PM Formalization of

Micro Food Processing Enterprises (PMFME) Scheme

HANDBOOK

OF

TEA AND TEA PRODUCTS

AATMANIRBHAR BHARAT

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ABBREVIATIONS

1	PET	Polyethylene terephthalate
2	LDPE	Low-density polyethylene
3	BIS	Bureau of Indian Standards
4	FSSAI	Food Safety and Standards Authority of India

CHAPTER 1

1.1 INTRODUCTION

Fig 1: Tea Leaves

Scientific name: *Camellia sinensis*

Family: Theaceae

Common name: Tea, tea bush, cha, chai

Leaves: Bright green and shiny

Flowers: Scented, occurring singly or in clusters of two to four.

Fruits: Brownish-green, containing one to four spherical or flattened seeds.

Origin: Native to East, South and Southeast Asia, but it is today cultivated across the world in tropical and subtropical regions.

1.1 Origin and early trade history:

The story of tea starts in China in 2737 BC. China is considered as the birthplace of the first tea gardens.

As per the story, Shen Nung a famous Chinese herbalist who was resting under a tree and his servant was boiling water for him, meanwhile few leaves from the tree blew into it. The fragrance rises from water attracted him a lot. The tree was a Camellia Sinensis.

During colonial time tea became one of most profitable trading goods. In 1596, The Dutch Merchants at Benton established a trading base and it was year 1606 when first consignment from China reaches to Benton.

By the mid of 17^{th} century, popularity of tea rises in different parts of the world. Later, by the mid of 19^{th} century many counties such as India, Sri Lanka and others started tea cultivation commercially.

Currently, plant of tea is commercially cultivated throughout the world from Asia to Africa, from North America to South America, and from Europe to Australia.

1.2 Cultivation and harvesting :

The quality of tea is directly influenced by climatic condition and terrain of that particular area where the plantation has been done. Plantation of tea is restricted to few places of the world due to its sensitivity towards growing condition. It has been also found that the chemical composition of tea varies as per the environment condition at the time of processing.

Cultivation of tea requires following conditions:

- good amount of humidity and rainfall in growing season.
- high altitude
- Acidic soil

CHAPTER 2

2.0TYPES OF TEA

All the varieties of tea and their related traditions and activities have their source in one plant: Camellia sinensis, native to southeastern Asia.

Because of manufacturing process and oxidation tea leaves shows certain some changes in their color and shape and based on these tea can be of following types:

2.1 Green Tea:

- Green teas are those in which leaves are neither fermented and nor getting oxidized.
- Green tea have number of grade because of its peculiar flavor and aroma.
- Manufacturing of green tea is mainly due to presence of high amount of polyphenols which act as an antioxidant thus promoting good health.
- Because of high temperature during roasting, polyphenol oxidizing enzymes become inactive.

2.2 Black Tea :

- Unlike green it tea, it is completely oxidized and fermented which result in to formation of theaflavins and thearubigins.
- Black tea have strong flavor as compare to green tea.
- Has ability to retain flavors for many years.
- Black tea contain less amount of polyphenol as compare to green tea.

2.3 White Tea :

- It is either less oxidized or unoxidized.
- For the manufacturing of white tea only top buds and young leaves are used.
- Appearance of final product of white tea is silvery due to pubescence.
- Buds conation good amount of polyphenols which gradually reduce with age.

2.4 Oolong Tea :

- It is partially fermented tea.
- Have characteristics feature of both green and black tea
- manufacturing process involves withering of leaves.
- Oolong tea also called as hybrid black and green tea because it involves finishing techniques like green tea and oxidation like black tea.

2.5 Pu-erh Tea :

- A variety of aged dark tea.
- Manufacturing process involves fermentation and oxidation followed by drying and rolling.

2.6 Cut-tear-curl (CTC):

- Very much common in Bengal.
- Manufacturing process involves cut, tear and curl and then processed with an equipment called as CTC machine.
- Cost of production is very less and time of brewing is vey less.
- Have robust flavor with palletised appearance.

CHAPTER 3

3.1 TEA PROCESSING

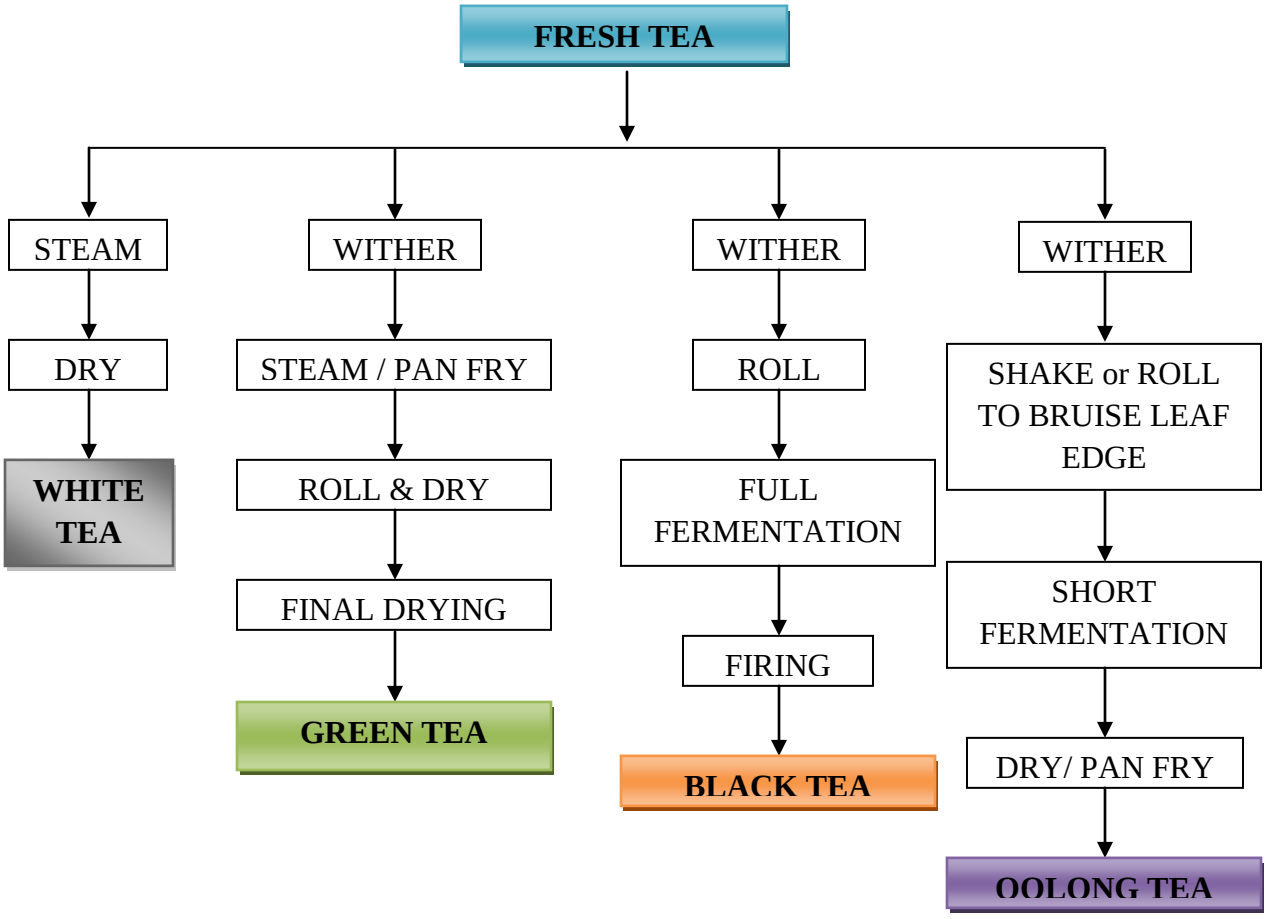

Fig 2: Tea Processing flow chart

3.1 PLUCKING :

Plucking of tea leaves is the first and important steps which requires careful handling while plucking. For example while keeping the tea leaves in basket, it should not be compressed so that damage can be prevented. The leaves must be of standard and fine quality which will results in to production of good quality tea. If the tea leaves are coarse then quality of the tea will be compromised.

Usually leaf plucking activities are normally done in the early morning so that processing of tea can be initiated on the same day. For getting fine quality of tea , processing of leaf should be initiated within few hours of harvesting. Delay in processing of tea leaves results into initiation of fermentation, thus quality will be reduced.

3.2 TRANSPORTATION :

After plucking, tea leaves must be transported to the factories within few hours so that processing can be initiated as soon as possible. During transportation, utmost care should be taken so that proper aeration should be maintained and leaves should not be compressed.

3.3 SPREADING :

While spreading, leaves should will uniformly spread through length and breadth to avoid any kind of bunching of leaves. Proper flow of air should be maintained so that tea leaves will not be lifted up. Drainage should be avoided and handler should be careful while walking in the room.

3.5 WITHERING :

Withering is another most important steps in tea processing where storage of tea leaves are done for 12-20 hours so that excess moisture from the tea leaves should be removed and this process of withering also called as physical withering. The withering process prepare the tea leaves biochemically for processing operations. Physical withering accompanied by chemical withering where there is changes occurs in chemicals which may have direct impact on fermentation process. Chemical withering process is driven by time and temperature where some changes occurs due to loss of moisture and few are independents.

Withering process can be natural or artificial, during natural withering leaves are placed in thin layer on tats staked on one above another and dried for minimum 20 hours in the presence of fresh air. Artificial withering is generally less time consuming process as compare to natural withering. In artificial withering, leaves are placed on a mesh having layer thickness up to 20cm. Then the meshes are kept in a tunnel; through which warm air mixed with fresh air is forced. Presence of moisture around 70% during withering can be considered as good for tea processing.

$$100\text{-}P_w = (Mf\text{-}Mw)/(100 - Mw)$$

Where, Pw is physical wither in % = (wt of wither leaf/wt of fresh leaf)*100

Mf is moisture % of fresh leaf.

Mw is moisture % of wither leaf.

3.5 DISRUPTION :

Disruption is mainly done for reducing the size of tea leaves. It is done with the help of an instrument known as Rotorvane.

3.6 ROLLING :

It is an important step in tea processing done with the help of rolling machine, this technique of rolling is also known by the name of maceration or preconditioning roll. Rolling machine have two separate metal roller which are closely placed together and revolving at different speed which cut, tear and twist the tea leaves gently. Rolling is mainly done to damage the cell membrane which enabling the enzymes to mixed with chemical components of tea leaves. It is important to ensure that temperature must be well below 35ºC at the time of rolling, increase in temperature from the specified limit will damage the quality of final products.

3.7 OXIDATION/ FERMENTATION :

The process of oxidation normally begun during rolling process and continue during fermentation also. The process of fermentation is carried out in separate clean room to avoid any kind of microbial contamination. Now a days, tea industries widely used an equipment called as Continuous Fermenting Machine (CFM) for fermentation. CFM consist of single circuit of tray,

top run of which passes through fermenting chamber. Tray exposed at the feed and take their leaf load through a conveyer and are made to travel slowly. The tray fed up to 15 cm depth with rolled leaf entering the fermenting chamber through which humidified air is supplied. Spread and height of thickness are adjust with the help of lever and spreader. When the color of leaves appeared as copper red then it is indication of completion and the process of fermentation must be stop by drying.

Factor affecting fermentation are :-

- Time of fermentation : Time of fermentation depend upon manufacturer, quality of leaf, temperature and humidity.
- Temperature : Optimum temperature for the fermentation is 27ºC, if the temperature is less than 16ºC then fermentation rate becomes slow and above 32ºC then enzyme activity starts declining.
- Humidity : Relative humidity of fermentation room should be around 95% for better fermentation. Lower relative humidity of room results in to evaporation water vapor from the leaf surface.
- Thickness of spreading : The thickness layer should be such that it can easily absorb more oxygen.
- Aeration : During fermentation large amount of CO_2 release thus proper supply of air is required for the removal of CO_2.

3.8 DRYING:

Drying can be performed either with the help of Endless Chain Pressure Drier (ECP) or Vibratory Fluid Bed Drier (VFBD). During drying the polyphenol oxidize enzyme should be properly inactivated and the desirable properties are fixed. The moisture content should be reduced to 3.5% and the leaves chlorophyll is converted to phaeophytin which has taken on their typical black colouration. It helps in bonding of polyphenols with the protein and brings down the astringency. Ionone, pyrazines, pyridines, quinolisis and 10-15 % TF is formed during drying. In present days, mostly VFBD is used in CTC tea manufacture. The inlet and outlet temperature of VFBD are 96º - 130ºC and 35º - 45ºC respectively and the total temperature

difference between inlet and outlet should approximately around 32ºC. While drying, precautions like time of drying, volume of air, temperature of inlet and exhaust air etc must be taken.

3.9 SORTING & GRADING :

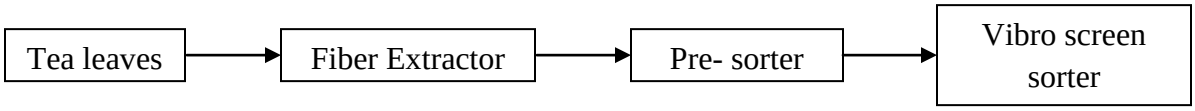

Fig 3: Sorting & Grading

3.10 FINAL FIRING :

The moisture content in tea reaches more than 4% while sorting and bulking process. So it become necessary to bring down the final moisture content of tea below 3% thus final firing is done in order to achieve the target for 10 minutes at 104ºC and the process is also called as gapping.

CHAPTER 4

4.0 PROCESSING OF INSTANT TEA

Instant tea is mainly in the powder form which is reconstituted by adding hot water. Instant tea has been first developed in year 1885 in U.K

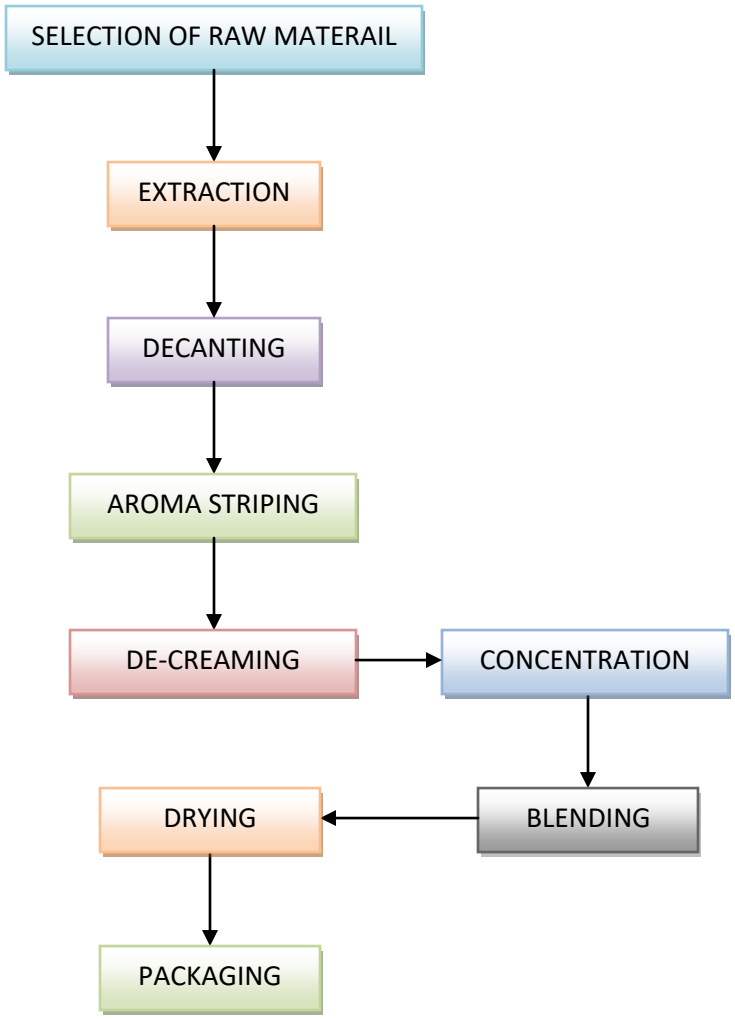

Fig 4: Instant Tea processing

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

4.2. Extraction : Extraction is done either in warm or cold water. It can be either batch or continuous extraction. For ice tea beverages, cold extraction is preferred while for hot beverages hot extraction is preffered.

4.3. **Decanting:** The slurry obtained from the extraction passes through continuous decanters and clarifier which remove the non soluble suspended matter from the extract.

4.4. 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.

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

4.6. Concentration : Concentration is normally done through evaporation at reduced pressure.

4.7. Blending : It is done to blend concentrate with aroma for getting the rich flavor of tea.

4.8. 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.

4.9 Packaging: Final stage of instant tea processing which normally done in aseptic condition to avoid any kind of microbial contamination.

CHAPTER 5

5.0 PACKAGING:

Packaging is an important part of food manufacturing process. It protect the food products from physical ,chemical, biological damages. Without packaging, food handling would be a messy, inefficient and costly exercise and modern consumer marketing would be virtually impossible. Thus food packaging lies at the very heart of the modern food industry.

Packaging Institute International defined packaging as the enclosure of products, items or packages in a wrapped pouch, bag, box, cup, tray, can, tube, bottle or other container form to perform one or more of the following functions: containment, protection, preservation, communication, utility and performance. If the device or container performed one or more of these functions, it was considered a package.

5.1 NEED OF PACKAGING :

Packaging performs a series functions:

5.1.1 CONTAINMENT : The containment function of packaging makes a huge contribution to protecting the environment from the myriad of products that are moved from one place to another on numerous occasions each day in any modern society. Faulty packaging (or under-packaging) could result in major pollution of the environment.

5.1.2 PROTECTION : the primary function of the package: to protect its contents from outside environmental influences such as water, water vapor, gases, odors, microorganisms, dust, shocks, vibrations and compressive forces.

5.1.3 CONVENIENCE : Products designed to increase convenience include ready to cook or ready to eat foods which can be reheated in a very short time, preferably without removing the primary package. Thus, packaging helps in convenience of consumer. Convenient packages promote sales.

5.1.4 COMMUNICATION : Packaging contains a lot of information such name of its manufacturer, product name, terms and uses, date of manufacturing, best before. nutritional information thus helping the consumer to be more informed.

5.2 TYPES OF PACKAGING :

5.2.1 PRIMARY PACKAGING :

- Primary package are those package which directly came into contact with food products. It provides first or initial layer of protection to the food products.
- Examples of primary packaging includes Metal cans, tea bag, paperboard cartons, glass bottles and plastic pouches.

5.2.2 SECONDARY PACKAGE :

- Secondary package are those package which surrounds or contains the primary package.
- It further used to group primary packages together.
- Act as carriers and many a times also used for the display of primary package.
- Ex. Corrugated case, Boxes.

5.2.3 TERTIARY PACKAGE :

- It contains number of secondary package together.
- Mainly used for bulk handling of food products.
- Example : stretch-wrapped pallet.

5.2.4 QUATERNARY PACKAGE :

- Quaternary package is mainly used for handling the tertiary packages.
- It generally includes a metal container which can be transferred to or from ships, trains.

5.3 PACKAGING OF TEA :

Packaging of tea is mainly done to protect the tea from outside environment especially after the completion of process so that tea can retain flavor, aroma, freshness for a longer period of time. Packaging of their is also done to increase their shelf life. Tea can be packed in wide range material which includes LDPE, PET, glass, aluminum etc.,

- As per FSSAI, if a package containing tea with added flavor shall bear the label, namely : "FLAVOURED TEA".

5.3.1 LDPE :

Low-density polyethylene is heat sealable, inert, odour free and shrinks when heated.

It act as a barrier to moisture and has high gas permeability, sensitivity to oils and poor odour resistance. It is less expensive, therefore widely used. One of the great attributes of LDPE is its ability to be fusion welded to itself to give good, tough, liquid-tight seals.

5.3.2 PET :

PET can be made into film by blowing or casting. It can be blow moulded, injection moulded, foamed, extrusion coated on paperboard and extruded as sheet for thermoforming. Melting point of tea is higher than PP which is around 260°C and due to the manufacturing conditions does not shrink below 180°C. Thus PET is ideal for high-temperature applications. PET is also fexible to low temperature (-100°C). It also act as good barrier of oxygen and water vapour

5.3.3 GLASS :

Now a day glass container has been also used for packaging the tea. It has following advantages:

- act as strong barrier to moisture, gases, odours and micro-organisms.
- do not react with food products.
- suitable for heat processing when hermetically sealed
- glass are re-useable and recyclable
- they are transparent to display the contents
- they are rigid, to allow stacking without container damage.

The disadvantages of glass include:

- higher weight which incurs higher transport costs than other types of packaging
- lower resistance than other materials to fractures, scratches and thermal shock
- more variable dimensions than metal or plastic containers
- potentially serious hazards from glass splinters or fragments in foods

5.3.4 ALUMINIUM:

Aluminium is used for packaging as it is highly malleable: it can be easily converted to thin sheets and folded, rolled or packed. Aluminium foil acts as a total barrier to light and oxygen odours and flavors, moistness, and germs, and so it is used broadly in food and pharmaceutical packaging, including long-life packs.

5.3.5 LAMINATE :

The laminates can be formed, filled, gas flushed and sealed on a single machine from reel stock. Gas flushing is achieved by saturating the powder with inert gas. The main advantages associated with laminates are lower material cost and lighter material weight. The disadvantages are that laminates do not have the mechanical strength and durability of rigid containers, and there can be difficulty in obtaining a satisfactory heat seal because of contamination of the heat seal area by powder during filling at high speed.

5.4 SOME RECENT DEVELOPMENT IN PACKAGING :

5.4.1 ASPECTIC PACKAGING

Aseptic packaging is the filling of sterile containers with a commercially sterile product under aseptic conditions, and then sealing the containers so that reinfection is prevented; that is, so that they are hermetically sealed. Currently, there are two specific fields of application for aseptic packaging: (1) packaging of presterilized and sterile product and (2) packaging of a nonsterile product to avoid infection by microorganisms.

The three major reasons for the use of aseptic packaging are (1) to take advantage of high temperature- short time (HTST) sterilization processes, which are thermally efficient and generally give rise to products of a superior quality compared to those processed at lower

temperatures for longer times, (2) to enable containers to be used that are unsuitable for in-package sterilization and (3) to extend the shelf life of products at normal temperatures by packaging them aseptically.

5.4.2. ACTIVE AND INTELLIGENT PACKAGING

Active packaging is defined as packaging in which subsidiary constituents have been deliberately included in or on either the packaging material or the package headspace to enhance the performance of the package system.

Intelligent packaging is defined as packaging that contains an external or internal indicator to provide information about the history of the package and/or the quality of the food. Sachets and pads are the most widely used forms of active packaging and the various functions which they perform are discussed in the following:

- Oxygen absorber
- Carbon dioxide absorber or emitter
- Ethylene absorber
- Ethanol emitter
- Moisture absorber

5.4.3 MODIFIED ATMOSPHERE PACKAGING

MAP can be defined as packaging of food items where atmosphere inside the packet has been modified to increase the shelf life of food products. It involves active modification or passive modification. In active modification air is displaced with a controlled, desired mixture of gases, and the process is called as gas flushing. Passive modification occurs due to respiration and the metabolism of microorganisms associated with the food. The package structure normally incorporates a polymeric film, and so the permeation of gases through the film also influences the composition of the atmosphere that develops.

Vacuum packaging of respiring foods or foods containing viable microorganisms such as flesh foods is clearly a form of MAP, because after initial modification of the atmosphere by removal of most of the air, biological action continues to alter or modify the atmosphere inside the package.

5.5 LABELING

Labeling performs the communication function of packaging, informing the consumer about nutritional content, net weight, product use and so on. Labeling acts as a silent salesman through distinctive branding, as well as facilitating identification at check-outs through the Universal Product Code (UPC).

There various types of labeling which are as follows:

5.5.1 GLUED-ON LABELS : These are the simplest type and consist of sheet material (typically paper), which has been printed and cut to size. They are attached to the package with adhesive, which is applied either at the time of application, or at the time of manufacture, in which case the adhesive is activated with moisture immediately prior to application.

5.5.2 SELF-ADHESIVE (PRESSURE-SENSITIVE) LABELS : These can be made from paper, plastic or aluminum foil laminated to paper or plastic, and can be produced to adhere to a wide range of materials.

5.5.3 IN-MOLD LABELS : It offers better resistance to heat, moisture and chemical than those labels made from paper. There are also recycling advantages with film labels. IML materials must be able to withstand the container manufacturing process. The heat generated during blow molding presents a challenge to most inks because pigments can change.

5.5.4 SLEEVE LABELS : A wide range of containers can be sleeve labeled including glass bottles, plastic bottles and metal cans. Sleeve labels shrink into or stretch around contours, penetrate variable geometries and conform to irregular features.

5.5.5 HOLOGRAPHIC LABELS : Holographic labels that incorporate a hologram have large application in food packaging for both marketing and security reasons, specifically in the areas of anticounterfeiting (authentication) and brand protection. Surface relief and volume are the most common type of hologram. Surface relief holograms exhibit a characteristic rainbow-colored pattern or image. Volume, or reflection, holograms have a very different appearance to surface relief holograms and are generally used for authentication.

CHAPTER 6

6.0 EQUIPMENT FOR TEA PROCESSING

6.1 WITHERING TROUGH :

As we discussed earlier that withering is performed to remove the surface moisture and partially the internal moisture of freshly harvested of tea leaves to get the correct physical and chemical conditions. Hence for withering we need withering trough where tea leaves are kept on trough for reducing moisture content. Once proper withering is completed, the air flow is continued to reduce damage of withered leaves with help of withering fan.

Fig 5: Withering trough

6.2 DRYER :

Dryer is used for drying tea leaves which further improves the shelf life of tea. There are various types of dryer which can be used for drying purpose, such as :

- Commercial dryer
- Oven dryer
- Sun drying

Fig 6 : Commercial Dryer

Source: food-drying-machine.com

Fig 7 :Sun Drying

Source : teaepicure.com

Fig 8 : Oven dryer

6.3 ROLLING MACHINE :

Rolling machine is used for rolling the tea leaves without any breakage. The roll is very gentle and during this temperature should below 35ºC. The rolling action further causes some of the sap, essential oil, and juices inside the leaves to ooze out which further enhance the test of tea.

Fig 9 : Roller

Source : cambridgeincolour.com

6.4 ROTOR VANE : After rolling leaves are passed through rotor vane, results into properly mixing of tea leaves helps in the cell maceration and juice extraction.

Fig 10 : Rotor vane

Source : pinterest.com

6.5 CONTINUOUS FERMENTING MACHINE (CFM) :

CFM consist of single circuit of tray, top run of which passes through fermenting chamber. Tray exposed at the feed and take their leaf load through a conveyer and are made to travel slowly. The tray fed up to 15 cm depth with rolled leaf entering the fermenting chamber through which humidified air is supplied.

Fig 11: Continuous fermenting machine

Source : The Aarkay Group

6.6 FIBER EXTRACTOR :

Fiber extractor work on the principle of static electricity. There are four to six PVC roller arranged in a row. After firing process tea is fed in the machine, because of frictional force between roller (+ve) and the fiber (-ve) tea gets separated. Thus fibre is collected.

Fig 12 : Fiber extractor

Source : Bharat Engineering Works

6.7 VIBRO SCREEN SORTER :

It is a sorting machine suitable to install in any sorting room of a tea Factory. It replaces the conventional type sorting machine as it has various advantages over the standard sorting machine.

Fig 13: Vibro screen sorter

Source : The Aarkay Group

CHAPTER 7

7.0 STORAGE OF TEA

The proper storage of tea with utmost care is very important otherwise tea will become rancid and stale rancid much faster which may further alter the aroma and flavor and can also harm the health of consumer. Teas are mainly vulnerable to light , air, heat, odour, and moisture. Thus the proper tea storage requires following :

7.1 Dark Place : Tea should be always stored in a dark room to avoid it from sunlight or UV light, so that quality such as aroma and flavor should be maintained till final consumption.

7.2 Airtight : To avoid tea from absorbing moisture and unpleasant odour from air.

7.3 Hypothermia: Exposure of tea to heat will ruin its quality thus avoid keeping tea in sunlight or near heat .

7.4 Away from strong odour . Tea leaves have tendency to absorb any odour quickly thus tea must be stored separately from the product which have strong odour such as spice.

7.5 Away from moisture.

CHAPTER 8

FSSAI REGULATION FOR TEA

8.1 TEA means tea other than Kangra tea obtained by acceptable processes, exclusively from the leaves, buds and tender stems of plant of the Camellia sinensis. It may be in the form of black or oolong tea. The product shall have characteristic flavour free from any off odour, taint and mustiness. It shall be free from living insects, moulds, dead insects, insect fragments and rodent contamination visible to the naked eye (corrected if necessary for abnormal vision). The product shall be free from extraneous matter, added colouring matter and harmful substances. Tea may contain "natural flavours" and "natural flavouring substances" which are flavour preparations and single substance respectively, acceptable for human consumption, obtained exclusively by physical processes from materials of plants origin either in their natural state or after processing for human consumption in packaged tea only. Tea containing added flavour shall bear proper label declaration as **"FLAVOURED TEA"**. Tea used in the manufacture of flavoured tea shall conform to the standards of tea. The flavoured tea manufacturers shall register themselves with the Tea Board before marketing flavoured tea. Pectinase enzyme can be added up to a level of 0.2% during manufacture as processing aid. The product shall conform to the following requirement in which all the figures given are expressed on the basis of the material oven-dried at 103±2° C.

1	Total Ash (m/m)	Not less than 4.0 percent and not more than 8.0 percent
2	Water Soluble Ash	Not less than 45.0 percent of total ash
3	Alkalinity of water soluble ash expressed as KOH (m/m)	Not less than 1.0 percent and not more than 3.0 percent
4	Acid-insoluble ash (m/m)	Not more than 1.0 percent
5	Water extract (m/m)	Not less than 32.0 percent
6	Crude Fibre (m/m)	Not more than 16.5 percent

Source : FSSAI

It shall not contain any added colouring matter. It may also contain 0.2 per cent Pectinase enzyme. Flavoured tea manufacturers shall register themselves with the Tea Board before marketing Flavoured tea. Tea for domestic market may contain added vanillin, flavour upto a maximum extent of 5% by weight and other flavours upto a maximum extent as indicated in the table below :

Flavors	Percent by weight (Max.)
Cardamom	2.8
Ginger	1.0
Bergamot	2.0
Lemon	1.6
Cinnamon	2.8

Source : FSSAI

8.2. KANGRA TEA means tea derived exclusively from the leaves, buds and tender stems of plants of the Camellia sinensis or Camellia tea grown in Kangra and Mandi valleys of Himachal Pradesh. It shall conform to the following specifications namely

1	Total ash determined on tea dried to constant weight at 100ºC	4.5 to 9.0 percent by weight
2	Total ash soluble in boiling distilled water	Not less than 34 percent of total ash
3	Ash insoluble in dilute hydrochloric acid	Not more than 1.2 percent by weight on dry basis.
4	Extract obtained by boiling dried tea (dried to constant weight at 100ºC) with 100 parts of distilled water for one hour under reflux	Not less than 23 percent.
5	Alkalinity of water soluble ash expressed as KOH (m/m)	Not less than 1.0 percent and not more than 2.2 percent expressed as K2O on dry basis.
6	Crude fiber determined on tea dried to constant weight at 100ºC	Not more than 18.5 percent.

Source : FSSAI

It shall not contain any added colouring matter. It may also contain 0.2 per cent Pectinase enzyme. Flavoured tea manufacturers shall register themselves with the Tea Board before marketing Flavoured tea. Tea for domestic market may contain added vanillin, flavour upto maximum extent of 5% by weight and other flavours upto a maximum extent as indicated in the table below :

Flavors	Per cent by weight (Max.)
Cardamom	2.8
Ginger	1.0
Bergamot	2.0
Lemon	1.6
Cinnamon	2.8

Source : FSSAI

8.3. GREEN TEA means the product derived solely and exclusively, and produced by acceptable processes, notably enzyme, inactivation, rolling or comminution and drying, from the leaves, buds and tender stems of varieties of the species Camellia sinensis , known to be suitable for making tea for consumption as a beverage. The product shall have characteristic flavour free from any off odour, taint and mustiness. It shall be free from living or dead insects, moulds, insect fragments and rodent contamination visible to the naked eye (corrected if necessary for abnormal vision). The product shall be free from extraneous matter, added colouring matter and harmful substances. The product shall conform to the following requirement in which all the figures given are expressed on the basis of the material oven-dried at 103±2° C.

1	Total Ash (m/m)	Not less than 4.0 % and not more than 8.0%
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4	Acid-insoluble ash (m/m)	Not more than 1.0 %
5	Water extract (m/m)	Not less than 32.0 %
6	Crude Fibre (m/m)	Not more than 16.5 %
7	Total catechins (m/m)	Not less than 9.0 % and not more than 19.0 %

Source : FSSAI