

## TEA- PROCESSING



**AATMANIRBHAR BHARAT**

**PM Formalisation of Micro Food Processing  
Enterprises Scheme (PM FME Scheme)**

# INTRODUCTION

The actual origin of tea aren't quite known but it is believed to have originated from north east India, north Burma, southwest China or Tibet.

The harvesting and selling of tea began hundreds of years ago in China and from there it spread to Japan and Korea.

**Common name : Tea**  
**Scientific name: *Camellia sinensis***



# INTRODUCTION

- Through the centuries, a variety of techniques for processing tea, and a number of different forms of tea, were developed.
- During the Tang dynasty, tea was steamed, then pounded and shaped into cake form.
- Tea was first introduced to Western priests and merchants in China during the 16th century, at which time it was termed *chá*.
- In India, tea industry originated after 1823 as result of discovery of tea plant in Assam. The discovery of indigenous tea in Assam in 1823 led to the origins of the tea industry in India.

# TYPES OF TEA

## GREEN TEA

- Less fermented and contain high amount of catechins.
- Manufactured mainly for preservation of polyphenols in tea leaves.

## BLACK TEA

- More fermented than green tea.
- Contains more Flavonoids.

## WHITE TEA

- Made from buds which have been steamed to inactivate polyphenol oxidation.
- Contain high amount of Polyphenols.

# TYPES OF TEA

## ORTHODOX TEA

- Very popular and widely consumed in India.
- Known for its distinctive color and flavor

## OOLONG TEA

- Semi fermented tea.
- Posses characteristics of both green tea and black tea

## BRICK TEA

- Mainly made from old or fallen leaves.
- Not used for commercial purpose.

# VARIOUS REGIONAL PRODUCTS OF TEA



# PRODUCTION TREND (GLOBAL SCENARIO)

	1998	2010	2012	2013	2014	2015	2016	2017	2018(P)*
Production (M.Kg)	2987	4281	4693	5001	5209	5285	5574	5698	5883
Imports (M.Kg)	1236	1656	1665	1735	1741	1721	1735	1727	1738
Exports (M.Kg)	1303	1786	1775	1861	1826	1798	1803	1796	1863
Consumption (M.Kg)	2920	4154	4538	4702	4879	5035	5283	5488	5615

\*Provisional

**Source** : Indian Tea Association

# PRODUCTION TREND (INDIAN SCENARIO)

	1998	2010	2012	2013	2014	2015	2016	2017	2018(P)*
Production (M.Kg)	874	966	1126	1200	1207	1209	1267	1322	1339
Imports (M.Kg)	9	20	21	20	21	19	21	20	20
Exports (M.Kg)	210	222	208	219	207	229	223	252	256
Consumption (M.Kg)	650	860	944	966	989	1012	1035	1059	1084
TOTAL Auction Price (Rs/Kg)	76.73	106.32	125.25	132.23	130.91	128.60	135.93	134.81	138.83

\*Provisional

**Source : Indian Tea Association**

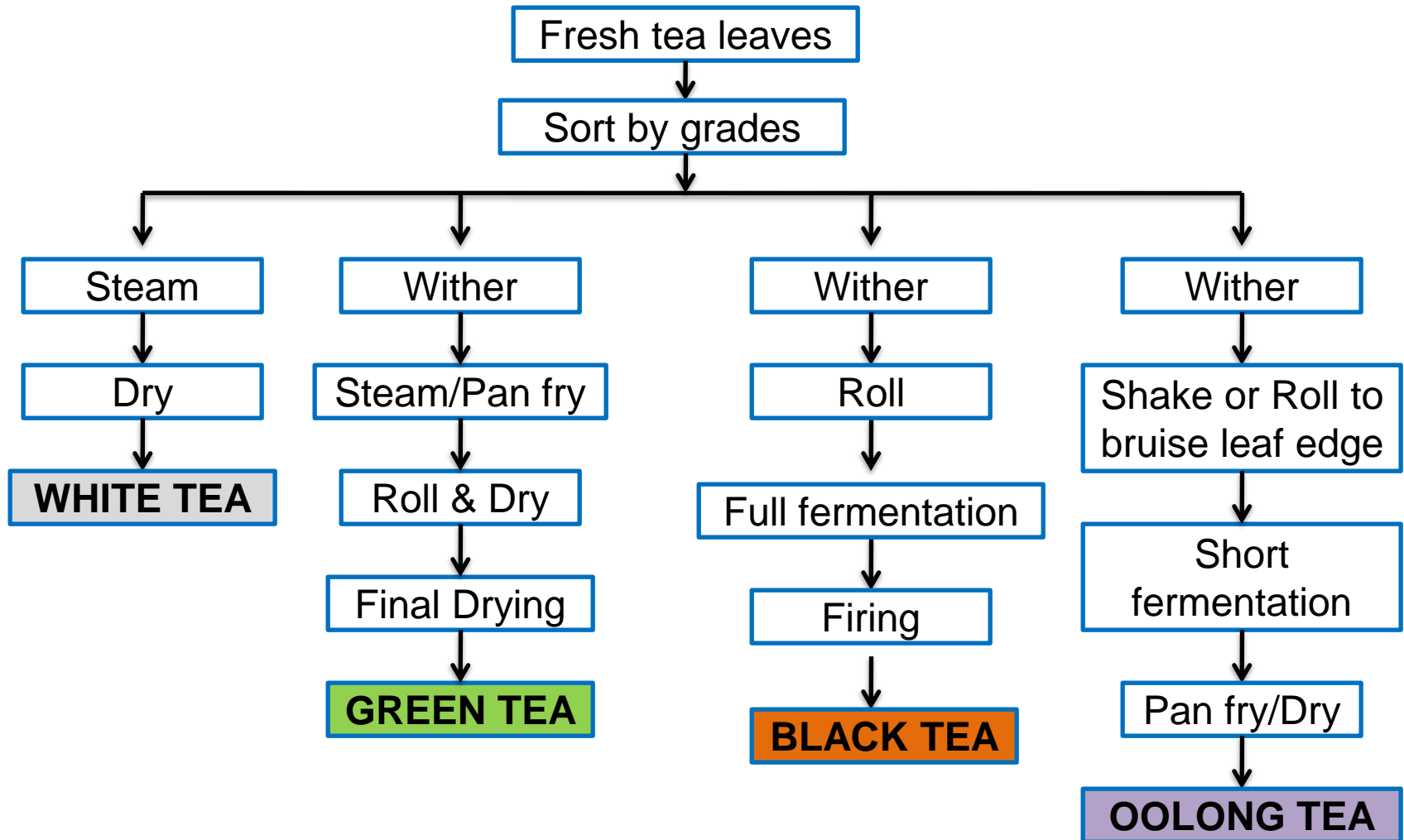


# PRODUCTION AREA OF TEA IN INDIA

SL .NO	STATE	TOTAL AREA (in Hect)
1	Assam	337690.35
2	West Bengal	148121.74
3	Other North India	49816.95
<b>4</b>	<b>North India</b>	<b>535629.04</b>
5	Tamil Nadu	62885.13
6	Kerala	35871.16
7	Karnataka	2171.74
<b>8</b>	<b>South India</b>	<b>100928.03</b>
<b>9</b>	<b>ALL INDIA</b>	<b>636557.07</b>

**Source** : Tea Board India, Kolkata

# TEA PROCESSING



# TEA PROCESSING

## 1. PLUCKING:

- ✓ Fine and standard plucking gives better quality of tea
- ✓ Mostly done in morning and leaves should be processed within few hours of plucking for getting good quality of tea.
- ✓ Proper care should be taken to avoid bruise or damage of fresh leaves.
- ✓ Coarse leaf gives poor quality of liquors.



# TEA PROCESSING

## 2. WITHERING :

- ✓ It requires storage of green shoots for 12 – 20 hours.
- ✓ Remove excess moisture from tea leaves.
- ✓ Gradual onset of enzymatic oxidation.
- ✓ Accompanied by chemical changes which affect the fermentation and final quality of the product.



# TEA PROCESSING

## 3. DISRUPTION

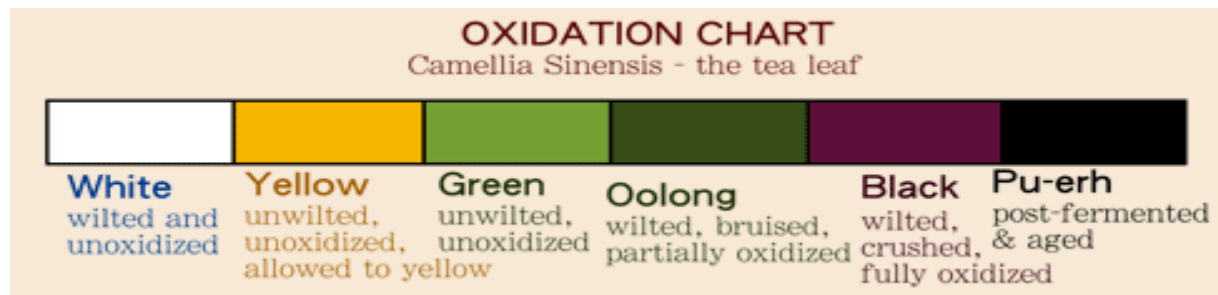
- ✓ It means reduction of size of tea leaves or leaf maceration.
- ✓ Done with help an equipment called as Rotorvane.



# TEA PROCESSING

## 4. OXIDATION AND FERMENATTION

- ✓ Leaves are left their own I climate controlled room.
- ✓ As soon as the tea has acquired a copper red color, the correct degree of fermentation has been reached.
- ✓ This is accompanied by agitation in some case.
- ✓ The chlorophyll in the leaves is enzymatically broken down.



**Source : Pouring Tea**

# TEA PROCESSING

## 5. FIXATION/ KILLING GERMS :

- ✓ Done to stop the leaf oxidation
- ✓ Leaves are moderately heated to inactivate the oxidative enzymes.
- ✓ Leads to removal of unwanted scents from the leaves without damaging the quality of leaves



**Source : [Esgreen.com](http://Esgreen.com)**

# TEA PROCESSING

## 6. SWELTRING/YELLOWING :

- ✓ This process is unique for yellow tea.
- ✓ Warm and damped tea leaves from after kill-green allowed to be lightly heated in a closed container.
- ✓ Results into turning of green leaves in to yellow color.



**Source** : Royal Tips Tea



# TEA PROCESSING

## 7. ROLLING /SHAPING:

- ✓ The damp tea leaves are rolled to be formed into wrinkled strips with the help of rolling machine.
- ✓ The roll is very gentle and during this temperature should be below 35°C.
- ✓ The rolling action further causes some of the sap, essential oil, and juices inside the leaves to ooze out which further enhances the taste of tea.



# TEA PROCESSING

## 8. DRYING :

- ✓ The fermented tea dried/fired up for 20-25 minutes at temperature ranges from 220°F -250°F.
- ✓ Temperature difference between inlet and outlet should be approximately 90°F.
- ✓ There are various types of dryer used for drying such as fluid bed drier, hot bed drier etc.



Source: [food-drying-machine.com](http://food-drying-machine.com)

# FACTORS DETERMINE QUALITY OF TEA

- ❑ **Quality of plucked leaves** : Should be freshly plucked
- ❑ **Optimum Wither** : Light wither around 65 to 75% consider as good.
- ❑ **Speed of the roller** : Lower the speed, better is the quality of tea due to proper cut.
- ❑ **Teeth sharpness of rollers**: Blunt rollers produce poor quality of tea.
- ❑ **Temperature of rolling room**: should be cool and humid.
- ❑ **Cleanliness and Hygiene of production chamber, equipment, and others.**

# MAJOR CHEMICAL CONSTITUENT OF TEA

Constituent	Percentage (% 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

*\*Source: Sinija VR and Mishra HN (2008) Green tea: Health benefits, Review. Journal of Nutritional and Environmental Medicine.*

# TEA PRODUCTS

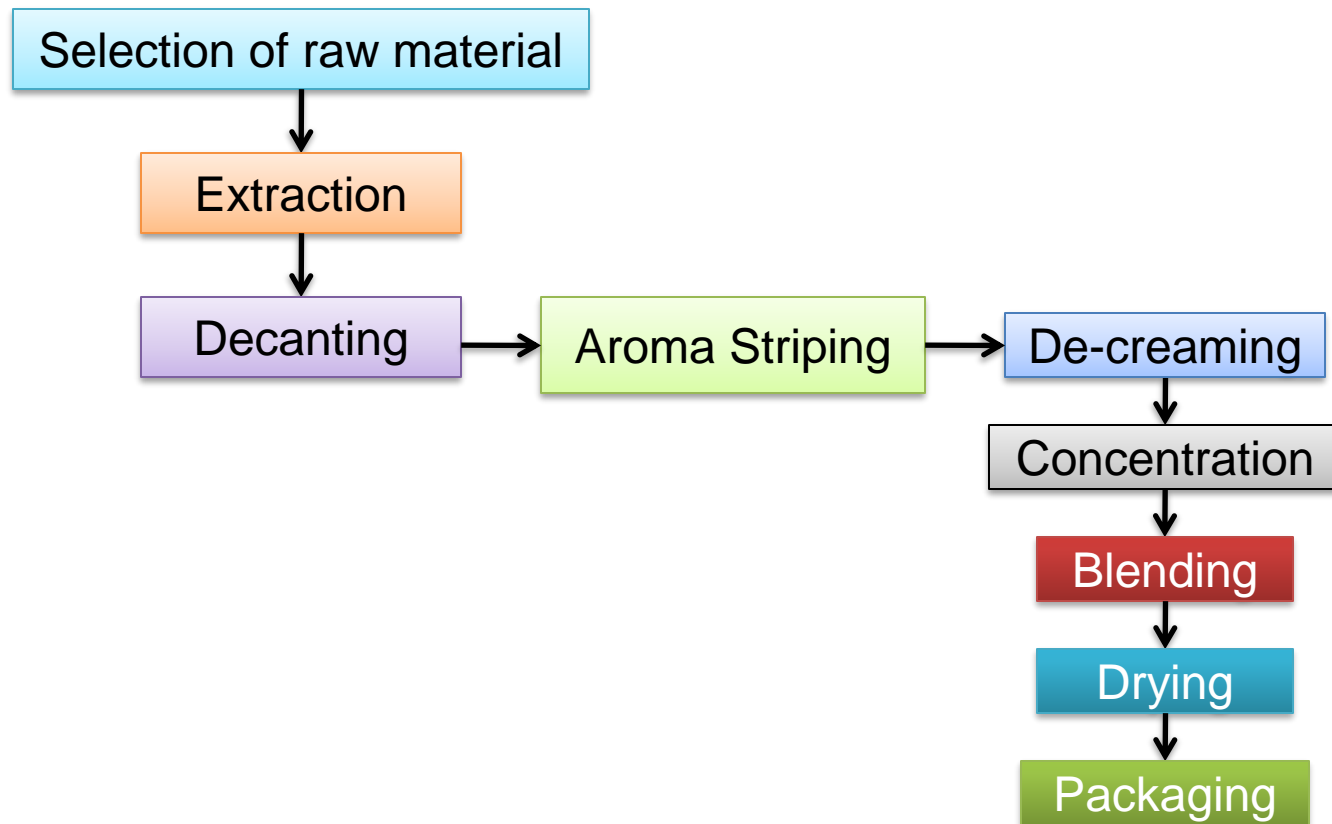
## INSTANT TEA :

- Instant tea is a powder in which water is added, in order to reconstitute it into a cup of tea.
- The earliest form of instant tea was developed in the United Kingdom in 1885.
- Falls under the classification of a Newtonian fluid.
- Flavor and color compounds being evenly distributed when water is added.



# PROCESSING OF INSTANT TEA

**MANUFACTURING OF INSTANT TEA INVOLVES FOLLOWING STAGES.**



# PROCESSING OF INSTANT TEA

## 1. Raw material :

- Selection of raw materials includes availability of material, processing method, and manufacturer and end user preferences.

## 2. Extraction :

- Extraction is carried out either in hot or cold water in batch or continuous extraction.
- Cold extraction is good for ice tea beverages while hot extraction is used for hot tea beverages.

## 3. Decanting:

- The extracted slurry is subjected to pass through continuous decanters and clarifier to remove the non soluble suspended matter from the extract.

# PROCESSING OF INSTANT TEA

## 4. Aroma striping:

- Striping is a physical process.
- Volatile aroma compounds are stripped from the extract prior or during evaporation and added back to the liquor before spray drying.

## 5. De-creaming :

- Presence of excess tannin may hamper the quality of instant tea.
- Undesirable tannin are removed by precipitation process known as cream separation.

## 6. Concentration :

- Concentration is normally done through evaporation at reduced pressure.



# PROCESSING OF INSTANT TEA

## 7. Blending :

- Blending of tea concentrate with aroma returns the rich flavor of tea.

## 8. Drying :

- Drum, spray and freeze drying can be used for the drying of concentrated tea liquor, but spray drying is most commonly used in the industry because it is cheaper in terms of both capital and running costs.

## 9. Packaging:

- Final stage of instant tea processing which normally done in aseptic condition to avoid any kind of microbial contamination

# TEA PRODUCTS

- ❖ Tea is highly beneficial for the health due to presence of polyphenol approximately 30-40% in green tea and 3- 10% in black tea.
- ❖ Because of its antioxidant properties, extract of green tea is widely used as ingredients in manufacturing of products like protein powder, chocolate etc.



# GLOBAL PLAYER IN TEA MANUFACTURING



# DIFFERENT FLAVORS OF TEA AVAILABLE IN MARKET



Source : <https://www.tetley.in/>

# HEALTH BENEFITS

- ✓ Tea possesses antioxidant properties thus help the body in defend from free radical, heart diseases, plaque in mouth etc.
- ✓ Consumption of tea helps in reducing LDL (bad) cholesterol.
- ✓ Catechins found in tea have anticariogenic properties which prevent dental caries.
- ✓ Helps in reducing different types of cancer such as digestive cancer, oral cancer, lung cancer, prostate cancer, Ovarian cancer etc.
- ✓ Reduces risk of Osteoporosis
- ✓ Posses antibacterial & antiviral properties.

# HEALTH BENEFITS

Consumption of different types tea also helps in :

- ✓ Lowering the blood pressure
- ✓ preventing the symptoms of diabetes
- ✓ promoting Healthy Skin
- ✓ reducing the signs of inflammatory disease and artery disease.



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