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## Comprehensive review on tea processing

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### Abstract

After water, tea is the greatest popular drink. It is made from *Camellia sinensis* leaves (family: Theaceae). Tea is non-alcoholic beverage and it is generally accepted that next to water, it is most frequently consumed beverage in the world. Oolong, black, and green teas are among the varieties produced, and they vary according on the post-harvest practises and the flavour preferences of a given region. Tea is processed in a variety of ways, including picking, withering, fixing, steaming, drying, rolling, fermenting, and storing. Due to its high content of natural antioxidants, tea is thought to be effective in preventing diseases like urinary stones, dental decay, and esophageal, colon, and lung malignancies. Tea can be utilised as a powerful agent because it has been shown to be anticariogenic, antimicrobial, anti-inflammatory, anti-carcinogenic, and anti-oxidant. These days, there is a huge need for healthy meals that contain free radical scavengers that are active. There are several key methods for producing tea, including the crush and curl methods. The various leaf-growing environments have an impact on tea quality. On the basis of liquor, brightness, briskness, colour, flavour, and leaf appearance, quality is assessed. Tea have many health like boost immune system, contain antioxidants, alertness, fight off inflammation and even off cancer and heart disease.

**Keywords:** Tea, health, quality, oolong, green tea, black tea, white tea, health benefits

### Introduction

The most popular beverage in the world and one that is served in a variety of ways is tea. *Camellia sinensis*, the plant from which tea is made, produces a tea beverage by wasting its young leaves and leaf buds. There are two primary varieties used: the small-leaved China plant (*Camellia sinensis* varieties *sinensis*) and the large-leaved Assam plant (*Camellia sinensis* variety *assamica*). (Kaundun and Mutsumoto, 2002; Namita *et al.*, 2012) <sup>[1-2]</sup>. It is generally acknowledged that tea, which is a non-alcoholic beverage, is the most popular beverage in the world after water. A lot of people consume it all over the world and it is also one of the least expensive beverages. (Henebery, 2006). When consumed without milk or sugar, it is a healthy, calorie-free beverage that is cool and pleasant. The tea plant was primarily developed in south eastern Asia and is now grown in over 30 nations worldwide in both tropical and sub-tropical locations. (Adnan *et al.*, 2013) <sup>[3]</sup>. Tea plants need an air temperature range of 180 to 250C to flourish. Shoot growth is observed to be reduced at temperatures below 130 c and above 300 c. Tea plants require 1200 mm of annual rainfall as a minimum. For the tea plant to develop, the soil's Ph must be between and (4.5 to 5.6). A well-drained, deep, well-aerated soil with more than 2% organic matter is the ideal soil condition advised for tea plant growth. (De silva, 2007) <sup>[4]</sup>. There are numerous sorts of tea available on the market, including black tea, red tea, yellow tea, green tea, etc., each with a unique processing method, level of fermentation, and level of oxidation. (Tran, 2013) <sup>[5]</sup>. Tea is mostly produced using the crush, tear, and curl (CTC) process. In order to properly prepare CTC tea, a horizontal maceration machine is used, and in the orthodox method, a roller or manual hand rolling is used. (Jolvis pou, 2016) <sup>[6]</sup>. The plucking interval, standard, and season size of the ground tea leaves, as well as the production process, all have an impact on the quality of the tea. Liquor, brightness, briskness, colour, flavour, and leaf appearance are used to gauge quality. (Ramedurai, 2000, Astill *et al.*, 2001) <sup>[8, 7]</sup>. Tea have many health benefits like boost immune system, fight off inflammation and even would off cancer and heart disease.

### Area and production

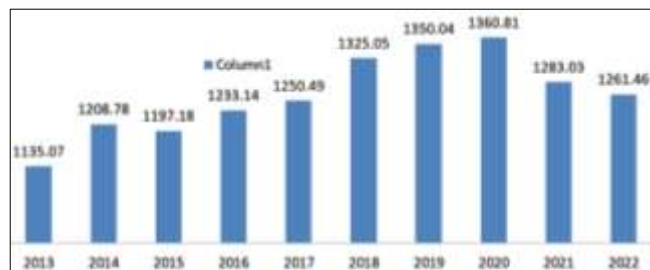
Due to the daily rise in demand, tea is one of the main commodities in the global beverage business. Increase in the area and production of tea along with global trade. China is top of the chart as the spiritual home of the humble cuppa and the tops of the list world largest tea production country. China produced 40% of the world tea weighing at 2.4 millian tonnes

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(Tea board, 2020). The estimated production volume of tea in west Bengal was approximately 26 million kilogram. Assam can second that year with as estimated production volume 24.5 million kilogram (Tea board, 2022).



**Fig 1:** Total production of tea across India from financial year 2013 to 2022

In 2013 there were 5.07 million tonnes of tea produced worldwide (including black, green, and instant varieties). Green tea production climbed by 5.1% in reaction to considerable rises in major tea producing countries, while black tea output increased by 5.4% in response to continuing firm pricing. China continues to be the world's largest producer of tea, with annual production of 1.9 million tonnes, or more than 38% of global production.

**Table 1:** World tea production from 2016 to 2020

Country	2016	2017	2018	2019	2020
China	2404.95	2496.41	2610.39	2799.38	2740.00
India	1267.36	1321.76	1338.63	1390.08	1257.53
Kenya	473.01	439.86	493.00	458.85	569.54
Sri Lanka	292.57	307.72	304.01	300.13	278.49
Vietnam	180.00	175.00	185.00	190.00	186.00
Indonesia	137.02	134.00	131.00	128.80	126.00
Other	838.83	834.64	904.18	882.84	855.25
Total	5593.74	5718.39	5966.21	6150.08	6012.81

(Tea board, 2020)

### Types of tea

Tea comes in several varieties, including green tea, black white, yellow tea, white tea, and oolong tea.

### Green tea

Black tea and green tea both come from the same species. Among all tea varieties, green tea is the most widely consumed and popular. Unoxidized tea is called green tea. It was made in China. In the nations where black tea is produced, it has recently grown in popularity. Green tea contains volatile taste, caffeine, flavanols, polyphenols, and amino acids. (Anonymous, 2011) [9]. Green tea was first used for medical purposes in China 4000 years ago, according to historical records. During the third century, cultivation, processing, and daily consumption had all started. It is particularly well-liked throughout east Asia, particularly in China and Japan. (Tran, 2013) [5] The percentage of green tea in manufactured tea is 20%. (Fatima and Rizvi, 2011) [22].

### Processing technology of green tea

Green tea is processed in a number of different ways during manufacture. Young, unfermented leaves are promptly steamed after being freshly gathered to prevent fermentation. This results in a dry, stable product that may be used to make green tea. (Yang *et al.*, 2009) [11]. Processing techniques

maintain green tea's poly phenol compound's natural poly with regard to its health-promoting effects. (Chacko *et al.*, 2010) [12]. Next harvest, inactive enzymes cannot degrade the chlorophyll in the tea tissue, which gives the plant its green colour.

### Plucking

The shoot with three leaves or the buds with two leaves from a high-quality tea need to be harvested and processed. For green tea of the highest calibre, such as Gyokura and Longjing, uniform and sensitive tea leaves are frequently required. Because normal flush depends on uniform leaves, immature shoots and coarse leaves are undesirable. The quality of prepared tea was diminished by plucking coarse leaves. After picking the shoot, lay it out on the ground or in bamboo trays for one to three hours to let it release a grass-like odour and then lower the moisture to the ideal amount to improve the flavour of the green tea.

Percentage of standard flush for picking standard leaves

Percentage	Leaf standard
<75%	Good picking
60-75%	Average Picking
> 60%	Rough Picking

(Singh *et al.*, 2014) [13]

A skilled individual may pluck about 40 kg of tea leaves each day when picking tea leaves. Hand plucking required more labour, which increased time and expense. Mechanizing the process of picking tea leaves is therefore necessary in order to gather tea leaves quickly and cheaply. Tea leaf automation in India is still in its infancy. (Sandeep *et al.*, 2011) [14]. The design and development of conceptual harvesting equipment has made it easier to gather tea leaves.

### Withering

Within a period of 4 to 12 hours, the withering causes the leaf's humidity content to decrease by 30%. Physical (resulting in a loss of moisture and changes in cell membrane permeability) and chemical (affecting the production of the tea scent, which is crucial for flavouring teas) alterations were experienced during withering. (Nagalakshmi, 2003) [31]. There are numerous ways to practise withering, but the classic approach is typically recommended since it uses an air blower to reduce the desired moisture for 12 to 24 hours.

### Physical change during withering

After being pulled, a new leaf instantly begins to lose moisture. Water removal occurs more quickly through the lower leaf surface when the stomata begin to close during the withering process as opposed to the top surface, which has no stomata. The permeability of the cell membranes in tea shoots increases with the degree of wither processes. (Singh *et al.*, 2014) [13].

### Biochemical changes in the green leaf during withering

Numerous chemical changes that happened throughout the withering process have been noted. The breakdown of protein into amino acids, the loss of fatty acids, lipids, carotenoids, and chlorophylls, the increase in caffeine content, the alteration of sugar, organic acids, and volatile compounds with scent are among the reported biochemical changes in withering. (Singh *et al.*, 2014) [13] Chemical withering lowers

the amount of chlorophyll and causes the emergence of many types of volatile taste chemicals. One of the most significant metabolic changes that take place during the process is the breakdown. (Hussain *et al.*, 2006) <sup>[56]</sup>.

### Fixing or steaming

Fixing green tea leaves in the processing technology is the next stage after picking. Fixing operations are carried out to lower the enzymatic activity in green leaf in order to stop fermentation and keep the leaves' green colour. The temperature used for pan-fixing is greater than 180°, but the temperature for steam-fixing is typically 100 °C. On a spinning drum, leaves are passed through heated steam for two minutes before being retrieved once more. In this step, the amount of steam will determine the outcome because too much steam can ruin the leaves and too little steam would cause fermentation to begin. The steam method has the advantage of speeding up the cooking process while preserving the antioxidant elements, appearance, and texture of the prepared meal. (Xua *et al.*, 2008) <sup>[16]</sup>. Steaming process caused the inactivation of enzymatic in freshly picked tea leaves and decreased the oxidation (Wang *et al.*, 2000) <sup>[17]</sup>. Green tea extracts in water comprised 22-23% phenols, while flavanols and catechins made up 49-87% of those phenols. The most prevalent water-soluble component in tea is usually the phenolic compounds, which are responsible for its strong antioxidant qualities.

### First drying

Use a metal or wooden drum to dry leaves by rotating it in warm air at 55 degrees for almost 30 minutes. The leaves lose around 50% of their remaining moisture during this process. The final tea quality is impacted by chemical or physical changes that occur during drying while requiring the least amount of energy. By controlling the drying temperature, one may detect burned flavour and quality loss. (Xie *et al.*, 2006) <sup>[18]</sup>. Drying can be done in a variety of ways, including vacuum drying with a blast furnace and a vacuum pump as well as hot air drying. Tea has been exposed to microwave energy, which causes the water and extra polar molecules to rotate at high speeds. This causes simultaneous heating of the tea's surface and inside and produces a significant amount of water molecules. (Lou, 2002) <sup>[19]</sup>. The maximum or minimum rehydration capacities of green tea for microwave vacuum drying and hot air drying, respectively, are shown. It can be seen that the rehydration ratio varied with different drying methods: microwave vacuum drying > microwave drying > vacuum drying > hot-air drying.

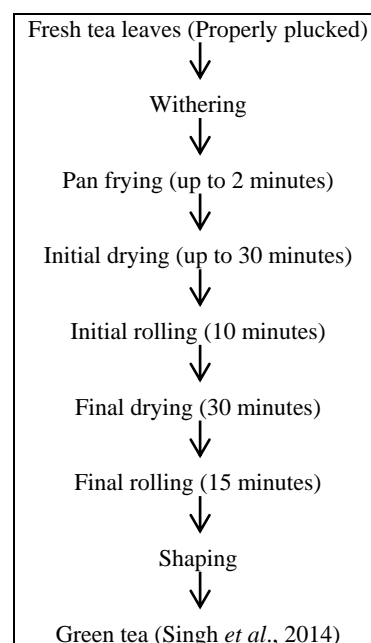
### Rolling

In this processing step, leaves are rolled with varying pressures for roughly 10 minutes in a rolling machine. Before moving on to the rolling machine, leaves are cleaned to remove impurities. The crushed materials are then refined further by a curl-turn-cut machine after passing finished a rotor vane machine for additional crushing. Finally, a roll breaker is used to remove harsh balls that hindered the

fermentation process from the materials. Optimal rolling is required because less rolling leads to unevenly crushed particles and more rolling results in chemical loss and incorrect chemical and enzyme mixing. (Naheed *et al.*, 2007) <sup>[54]</sup>. For a speedier drying procedure, loosen the compressed or compacted leaves by roll breaking and rolling. In order to improve the final product, remove moisture, and improve flavour, drying is frequently repeated. Due to the oxidation caused by the fermentation process, green tea often has needle-like shapes, dark green dry leaf, green infused leaf, and a distinctive aroma. It also contains more vitamin C than oolong tea and black tea. (Naheed *et al.*, 2007) <sup>[54]</sup>.

### Final rolling, drying and polishing

After the final rolling step, which involves holding tea leaves among two rotating metal plates of the rolling machine for up to 15 minutes, the leaves are then dried by being uncovered to hot air for a further 30 minutes for drying, and are then polished with the aid of a polisher by pressing them against a hot plate. Incredible flat, dazzling leaves are the end result.



Flow sheet processing of green tea

**Table 2:** The major chemical constituent of green tea leaves

Constituent	Percentages of dried leaf
Polyphenols	37
Carbohydrates	25
Caffeine	15
Protein	4
Aminoacids	6.5
Lignin	1.5
Organic acids	2
Lipids	5
Ash	0.5

(Sinija VR and Mishra HN, 2008) <sup>[21]</sup>



### Black tea

The most popular tea. The country that produces the most black tea is India. Black tea makes about 80% of all tea that is manufactured. Before to processing, the tea is heavily oxidised and totally fermented. The chemical composition includes polyphenols (Flavonoids, catechins) amino acid, vitamin, protein, carbohydrates (Caffeine, theobromine, theophylline). (Fatima and Rizvi, 2011) <sup>[22]</sup>. Blood pressure, platelet aggregation, CVD (cardiovascular disease), and CHD (coronary heart disease) risk have all been associated to lowering use of black tea. (Greyling *et al.*, 2014) <sup>[23]</sup>.

### Black Tea processing

#### Plucking

The manufacture of quality CTC (cut, tear, and curl) tea depends greatly on the leaf plucking process. The quality of tea will be reduced if it is made from coarse leaves. Leaf collection should occur early in the day so processing may begin right away. Two hours after the fresh tea is harvested, processing will begin to ensure high-quality tea. The quality of the tea will be substantially inferior if you process it the following day because fermentation will have already started. It is important to take precautions not to harm the tender leaves both during and after harvesting. The harvesting baskets shouldn't have any leaves squeezed or packed down.

#### Withering

The method involves drying off the tea leaves. It triggers physical changes and chemical changes in the leaves. In the physical changes after removal of water leaves become flaccid. In chemical changes, chlorophyll in the leaf begins to degrade, caffeine level slowly rise flavor and aroma develop in the leaves. (Srikantayya, 2003) <sup>[25]</sup>.

#### Withering trough

After spreading of green leaves on the trough on the basis of moisture content 1st hot air is blown to remove excess moisture from the leaves and then cold air is blown. Blowing time is depend upon moisture content it reduce moisture around 65-70%.

#### Type of withering

Physical or chemical withering are the two types of withering. It is challenging to obtain flavorful tea and a pleasing aroma from leaves that have not fully or unevenly withered, despite the importance of both withering stages. (Baruah *et al.*, 2012) <sup>[26]</sup>.

#### Chemical withering

Immediately when the tea leaves are harvested from the bushes, chemical withering occurs. Chemical withering is reliant on temperature and time but not on how quickly moisture is removed. The process involves the breakdown of complicated chemical compounds into simpler ones. The tea leaves get a floral flavour as a result of the enzymatic ripening that is sparked by the dehydration shock during chemical withering. (Sakata *et al.*, 2004) <sup>[27]</sup>. It has been said that

correct chemical withering is crucial for producing high-quality black tea. Chemical withering has been found to work best for 14 hours. According to experimental investigations, withering times exceeding 20 hours cause black tea's quality to decline, so they should be kept to a maximum of 18 hours. (Omiadze *et al.*, 2014) <sup>[28]</sup>.

#### Physical withering

The term "physical withering" describes the drying out of the tea leaf. The turgid leaf begins to sag during this process. Another outcome of this process is that sap builds up in the cells of the tea leaf. By blowing air through a pile of leaves, the desired amount of moisture can be removed. The moisture content of green leaves is decreased to 60% to 70% during physical withering. (Omiadze *et al.*, 2014, Jabeen *et al.*, 2019) <sup>[28, 29]</sup>. Relative humidity temperature time are the main reason affecting physical withering. (Obanda *et al.*, 2004) <sup>[38]</sup>. Tocklai (Tea Research Association, Assam, India) asserts that physical withering occurs more quickly than chemical withering. In order to regulate physical withering at a gentler rate for a lengthier period of time, withering must be achieved in the same amount of time as chemical withering. By monitoring the airflow rate and changing the air temperature when the tea leaves are withering, this can be prevented.

#### Rolling

After the withering process, the leaf is one-sided by rolling or cutting, thus it is not advised to use it right away. Black tea, green tea, and orthodox tea are produced through the traditional rolling of leaf. Rolling aids in extracting and twisting the juice from leaves. The leaf is twisted and damaged before being broken into little pieces and filtered by green leaf sifters while the bulk is called. Depending on the amount of wither the tea must have, the type of roller charge required, the pace of the rolling process, and the temperature, each roll can take anywhere from 15 to 60 minutes to complete, and a batch typically contains two to five rolls. (Nagalakshmi *et al.*, 2003) <sup>[31]</sup>.

#### Drying

Drying fermented tea has three main goals: to accelerate the chemical reaction that gives tea its flavour and character, to reduce moisture to extend tea's shelf life, and to stop the biochemical purpose by denaturing enzymes using heat. Tea was dried in order to lower its moisture content and enhance its flavour and aroma using a high-temperature thermochemical reaction. Measuring the moisture level of tea is a crucial step in making high-quality tea because it affects both the chemical and physical reactions that take place throughout the processing of the leaf. Tea is produced with decent quality when it is drawn at 1100 C and 1.5 RPM. The outcome is decent storage and keeping excellence. All lots were dried a second time at a low temperature of 80°C to eliminate 95% to 97% moisture. More than 6% of moisture causes continued fermentation after drying, which reduces quality. (Zobia *et al.*, 2007).

**Table 3:** Impact of tea quality and drying temperature

	Colour	Flavor/Taste	Aroma	Strength	Infusion
Tea is dried at 100 °C with 1.4 rpm and an additional 80 °C in the dryer.	Cheerful red	Decent	Fair	Week	Mixed
Tea is dried at 110 °C with a 1.5 rpm dryer speed and an 80 °C second dryer temperature.	Light red	Decent	Decent	Solid	Mixed
Tea is dried at 120 °C and 1.6 rpm with a second drying cycle at 80 °C.	Cheerful red and Light red	Very decent	Fair	Week	Green

(Zobia *et al.*, 2007)

**Fermentation**

It is the most important phase in the tea processing process and is essential for specific chemical and biochemical changes. ranges from 45 minutes to three hours. After rolling and unstable in the case of leaf (CTC type) is feast in reedy layer 5-8cm deep on the factory floor or on racked trays in a fermentation room temperature differs between 24° and 27° and is controlled by using cool air, an enzymatic oxidation of the polyphenols, especially tea, catechins, take place in the fermentation stage, leading to the formation of the green leaf. By the conclusion of the fermenting process, the leaf colour changes from green to red and a nice unique perfume develops. Theaflavin and Thearubigin have a 1:10 ratio. The benefits of contemporary advancements in fermentation technology, such as skip, trough, and drum nonstop fermenting systems, include controlled optimal temperature, reduced cost, lowered flood space requirement, and better briskness in tea liquor. (Srikantayya, 2003; Nagalakshmi *et al.*, 2003) [25, 31].

**Storage**

Tea is frequently sieved and winnowed to obtain various grades depending on the particle size in order to eliminate the shalky debris. As final tea products are stored, chemical changes occur, and they quickly lose any remaining greenness or harshness. If maintained in a cold phase and shielded from moisture and air, tea stays healthy and flavorful for longer than a year. (Nagalakshmi *et al.*, 2003) [31].



Plucking withering drying rolling



Packaging and storing

**White tea**

It is a non-fermented tea made from fresh *Camellia sinensis* shoots. It is used for reduce oxidative stress (Teixeira *et al.*, 2012) [35] It can be made by simply drying the bud or freshly picked leaves. (Hilal and Engelhardt, 2007) [36] The buds are protected to avoid exposure to the sun, which would reduce the production of green pigment. It has light and delicate taste. Another type of tea is prepared from young, tender leaves and buds that have undergone steam activation to initiate polyphenol oxidation before being dried. White tea is regarded as one of the most expensive types of tea for consumers and is more profitable for producers. Since white tea is created from tea buds that have been fully opened and have pubescence, which gives the finished product a silvery appearance, it is called white tea. due to the fact that the buds contain the maximum concentration of polyphenols, which subsequently decline with leaf ageing. Those who are health aware, particularly in America and Europe, love white tea. (Dias *et al.*, 2013) [37].



**Oolong tea**

Between green tea and black tea standards, oolong tea's oxidation is halted. Withering to drying normally takes two to three days, and the comparatively brief oxidation cycle only lasts a few hours. Lightly oxidised Darjeeling teas are more comparable to green or oolong teas. Semi-oxidized teas are collectively referred to as "blue tea" in Chinese, while some of these teas are more precisely referred to as "oolong" teas. In Taiwan, a major oolong grower, it is widely believed that too little oxidation can upset some consumers' stomachs. However, selected producers work to reduce oxidation in demand to achieve a particular flavour or to make it easier to roll the tea leaves into the spheres or half-spheres that are desired by consumers in the market. (Soni *et al.*, 2015) [38].

**Processing**

First off, the tea leaves necessity be harvested at a specific time to produce high-quality oolong tea. Second, the leaves need to be treated using the right procedures. The most crucial element in establishing the excellence of oolong tea is processing. The seven steps involved in the production of oolong tea include sunbathing and withering, fermentation, panning, rolling, fire, final firing, and packing. A variety of factors influence how good an oolong tea cup will taste. The method for preparing tea is crucial, in adding to the production-related factors.

Researchers in the twenty-first century claimed that the antioxidant activity of oolong tea was unaffected by whether it was steeped in hot or cold water. For individuals who are concerned about diabetes and obesity, oolong tea has become

**Table 4:** Black tea and green tea have different properties.

	Green tea	Black tea
Process	Short, no fermentation	Longer, Fermentation
Colour	Green or yellow	Black and red
Taste	Sweet after bitter	Distinct flavor, added sugar or milk
Antioxidant	In general, more polyphenols	More flavonoids
Caffeine	Less	More
Quality	Better in fresh	Depend on produced location
Health benefits	More in general: May irritate to empty stomach	Cardiovascular system

(Sharangi, 2009) [34]

more sanitary and convenient to bring, brew, beverage, clean, store, and travel. (Heiss, 2007) <sup>[39]</sup>.



## Health benefits

### Antioxidant property

The human body has a variety of defence mechanisms to deal with free radicals. Moreover, there is an equilibrium between pro-oxidative and antioxidant processes, and oxidation stress is the result of this equilibrium being upset in favour of free radicals. (Rohdewald, 1998) <sup>[40]</sup>. By the oxidation of vascular wall LDL (Low Density Lipoproteins), lipoproteins play a significant role in the growth of atherosclerosis. Because LDL is so high in cholesterol, it alters the way vascular walls are built. These structural alterations stimulate macrophages to

take up oxidised LDL, which facilitates a transformation into foam cells. The earliest discernible alteration of cellular tissue, known as fatty streaks, is caused by assembly of these cells in the arterial walls. These modifications may cause the artery to completely close, which could lead to vascular occlusion. It is commonly known that there are other abnormal behaviours. Among these, the anticariogenicity of catechins has actually been applied to stop tooth caries. In Japan, green tea extracts covering catechins are frequently used as a caries-preventive addition in food, sweets, chewing gum, and mouthwash. (Tsuchiya *et al.*, 1997) <sup>[41]</sup>.

### Anti-microbial activity

Black tea was discovered to be bactericidal and inhibitant against *S. mutans* or *S. sobrinus*. The agreement is that a cup of tea's catechin concentration is inhibitory and frequently bactericidal because the lowest inhibitory attentiveness of separate catechins was discovered to be between 50 and 500 mg/L. (Hamilton-Miller, 2001) <sup>[42]</sup>. According to research, Mutans streptococci produce less acid and grow more slowly when exposed to oolong tea extract. (Matsumoto *et al.*, 1999) <sup>[43]</sup>

### Anti-cancerous activity

As chemo preventive agents for cancer, green tea polyphenols have received substantial research. By inducing numerous cytochrome P450s, catechins act as carcinogens. The effectiveness of tea use in preventing several types of cancer is presented in the table.

**Table 5:** Impact of tea drinking on preventing various forms of tea

Type of cancer	Effect of tea consumption	Reference
Pancreatic cancer	Main tea drinker were less probable to grow pancreatic cancer compare to nondrinker. Advance studies are wanted to recommended it powerfully	Ji <i>et al.</i> , (1997) <sup>[44]</sup> and Lyn-Cook <i>et al.</i> , (1999) <sup>[45]</sup>
Lung cancer	Okinawan tea, which is fermented green tea comparable to green tea, has been linked to a lower incidence of lung cancer, especially in women, according to a population-based study.	Ohno, Wakai and genka (1995) <sup>[46]</sup>
Stomach cancer	In two trials that compared tea drinkers and non-drinkers, researchers discovered that those who drank tea had approximately half the risk of developing stomach cancer and gastritis (stomach inflammation) as those who did not. There is no connection between consuming green tea and the risk of stomach cancer, according to a recent Japanese study. Further study in this area can only support the finding that green tea lowers the risk of contracting this illness.	Setiawan, Zhang and Yu (2001) <sup>[47]</sup> and Tsubono, Nishino and kom21qatsu (2001) <sup>[48]</sup>
Esophageal cancer	According to a bigger population-based investigation, green tea significantly reduced the risk of developing esophageal cancer (particularly among women). The risk increases with the strength and temperature of the tea. Before green tea is advocated for the prevention of esophageal growth, more research is required.	Hu, Nyren, Wolk and Bergstrom (1994) <sup>[49]</sup> , Gao, Mc Laughlin and Blot (1994) <sup>[50]</sup>
Prostrate cancer	Green tea extracts have been shown in studies to stop the growth of prostate cancer cells in test tubes. During getting chemotherapy, black and green tea should not be consumed because they both become less sensitive.	Lyn-cook <i>et al.</i> , (1999) <sup>[45]</sup>

## Disadvantages

When used in moderation, tea has no negative side effects. However, excessive intake of certain teas, such as black tea, which contains a significant quantity of caffeine, may result in health issues such as headaches, nervousness, sleep issues, irritability, diarrhoea, vomiting, uneven heartbeat, indigestion, dizziness, and buzzing in the ears.

Excessive drinking of may cause issues with staining of the dentition. This staining is likely generated by interactions between components of the tea and both surface integuments, such as learnt salivary pellicle and probably, the mineral crystals of tooth enamel. (Simpson *et al.*, 2001) <sup>[51]</sup>.

## Conclusion

Next to water, tea is considered to be a delightful, thirst-quenching beverage by the majority of people worldwide. According to scientific studies, tea is the most popular natural health beverage in the world. Scientific studies on the benefits of tea drinking on human health have made the beverage more well-liked in society. Tea is one of the maximum studied plant-based medicines, despite the fact that it hasn't been approved as a medical treatment. A increasing body of preliminary study has been done to determine the possible advantages for oral health. It is obvious that tea is much additional than just a flavorful and gently stimulating beverage, perhaps as a result of its therapeutic benefits in the

treatment of periodontal and dental problems. But, more extensive, carefully monitored human experiments are necessary before any conclusive judgment can be reached. For now, it is reasonable to draw the conclusion that tea intake, without the addition of sugar, might be made a constituent of dietary guidance to prevent dental illnesses, so aiding in the promotion of general health and wellbeing by the most practical means. Now that we have discovered this ancient treasure, we should grab this opportunity and make the most of it. In comparison to current beverages like hard drinks, which have minimal value in terms of human health, tea is an economical beverage with natural therapeutic benefit.

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