

# TEA

(*Camellia sinensis* family: Theaceae)



## Contents : Morphology, Processing and Uses of Tea

**INTRODUCTION:** Tea is an aromatic beverage commonly prepared by pouring hot or boiling water over cured leaves of the *Camellia sinensis*, an evergreen shrub (bush) native to East Asia. After water, it is the most widely consumed drink in the world. There are many different types of tea; some, like Darjeeling and Chinese greens, have a cooling, slightly bitter, and astringent flavour, while others have vastly different profiles that include sweet, nutty, floral or grassy notes. Tea has a stimulating effect in humans primarily due to its caffeine content.



## PROCESSING OF TEA



### MORPHOLOGY:

*C. sinensis*, a member of Theaceae family is an evergreen tree or shrub that attains a height of 10 - 15 m in the wild and 0.6 - 1.5 m when cultivated. The leaves are light green, short stalked, coriaceous, alternate, lanceolate, serrate margin, glabrous or pubescent beneath, varying in length from 5 - 30 cm and about 4 cm width. Mature leaves are bright green colored, smooth and leathery while young leaves are pubescent. Flowers are white fragrant, 2.5 - 4 cm in diameter, found in solitary or in clusters of two or four. Flowers bear numerous stamens with yellow anther and produce brownish red capsules. Fruit is a flattened, smooth, rounded trigonous three celled capsule, seed solitary in each, size of a small nut.



## TEA PROCESSING:

### 1. Withering :

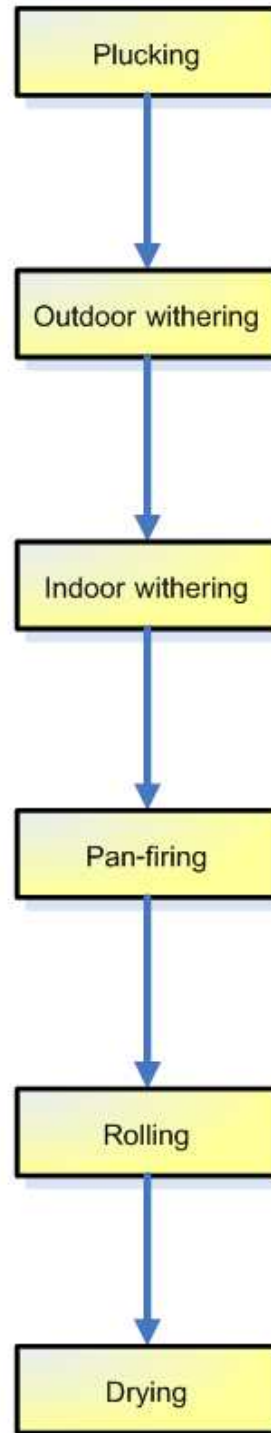
The first processing step after the leaves are harvested is a very basic one. Since *Camellia sinensis* leaves are thick and waxy on the plant, they must be softened, or withered, to make them pliable for crafting. The leaves are laid out on fabric or bamboo mats, and left to wilt. Modern tea farmers control the variables in this process with great precision. The withering process reduces the water content of the leaves by as much as half.



### 2. Bruising :

After the leaves are withered, crafting methods for different styles start to diverge. Oolong teas, black teas, teas usually undergo some sort of bruising process. This means the leaves are rolled, twisted, or otherwise crushed. The purpose of this step is to break down cell walls in the leaf, and facilitate the next step:







### 3. Oxidation :

Manually bruising a large batch of tea leaves was once the most demanding step in processing tea. Leaves must be thoroughly and evenly bruised to produce a consistent batch of tea. Some dark teas, with high levels of oxidation, must go through multiple rounds of bruising and oxidation. It's really no wonder that black tea producers began chopping leaves to speed up the process for the mass market.

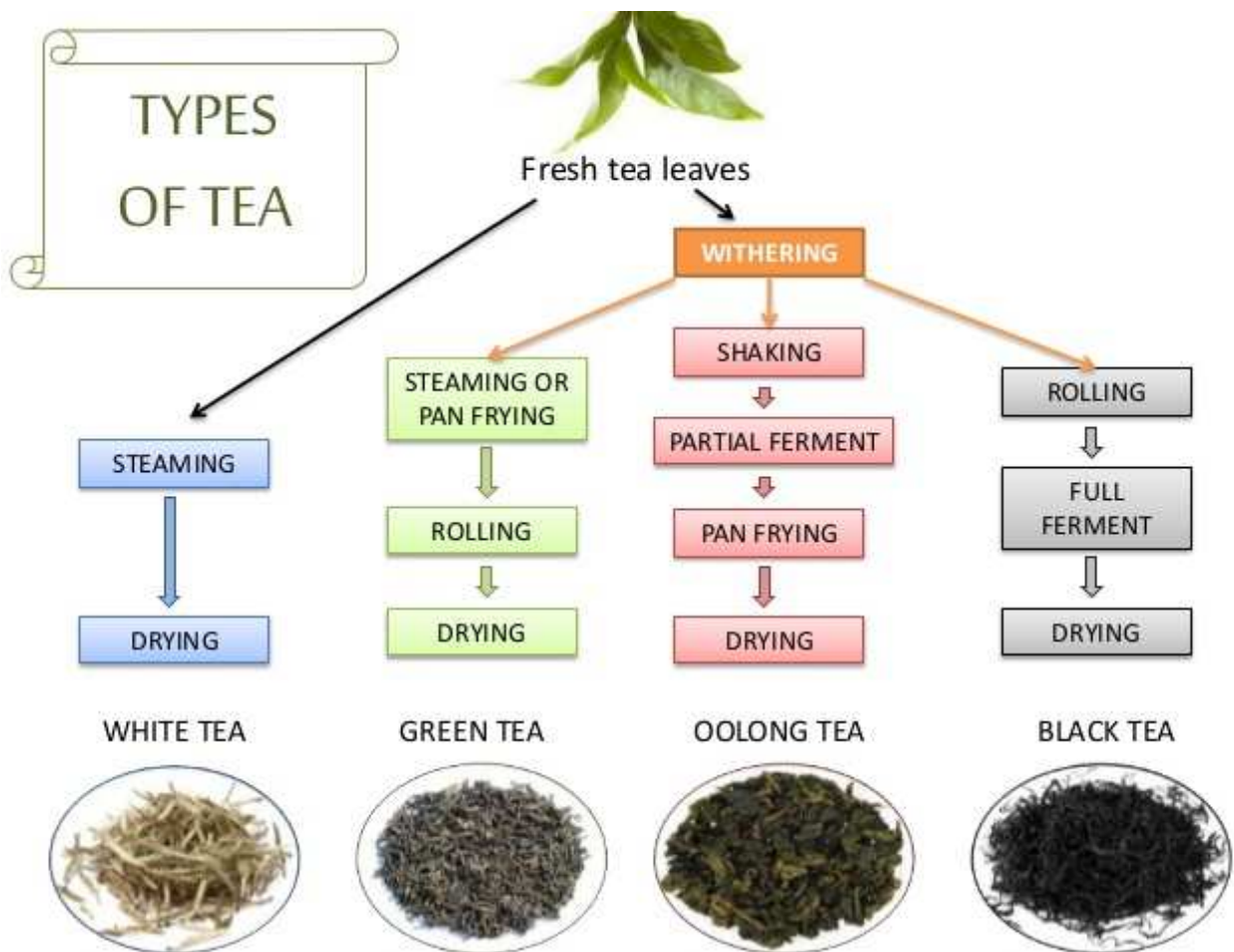
### 4. Oxidizing :

After bruising, leaves intended for oolong or black teas are left to oxidize, or turn brown. Again, the leaves are laid out and left to wither. Now that the cell walls have been broken, an enzymatic reaction turns the leaves brown, just like a cut apple. Leaves must be carefully monitored during this process. For oolongs, in particular, missing the correct moment can mean ruining the tea, or crafting something entirely different than what was intended. Again, heat and humidity are carefully controlled, and trays are rotated to ensure even oxidation. This browning process is the primary differentiating factor between different styles of tea. Green tea crafting skips these steps entirely, creating a tea that is by definition, unoxidized, and therefore still green in color. A black tea is defined as fully oxidized, without any green color left to the leaf. Pu-erh, or “post-fermented” tea, lies outside this spectrum. Pu-erh teas usually undergo bruising, but skip the wilting that creates oxidation.

Fixing To stop the oxidation process, the tea leaf is heated. Just like baking an apple, the application of heat denatures the enzymes responsible for oxidation and stops the leaf from continuing to turn brown. This step is applied to all tea styles except black tea, where the final drying step is used to slowly halt oxidation instead. This fixing step is sometimes called the kill green, but it actually serves to preserve whatever green color is still left in the leaf at this stage.

## 5. Drying :

Finally, all tea must be dried to remove any residual moisture and create a shelf-stable leaf. Again, the method of heating can dramatically change the flavor of the tea. This effect is most commonly seen with charcoal roasting, which imparts a distinctly rich quality to the flavor during this step. By contrast, the drying process can also be very gentle, to avoid imparting any flavor changes. White tea, for example, is usually given a very gradual bake, which replicates traditional sun-drying. After it's dried, the tea is ready to be packaged and shipped all over the world.





## USES OF TEA:

1. **Tea is the most popular beverage** consumed all over the world. In recent years its consumption is much higher due to its preventive effects against certain human diseases. Tea and its polyphenols have evidence based role in number of diseases (Dalluge and Nelson, 2000).
2. **Antiaging properties:** Free radical theory of aging suggests that oxidative stress and increased free radical generation leads to functional deterioration and degeneration e.g. neurodegeneration which is solely due to phenotype changes. Furthermore, green tea also decreases the level of a marker for oxidative DNA damage, 8-oxo-deoxyguanosine (8-oxodG) in liver kidney and cerebrum.
3. **Anticancer effects:** Main chemopreventive agents in green tea are complex falconoid structures like EGCG, EGC, ECG and proanthocyanidins (Robbers and Tyler, 1999). Recently green tea catechins have gained significance in cancer prevention due to their structure similarity with chaperones and their interactions with target molecules.
4. **Cardiovascular effects:** Epidemiological studies show that a high flavonoid intake from tea may reduce incidences of coronary heart disease (CHD) as it improves vasomotion (Yaniv and Bachrach, 2005).
5. **Anticaries effects:** Green tea extract is effective in preventing dental caries because of its dual effect, that is, its flavor compounds are antibacterial while polyphenols possess a antiplaque activity.
6. **Antiparkinson's property:** Enzyme dopa decarboxylase which has key role in biosynthesis of biogenic amines. Enzyme is of high interest while developing drugs for hypertension and Parkinson's disease. Bertoldi et al., (2001) demonstrated green tea



polyphenols EGCG and EGC both bind to the active site of enzyme and behave as irreversible inactivators of dopa decarboxylase following a pseudo first order kinetic at fixed concentration of EGCG (Bertoldi et al., 2001).

**7. Antibacterial activity:** Tea polyphenols show antibacterial activity, however, it is not determined precisely which species are inhibited by antioxidants. For example, polyphenols can inhibit clostridia and *Helicobacter pylori* but are ineffective against intestinal lactic bacteria.

**8. Activity against HIV:** The fact that green tea can be used as adjuvant therapy to AIDS is still hypothetical (Ernst et al., 2006).

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