

## TEA IN THE TIMES OF COVID-19: FINDINGS FROM A STUDENT PROJECT

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### Abstract

After water, tea is the most widely consumed beverage in the world. There are different types of tea which are primarily due to how leaves are processed after they are picked. Tea infusion is rich in polyphenols; epigallocatechin gallate (EGCG) and theaflavin (TF). Though the year 2020 saw the tea production and export touch a nadir as corona virus pandemic swept the country disrupting all activities there has been a slow increase in tea production in recent times. The antimicrobial qualities of tea could be the reason for increase in the consumption of tea in the times of Covid-19. During the lockdown in 2020 & 2021 some states in India have exempted the tea industry from lockdown. Special Standard Operating Procedure (SOP) guidelines for Tea Sector during COVID-19 Pandemic have been issued.

**Keywords:** *Camellia sinensis*, polyphenols, Covid-19, tea industry, SOP

### Introduction:

Tea is an aromatic beverage prepared by pouring hot or boiling water over cured or fresh leaves of *Camellia sinensis* (L.) Kuntze. Tea is an evergreen shrub native to China and East Asia. After water, it is the most widely consumed drink in the world. Tea is a traditional and most consumed drink globally due to its economic viability and easy availability and can play an essential role in nutritional immunity [1].

### The tea plant

*Camellia sinensis* (L.) Kuntze is a tree or small shrub in the family Theaceae grown for its leaves which are used to make beverages. The tea plant is branching with alternate elliptical leaves. The leaves are leathery in texture, matte green in colour and have serrated edges. The tea plant can take the form of a tree with a bowl-shaped canopy but is usually pruned under cultivation to be smaller and shrub-like. The plant produces fragrant white flower singly or in small clusters. In their natural state tea plants can reach a height of 15 to 20m.

**Scientific classification:**

- Kingdom: Plantae
- Order: Ericales
- Family: Theaceae
- Genus: *Camellia*
- Species: *sinensis*
- Binomial name: *Camellia sinensis*

**Types of Tea**

Since all tea comes from the *Camellia sinensis* (L.) Kuntze plant, the differences between the types of tea are primarily due to how they are processed after the leaves are picked. There are essentially three main types of tea, which are Green, Oolong and Black tea. There are other types too viz. White tea, Pu'erh tea.

The difference lies in the ‘fermentation’ which actually refers to oxidative and enzymatic changes within the tea leaves, during processing. The fermentation method used for obtaining the black tea results in the oxidation or condensation of primary catechins, giving origin to dimers or polymers, called as theaflavins, theasinensins and thearubigins, which provides peculiar and unique organoleptic characteristics, besides of aroma and colour to the teas [2, 3].

Irrespective of the type of tea, a typical procedure for production of green tea and black tea involves 5 general processes. Initially, the leaves are withered where the moisture content in the tea leaves is minimized. Then these leaves are fixed by enzymatically browning them and are allowed to get oxidized by exposing to oxygen. Finally, these leaves are rolled to give them a suitable shape and then dried to enhance the shelf-life. The main types of tea are:

- **Green tea:** Made with steamed tea leaves, it has a high concentration of EGCG and has been widely studied. Green tea has been a popular beverage for millennia, and many reports have shown that drinking green tea has various health benefits, such as cancer prevention and treatment of infectious diseases [4, 5].
- **Black tea:** Made with fermented tea leaves, black tea has the highest caffeine content and forms the basis for flavored teas like chai, along with some instant teas. Studies have shown that black tea may protect lungs from damage caused by exposure to cigarette smoke. It also may reduce the risk of stroke.
- **White tea:** White tea is known to be one of the most delicate tea varieties because it is so minimally processed. White tea is harvested before the tea plant’s leaves open fully, when the young buds are still covered by fine white hairs, hence the name “white” tea. Uncured and unfermented.
- **Oolong tea:** It is a traditional semi-oxidized Chinese tea (*Camellia sinensis*) produced through a process including withering the plant under strong sun and oxidation before curling and twisting. Different styles of oolong tea can vary widely in flavor. They can be sweet and fruity with honey aromas, or woody and thick with roasted aromas, or green and fresh with complex aromas, all depending on the horticulture and style of production.

## Types of Tea



### Benefits of tea in the times of Covid-19

Tea currently is the hot topic in both nutritional and therapeutic research worldwide. This is not so because tea is the most preferred drink after water, but because of the presence of crucial therapeutic compounds in tea which are more bio-stable and direct acting than those found in other plants. The phytochemicals present which produce a definite physiological action on the human body. Several epidemiological studies and clinical trials showed that green tea (black and oolong teas to a lesser extent) may reduce the risk of many chronic diseases [6]. This beneficial effect has been attributed to the presence of high amounts of polyphenols which are potent antioxidants. Tea infusion is rich in polyphenols; epigallocatechin gallate (EGCG) and theaflavin (TF) which are the major green and black tea polyphenols.

### Bioactive compounds in tea

Tea is reported to contain nearly 4000 bioactive compounds of which one third is contributed by polyphenols. Polyphenols are bonded benzene rings with multiple hydroxyl groups. Polyphenols are either flavonoids or non-flavonoids but chemicals found in tea are mostly flavonoids. They are secondary plant metabolites derived from the condensation reaction of

cinnamic acid with three malonyl-CoA groups. A number of flavonoids are present but dietary flavonoids are usually present in it.

Epigallocatechin gallate (EGCG) is one of the most abundant polyphenolic catechin found in *Camellia sinensis* (L.) Kuntze. EGCG has been tested for its antiviral activity against several viruses and found to be a potential treatment option over synthetic chemical drugs. It is recognized as a multi-functional bioactive molecule exhibiting antitumorigenic, anti-inflammatory, antibacterial, antioxidative, and antiproliferative properties in addition to its antiviral effects [7]. Other studies have found that some teas may help with cancer, heart disease, and diabetes; encourage weight loss; lower cholesterol; and bring about mental alertness. Tea also appears to have antimicrobial qualities. It has less caffeine compared to coffee. It is pretty well established that the flavonoid compounds in tea are good for the heart and may reduce cancer.

In 2021 new research found antiviral activity from green tea. In a new study, one of its ingredients, epigallocatechin gallate (EGCG), blocked severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from binding to human angiotensin-converting enzyme 2 (ACE2) receptors and can subsequently prevent infection of human lung cells. This action was also observed in the SARS-CoV-2 variants of concern (VOC) [8].

### **Tea industry in 2020**

Due to the lockdown, tea production in Assam and West Bengal declined by 65 per cent during March and April, and around 50 per cent in May. Prices of teas at the auctions have already increased by 5-10% and these products will be available to consumers with an increased price. The nationwide lockdown impacted tea production, pulling it down by 140 million kg from the level in 2019.

The tea industry offers direct employment to 1.2 million people and supports more than 3 million dependents of tea garden workers, with women accounting for 50% of the employment. The beverage has contributed significantly to socio-economic development in far-flung, remote and interior areas.

According to the ICRA (Investment Information and Credit Rating Agency) Vice-President and Sector Head (Corporate Sector Ratings) Kaushik Das had said in the first seven months of the calendar year 2020, domestic tea production had been adversely impacted with an estimated decline of around 22 percent. Restrictions on garden activities in the initial periods of the lockdown to contain the pandemic had impacted tea production in the northern India during March, April and May, 2020. The sudden drop in tea production for nearly a month due to the coronavirus disease (Covid-19)-induced 68-day nation-wide lockdown restrictions was being attributed as the main reason for the hike in tea prices in later half of 2020.

Tea being a fixed cost-intensive industry, a decline in the crop was expected to substantially increase the cost of production in the range of Rs 25-30 per kg for the bulk tea industry in the northern region during 2020.

### **Tea consumption in the times of Covid-19**

Depending on variety, the amount of time and the temperature in which tea leaves are steeped will impact antioxidant levels. White tea should be steeped longer in hot water while black

tea is best steeped for a short amount of time in very hot water. Green tea is sensitive to temperature, so prolonged cold steeping, roughly two hours, yields the same results as a quick hot steep. Because stress can weaken the immune system, sipping tea more often may help a person to relax, Herbal tea brewed with lavender, chamomile, peppermint or passionflower may have a positive impact too.

Epigallocatechin gallate (EGCG) is a major catechin found in green tea, and there is mounting evidence that EGCG is potentially useful for the treatment of coronavirus diseases, including coronavirus disease 2019 (COVID-19) [9].

While there were initial apprehensions that the lockdown would have an adverse impact on the overall consumption levels, it was seen that by September, 2020 there was increase in 'at-home consumption' has more than offset the decline in 'out-of-home consumption', So despite the COVID-19 pandemic that has created a demand-supply mismatch, the bulk tea industry has witnessed a slow increase in both consumption as well as prices.

### **Exemption of tea industry from lockdown**

In 2021 the Nilgiris Collector has permitted tea factories for processing, production of tea with minimum workers by strictly following the SOP of Covid-19. Many other states, for example West Bengal have allowed the tea industry to operate with 25% to 50% of workers on a shift basis during 2020 & 2021 lockdown after issuing the SOP.

### **Standard Operating Procedure (SOP) guidelines for Tea Sector during COVID-19 Pandemic**

With the onset of nationwide lockdown, various agricultural sectors including sectors which manufacture essential items and other industries requested the Government to allow them to continue production, with certain restrictions in place so as to maintain the cash flow in the system and to avoid disruption of the supply chain which is essential for sustenance of citizens. On similar line, Tea Industry which is highly labour intensive and also being part of the Agricultural activity had represented to the Government to allow manufacturing of tea during the lockdown period as tea is a labour intensive industry. In view of the above, to mitigate the hardship faced by the industry, citizens and also due to several other economic reasons, the Ministry of Home Affairs vide order no.40-3/2020-DM-I(A) dated 03-04-2020 has allowed the tea industry to operate with maximum 50% of workers. Consequent to this, various tea producing states have allowed operations in tea gardens with 25% to 50% of workers on a shift basis.

### **Conclusion**

The year 2020 saw the tea production and export touch a nadir as coronavirus pandemic swept the country disrupting all activities. But tea consumption has increased steadily. During the lockdown in 2020 & 2021 some states in India have exempted the tea industry from lockdown. Special Standard Operating Procedure guidelines for Tea Sector during COVID-19 Pandemic have been issued. Now the beverage, tea, finds its place in most of the homes of all COVID-19 constrained households.

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