**TEA: THE UNIVERSAL DRINK**

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**ABSTRACT**

Tea is the world’s most popular beverages and is the economical backbones of various teaproducingcountries like India, China, Sri Lanka, Kenya etc. Indian tea is very much famousin the world, especially Darjeeling tea which is famous for its unique flavour and taste.Among the various types of tea, Orthodox/ Conventional tea is highly demandable amongthe various types of tea due to its quality. This paper focuses on the brief history of teaand its production especially in India, Types of teas - Conventional and Non- Conventionaland Processing techniques of tea.

**HISTORY**

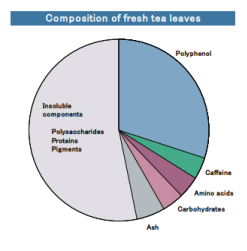
The saga of origin, dispersal and cultivation of tea is still a mere speculation even after almost two centuries of it’s consumption. It is believed that tea originated somewhere in south-east Asia. According to the current distribution pattern of tea types and varieties, it probably originated near the Irrawaddy bas in from where it got dispersed to China, Indonesia, Assam. These three principal regions have their own characteristic biological features imparting peculiar flavour to it. Eventually, tea got dispersed from these three prime locations to tropical or sub- tropical regions either by human intervention or naturally marking its presence in red-yellow podzols in Taiwan, red soils in China, lateritic soil in south- India, south Africa, Sri-Lanka etc. (Panda et al.,2016).

The search for tea in India was started by East India Company as an alternate source of supply to the U.K, which was then heavily dependent on China for its tea imports. Geographical constraints forced these plants to indigenously exist in the regions of India, Burma and China and some parts of Kumaon hills. Major Robert Bruce virtually laid the foundation of the tea industry in India after his discovery of tea plants in Assam.

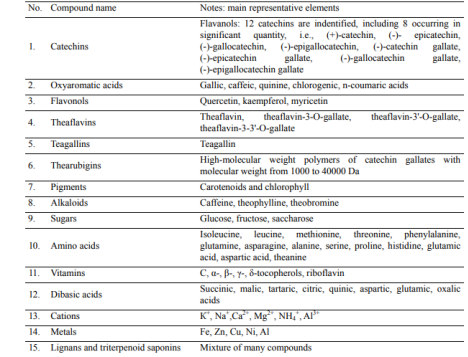
The pioneering endeavours by George Williams on in commercial manufacture of tea was carried out in 1839. He started a company, Assam Tea Company, leading the path to the development of tea technology compared to the traditional methods of manufacturing in China then. Further expansion of centres in Darjeeling, terai and cachar in 1862, followed by Dooars in 1874 resulted in rapid growth and development of tea production in India.

**COMPOSITION**

The chemical composition of fresh tea flush contains components like, polyphenols, catechins-There are twelve catechins in total, although only eight catechins arepresent intea in significant quantities (Zeeb et al., 2000)., caffeine, amino acids, flavonoids, vitamins, polysaccharides and fluorine. Polyphenols and caffeine are the most important pharmacological components of the tea. Polyphenols are present from 30-35% in dry tea leaf matter determiningthequality of tea. (\*All these compositions are subjected to change, depending upson tea varieties, environmental effects, methods of processing and mode of propagation.)



**Table 1: All the compound names and their main representative elements present in tea:**



**TYPES**

Teas canbe broadly classified into conventional andnon-conventional types. Conventional teas include; totally fermented black tea, raw orunfermentedgreentea and partially fermented Oolong(red and yellow) tea (Table 2).

Non- conventional teaproducts are- instant tea, decaffeinated tea, instant tea, flavoured tea. Other in trendproducts are canned/bottled teas, soluble mixes, tea beverages, frozentea liquid have showntremendous increase ininternational markets especially US, UK and Germany.(Nagalakshmi et al., 2003) (Table 3).

**Table 2: Characteristic features of different types of conventional tea**

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| **S.no** | **Types of tea** | **Characteristic Feature** | **References** |
| 1. | Green tea | Steaming fresh tea leaves of Camellia sinensis produces green tea, resulting in preservation of colour. Consumption has been known to refer back to the third century B.C.  Green tea is very well known to possess medicinal properties owing to the presence of various phytochemicals or bioactive compounds.  Catechins, the bioactive compounds have the potency to scavenge the free radicals. Therefore, they are potent antioxidants. | Schneider and Segre, 2009;  Tran, 2013  Cabrera et al., 2006 |
| 2. | Black tea | India is the largest producer of black tea. 80% of the total manufactured tea is black tea.  It is primarily consumed in countries like China, Japan, India and some others in North Africa and Middle. The chemical composition includes polyphenols (catechins, flavonoids, Bisflavanols, theaflavins), amino acids, vitamins, proteins, carbohydrates and alkaloids (theobromine, caffeine, theophylline) | Ruxton,2008; Fatima and Rizvi, 2011; Chaturvedula and Prakash, 2011; Adnanet al., 2013 |
| 3 | Oolong tea | It is partially fermented. Its consumption is confined to Southeastern Asia and Taiwan. Its composition is intermediate Between green tea and black tea. Major constituents are caffeine, polyphenols and amino acids. Oolong tea is prepared by soaking tea in hot water i.e. ˃90ºC followed by careful stirring and steeping procedures for the extraction of catechins or theaflavins. Its astringency is low and is sweet in taste as compared to green tea. | Bhagwat et al.,2003;  Chaturvedula and Prakash, 2011; Graham, 1992; Komatsu et al., 2003; Suet al., 2007 |
| 4 | White tea | It is an unfermented tea obtained from young shoots of Camellia sinensis. It is obtained by drying the bud or First plucked leaves with minimal processing. The countries producing white tea are India, China, Kenya, Sri Lanka and Vietnam. It has a light and delicate taste. It is used to reduce oxidative stress and treat obesity. | Teixeira et al., 2012;Hilal andEngelhardt, 2007;Blair, 2006; Dias et al.,2013; Teixeira et al., 2012 |
| 5 | Yellow tea | It is partially fermented tea. It is unwilted and unoxidised. The most popular traditional yellow tea in China is “large yellow tea” which is made from “one bud 6 leaves” of Camellia sinensis.  It possesses a mild taste and strong aroma. Its characteristic burnt flavour makes it highly popular. | Hashimoto et al., 2007;Bhattacharjee 2015; Tenget al., 2018 |
| 6 | Dark tea | It is an unfermented type of tea. It contains brick tea and pu-erh tea. It is brownish yellow or brownish red in infusion, has a stale aroma and has a smoky taste. | Chaturvedula and  Prakash, 2011 |

**Table 3: Non- Conventional Tea products**

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| **S.no** | **Types of Tea** | **Characteristic Feature** |
| 1 | Flavoured Tea | Flavoured teas are nothing but incorporated with natural or nature identical flavours during processing of tea. Such teas are a boost to the economy. Some commonly consumed flavours are flavoured black tea, instant tea, decaffeinated tea etc. Natural flowers, flower petals, skin peel of citrus fruits, essence of apricot, apple, lemon, orange also impart fruity flavour. |
| 2 | Instant Tea | The process of dehydrating the infusions of either black or green tea yields a highly hygroscopic product called instant tea. They are available in the market mainly in two types: fat soluble and cold-soluble based on customer preferences. Green tea, black tea etc are used as the base for instant teas. |
| 3 | Decaffeinated Tea | These days concerned consumers have started regulating the amount of sugar, oils etc in their diets. Caffeine is no such exception. 60-80% of caffeine is separated from black tea by the process of solvent extraction. This reduces caffeine content significantly from 0.8% to 0.2 %. |
| 4 | Ready to serve beverages | Brown teas are consumed across the globe except in India and UK, where it is consumed along with milk and sugar. Extracts undergo a process of vindication. Extract is fermented by *Saccharomyces cerevisiae*over a span of 15 days. |
| 5 | Carbonated tea beverages | Black tea or decaffeinated black tea is extracted with water to introduce the required solubles into the water medium and then filtered through fine filters. Sugar syrup, a preservative (sodium benzoate) and an acidulant (citric acid) are prepared separately and later incorporated in the beverage. |

**PROCESSING**

1. Harvesting or Plucking

This operationis a significant stepinthe finalquality of the tea. Usually, tender and uniform terminal buds and two shootingleaves or only shoots withthree leaves are picked from the teaplant twice a year. Manualpickingis done forhighquality tea and it highly depends onthe skill of thepicker but this is a costly method. Mechanicalpickingof tea flushes and leaves are alsopracticed but it results inlargequantities of brokenleaves andpartial flushes. However, mechanicalharvestingat the right time canyieldhigh quality teas. Pluckingof coarse leaves is strictly avoided since it interferes inthequality of the tea.

1. Withering

Theplucked tea leaves are subjected to witheringfor initial removal of moisture content. Two methods of witheringaregenerallypracticed.

* Natural method of Withering -The freshlypicked tea leaves are spread out invery thin layers on wire meshed racks that are arranged one above the other and further subjected to dryinginnatural air for a minimum period of 20 to 24 hours.
* Artificial Withering – Theplucked tea leaves are widely laid in 18 to 20cm layers in tables with wire meshes that areplaced ina tunnel in whichforced circulationof warm air mixed withfreshair takesplace. This method of witheringsignificantly causes a reduced witheringtime, resultinginapproximately 60-62% residual moisture reduction renderingthe withered tea leaves suitable for teaprocessing.

1. Breaking Up

Breakingupis theprocess of rollingthe withered tea leaves whichis apre-preparation step. This is done withtheuse of a circular table witha central cone withlateral slat-like arrangement called battens. The topof the table is fitted witha circular jacket witha pressure cap. The table and jacket are made to rotate inopposite directions eccentrically, thereby causingthe withered leavesplaced inthe jacket to twist and roll onthe surface of the cone and battens whichis almost similar to manual rolling.

1. CTC Method (Crushing, Tearing and Curling)

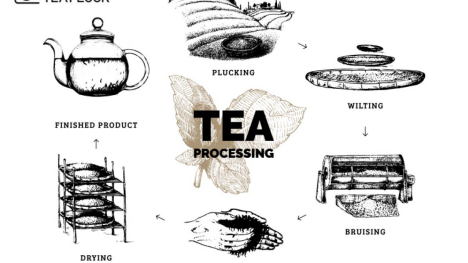
CTC machine comprises two metal rollers that are separated butplaced with minimum distance betweeneach other that revolves atunequal speeds. This movement cuts, tears and twists the withered and broken uptea leaves. As a result the juice from the tea leaves arepressed to the surface of the leaves, whichinitiates the fermentationprocess.

1. Fermentation

Duringfermentation, the oxidationprocess whichhad begunduringrollingis continued. Fermentationtakesplace inseparate fermentationrooms, whichneed to be kept extremely cleanto avoid bacterial infectionof the tea. The tea leaves areplaced in 3.5 –7.5 cm. layers onaluminium trays. The thickness of the layers depends onthe room temperature. As soonas the teahas acquired a copper red color, the correct degree of fermentationhas beenreached, and theprocess must behalted by drying. The tannin content decreases duringfermentation, from 20% infreshtea leaf to 10%–12% after fermentation. The formationof aroma compounds is caused due to oxidationof amino acids, carotenes, andunsaturated lipids duringthe fermentationperiod.

1. Drying or Firing

The dryingprocess carried ona 4 plates system drier. Hot airupto 90 °C, is blownagainst the leaves, whichshouldhave reached 80 ° C. By the time ithas beencompleted, I order for thepolyphenol oxidase enzyme to beproperly inactivated. The moisture content should be reduced to 3.5% whereby the aroma becomes established and the leaves take ontheir typical black coloration.



**SUMMARY**

Tea is a refreshing, thirst-quenching beverage next to water, consumed inanumber of different ways by mostpeople all across the world. Owingto thepresence ofnumerous compounds, itplays animportant role inthehealthfood/functional food industry. Different types of tea and tea basedproducts arenow-a-days inthe market to cater the needs of the consumers.Still there is a strongneed to developor modify the existing processing methods, for the better retentionof thephytochemicals as well as tea-based products. Onanotherhand, consumer awareness regardingthe same ishighly required for their wide acceptability. Highimpact value additioncanexpand the export market of India dramatically and it is emergingas anew researchscope inthis era.

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