or mixed with flavourants to alter the flavour of the final tea .

= = History = =

The history of the tea processing corresponds intimately with the role that tea played in Chinese society and the preferred methods of its consumption in Ancient Chinese society .

= = = Green = = =

The ancient Chinese society first encountered the tea plant in what is now southern China and processed it as another medicinal herb for use in Chinese herbology . The processing technique used to process fresh tea leaves was to immediately steam the fresh tea leaves and dry them for preservation , which is likely the most ancient Chinese form of tea leaf processing . This processing method was perfected near the end of the Han Dynasty (206 BCE @-@ 220 CE) and produced a dried tea that would be classified today as " green tea " and quite similar to modern Japanese sencha . For consumption , dried tea leaves were either decocted with water around with other herbs , or ground into a powder to be taken straight or in a liquid .

With the increase of tea 's use in Chinese herbology , production methods changed , where the processed green tea leaves were not immediately dried after steaming . Rather the steamed tea leaves were first pulverized into a paste form , with the paste then formed in moulds and slowly dried into brick tea , a technique well described by Lu Yu in his work The Classic of Tea . Tender leaves and leaf buds were generally not used , as older mature tea leaves were preferred for tea production . Some tea bricks were also produced from mature whole leaves , which typically required the use of a cooked rice slurry (??) to bind the tea brick together . The preference of producing tea in brick form possibly stems from the fact that it can be more easily transported and stored .

= = = Yellow and fermented = = =

This use of steam in fixation (??) for tea leaf enzymes is an important step in processing tea , with the leaves to be quickly cooled down and undergo further processing . The less tightly controlled methods of it in the past resulted in the creation of " yellow tea " when the tea leaves were over @-@ steamed for fixation or were not quickly spread out , doused with water and cooled . Although green tea was the most popular in Lu Yu 's time , he personally considered yellow tea to be superior to green .

Even when the leaves were quickly cooled , if they are left in piles (??) for too long before processing , the leaves will begin to undergo microbial fermentation to produce " post @-@ fermented tea " . This technique is somewhat similar to composting , albeit tightly controlled , and still used in the production of Liu 'an tea (??????) and was more recently introduced for the production of the " ripe " type pu @-@ erh tea . The production of tea in brick forms and their storage also resulted in another type of post @-@ fermented tea , which was produced by aging . The long transport and storage times of the day unwittingly allowed the tea bricks to undergo prolonged exposure to the elements and to various microflora , which resulted in the aging , oxidation , and fermentation of green brick teas . A brick of green tea that had been stored and aged

into post @-@ fermented tea was charred over charcoal to rid it of the layer of detritus , dust , and shiny multicoloured growths before being broken down into a powder , cooked , and then consumed . By the end of Tang Dynasty (618 @-@ 907CE) green , yellow , and post @-@ fermented tea was commonly used in China and moved from purely being used in herbology to becoming a beverage drunk for pleasure .

= = = Oolong and white = = =

The Qing Dynasty was also the period when oolong tea was first developed in the Fujian province . It was originally produced in thin brick form , known then under then name " Beiyuan " tea (???) . The importance of the withering process for producing oolong tea was described by poet Huang Furen (???) in his poem " ????????? " , which indicated that the processing of tea leaves is not a simple task , requiring the scaling of steep cliffs to pick the choicest leaves and the withering of the leaves under the sun and warm winds (" ????? ? ????? ? ????? ? ????? ... ") .

White tea (??) was also developed in the Fujian province with its first mentions in the Song Dynasty document Treatise on Tea , where the delicate buds used for producing white tea , the difficulty in producing it , its taste , and its rarity were lauded . The production method of white tea was described by Ming Dynasty author Tian Yiheng (???) in " Zhuquan Xiaopin " (????) (produced in the 33rd year of the Jiajing Emperor) regarding Fuding white tea (????) . In this work , he stated that tea buds that have undergone fixation by panning over flames (as with green tea) is second to a white tea that was simply allowed to dry under the sun , since it is more natural in taste and lacks flavours imparted by the smoke and flames (" ???????? ? ????? , ????? ? ?????? ")

= = = Black = = =

The technique for producing black tea was first developed during the late Ming Dynasty Wuyishan , Fujian either resulting from the over @-@ oxidation of tea @-@ leaves during the manufacture of oolong tea or indirectly from the methods of manufacturing green and white teas . In the early 1600s , tea producers in the Wuyi Mountains began kneading the sun @-@ withered tea leaves to macerate them , then allowed them to dry under the sun , thus reaching full oxidation and producing " Gongfu " black tea (????) . When there was insufficient sun and temperatures were low , the withered leaves would be processed indoors in warmed rooms and allowed to fully oxidize , then smoked dry over pine fires thus producing lapsang souchong . According to oral traditions of the region , the discovery of lapsang souchong processing was due to military troops passing through a Wuyi 's tea factory during the last years of the Ming Dynasty , causing delays to tea leaf processing thus resulting in a completely oxidized leaf that the producer salvaged by drying over a fire built from pine branches . By the Qing Dynasty , both lapsang souchong and gongfu black tea were well recognized in China and noted in " Records on Yiwu mountain " (????) by the scholar Dong Tiangong (???) .

= = Procedure = =

= = = General = = =

Although each type of tea has different taste , smell , and visual appearance , tea processing for all tea types consists of a very similar set of methods with only minor variations . Without careful moisture and temperature control during its manufacture and life thereafter , fungi will grow on tea . This form of fungus causes real fermentation that will contaminate the tea and may render the tea unfit for consumption .

Plucking : Tea leaves and flushes , which includes a terminal bud and two young leaves , are picked from Camellia sinensis bushes typically twice a year during early spring and early summer or late spring . Autumn or winter pickings of tea flushes are much less common , though they occur

when climate permits . Picking is done by hand when a higher quality tea is needed , or where labour costs are not prohibitive . Depending on the skill of the picker , hand @-@ picking is performed by pulling the flush with a snap of the forearm , arm , or even the shoulders , with the picker grasping the tea shoot using the thumb and forefinger , with the middle finger sometimes used in combination . Tea flushes and leaves can also be picked by machine , though there will be more broken leaves and partial flushes reducing the quality of the tea . However , it has also been shown that machine plucking in correctly timed harvesting periods can produce good leaves for the production of high quality teas .

Withering / Wilting : The tea leaves will begin to wilt soon after picking , with a gradual onset of enzymatic oxidation . Withering is used to remove excess water from the leaves and allows a very slight amount of oxidation . The leaves can be either put under the sun or left in a cool breezy room to pull moisture out from the leaves . The leaves sometimes lose more than a quarter of their weight in water during withering . The process is also important in promoting the breakdown of leaf proteins into free amino acids and increases the availability of freed caffeine , both of which change the taste of the tea .

Disruption : Known in the Western tea industry as " disruption " or " leaf maceration " , the teas are bruised or torn in order to promote and quicken oxidation . The leaves may be lightly bruised on their edges by shaking and tossing in a bamboo tray or tumbling in baskets . More extensive leaf disruption can be done by kneading , rolling , tearing , and crushing , usually by machinery . The bruising breaks down the structures inside and outside of the leaf cells and allows from the co @-@ mingling of oxidative enzymes with various substrates , which allows for the beginning of oxidation . This also releases some of the leaf juices , which may aid in oxidation and change the taste profile of the tea .

Oxidation / Fermentation : For teas that require oxidation , the leaves are left on their own in a climate @-@ controlled room where they turn progressively darker . This is accompanied by agitation in some cases . In this process the chlorophyll in the leaves is enzymatically broken down , and its tannins are released or transformed . This process is sometimes referred to as " fermentation " in the tea industry . The tea producer may choose when the oxidation should be stopped , which depends on the desired qualities in the final tea as well as the weather conditions (heat and humidity) . For light oolong teas this may be anywhere from 5 @-@ 40 % oxidation , in darker oolong teas 60 @-@ 70 % , and in black teas 100 % oxidation . Oxidation is highly important in the formation of many taste and aroma compounds , which give a tea its liquor colour , strength , and briskness . Depending on the type of tea desired , under or over @-@ oxidation / fermentation can result in grassy flavours , or overly thick winey flavours .

Fixation / Kill @-@ green : Kill @-@ green or sh?q?ng (??) is done to stop the tea leaf oxidation at a desired level . This process is accomplished by moderately heating tea leaves , thus deactivating their oxidative enzymes and removing unwanted scents in the leaves , without damaging the flavour of the tea . Traditionally , the tea leaves are panned in a wok or steamed , but with advancements in technology , kill @-@ green is sometimes done by baking or " panning " in a rolling drum . In some white teas and some black teas such as CTC blacks , kill @-@ green is done simultaneously with drying .

Sweltering / Yellowing : Unique to yellow teas , warm and damp tea leaves from after kill @-@ green are allowed to be lightly heated in a closed container , which causes the previously green leaves to turn yellow . The resulting leaves produce a beverage that has a distinctive yellowish @-@ green hue due to transformations of the leaf chlorophyll . Through being sweltered for 6 ? 8 hours at close to human body temperatures , the amino acids and polyphenols in the processed tea leaves undergo chemical changes to give this tea its distinct briskness and mellow taste .

Rolling / Shaping : The damp tea leaves are then rolled to be formed into wrinkled strips , by hand or using a rolling machine which causes the tea to wrap around itself . This rolling action also causes some of the sap , essential oils , and juices inside the leaves to ooze out , which further enhances the taste of the tea . The strips of tea can then be formed into other shapes , such as being rolled into spirals , kneaded and rolled into pellets , or tied into balls , cones and other elaborate shapes . In many types of oolong , the rolled strips of tea leaf are then rolled to spheres or

half spheres and is typically done by placing the damp leaves in large cloth bags , which are then kneaded by hand or machine in a specific manner .

Drying : Drying is done to " finish " the tea for sale . This can be done in a myriad of ways including panning , sunning , air drying , or baking . Baking is usually the most common . Great care must be taken to not over @-@ cook the leaves . The drying of the produced tea is responsible for many new flavour compounds particularly important in green teas .

Aging / Curing : While not always required , some teas required additional aging , secondary fermentation , or baking to reach their drinking potential . For instance , a green tea puerh , prior to curing into a post @-@ fermented tea , is often bitter and harsh in taste , but becomes sweet and mellow through fermentation by age or dampness . Additionally , oolong can benefit from aging if fired over charcoal . Flavoured teas are manufactured in this stage by spraying the tea with aromas and flavours or by storing them with their flavorants .

= = = Type @-@ specific = = =

Tea is traditionally classified based on the degree or period of " fermentation " the leaves have undergone :

White tea

Young leaves or new growth buds that have undergone minimal oxidation through a slight amount of withering before halting the oxidative processes by being baked dry , with the optimal withering conditions at 30 degrees Celsius (65 % relative humidity) for 26 hours . Withering of the leaves can last from around one to three days depending on the season and temperature of the processing environment . The buds may be shielded from sunlight to prevent the formation of chlorophyll . White tea is produced in lesser quantities than most other styles , and can be correspondingly more expensive than tea from the same plant processed by other methods . It is less well known in countries outside of China , though this is changing with increased western interest in the tea . There is an international disagreement on definition of white tea between China and other producing countries . In China , White tea is fully oxidized by letting the tea naturally dry out in sunlight . It is different from traditional black teas because it does not undergo any manmade processing such as rolling or curling .

Green tea

This tea has undergone the least amount of oxidation . The oxidation process is halted by the quick application of heat after tea picking , either with steam , the Japanese method , or by dry cooking in hot pans , the traditional Chinese method . Tea leaves may be left to dry as separate leaves or they may be rolled into small pellets to make gunpowder tea . This process is time consuming and is typically done with pekoes of higher quality . The tea is processed within one to two days of harvesting , and if done correctly retains most of the chemical composition of the fresh leaves from which it was produced . Variation in steaming time for fixation or processing from additional stages of rolling and drying are sometimes used to improve or altering the flavour for types of green tea .

Yellow tea

This tea is processed in a similar manner to green tea , but instead of immediate drying after fixation , it is stacked , covered , and gently heated in a humid environment . This initiates oxidation in the chlorophyll of the leaves through non @-@ enzymatic and non @-@ microbial means , which results in a yellowish or greenish @-@ yellow colour .

Oolong tea

This tea 's oxidation is stopped somewhere between the standards for green tea and black tea . The processing typically takes two to three days from withering to drying with a relatively short oxidation period of several hours . In Chinese , semi @-@ oxidized teas are collectively grouped as blue tea (?? , literally : blue @-@ green tea / " celadon tea ") , while the term " oolong " is used specifically as a name for certain semi @-@ oxidized teas . Common wisdom about lightly oxidized teas in Taiwan (a large producer of Oolong) is that too little oxidation upsets the stomach of some consumers . Even so , some producers attempt to minimize oxidation in order to produce a specific taste or allow the tea leaves to be easily rolled into the spherical or half @-@ sphere form

demanded by buyers in the market .

Black tea

The tea leaves are allowed to completely oxidize . Black tea is first withered to induce protein breakdown and reduce water content (68 @-@ 77 % of original) . The leaves then undergo a process known in the industry as " disruption " or " leaf maceration " , which through bruising or cutting disrupts leaf cell structures , releasing the leaf juices and enzymes that activate oxidation . The oxidation process takes between 45 ? 90 minutes to 3 hours and is done at high humidity between 20 @-@ 30 degrees Celsius , transforming much of the catechins of the leaves into complex tannin . Orthodox processed black teas are further graded according to the post @-@ production leaf quality by the Orange Pekoe system , while crush , tear , curl (CTC) teas use a different grading system . Orthodox tea leaves are heavily rolled either by hand or mechanically on a cylindrical rolling table or a rotorvane . The rolling table consists of a ridged table @-@ top moving in an eccentric manner to a large hopper of tea leaves , of which the leaves are pressed down onto the table @-@ top . The process produces a mixture of whole and broken leaves , and particles which are then sorted , oxidized , and dried . The rotovane consisted of an auger pushing withered tea leaves through a vane cylinder which crushes and evenly cuts the leaves . Crush , tear , curl is a production method developed by William McKercher in 1930 which uses machines with contra @-@ rotating rotors with surfaces patterning that cut and tear the leaves producing a product popular for use in tea bags . The rotovane to often use to precut the withered tea prior to the CTC and to create broken orthodox processed black tea .

Post @-@ fermented tea

Teas that are allowed to undergo a second oxidation after the fixation of the tea leaves , such as Pu @-@ erh , Liu 'an , and Liubao , are collectively referred to as secondary or post @-@ fermentation teas in English . In Chinese they are categorized as Dark tea or black tea . This is not to be confused with the English term Black tea , known in Chinese as red tea . Pu @-@ erh , also known as Póu léi (Polee) in Cantonese is the most common type of post @-@ fermetation tea in the market .