Project funded by EUROPEAN UNION

TEAWAY
Promoting Tea as the Engine of Growth for the Black Sea Basin Area

Black Sea CROSS BORDER COOPERATION

TEA MANUFACTURING AND PROCESSING TECHNOLOGIES TRAINING

ÇAY – TEA – 茶 – ちゃ

HASAN ÇEBİ
GENERAL DIRECTORATE OF TEA ENTERPRISES
Quality Control Branch Manager

Common borders. Common solutions

CROSS BORDER COOPERATION

Definition of Tea Plant,

The scientific name of tea plant in world literatures is **Camellia sinensis**. It is said that it has more than 3,000 different species. Its homeland is China for some, and India for the others.

According to Chinese mythology, the tea plant is discovered by Shen Nong in approximately 2700s B.C.

Well-known Philosopher Conficuis has compiled the information of tea in 500s B.C.and advised the public to drink tea due to its benefits.

….Hope that tea, which has a history of 700 years, would exist to the end of the world..

Definition of Tea Plant,

Tea is a type of drink obtained by boiling or poaching the plant leaves.

It is obtained as a result of subjecting the leaves of Tea Plant, of which the scientific name is *Camellia sinensis*, to the Withering, curling, and Grading processes.

Main types;

Black tea,

Green tea,

Oolong Tea

White tea.

White Tea

White tea has taken its name particularly from the small white / silver villus covering the bud on the tip of the fresh offshoots. It is produced in a very limited scale.
Its production has started in 2014 in our country.

Yellow Tea

This tea is similar to the most precious and white tea of China.
The new buds are left to the appropriate environments in small stacks so as to be oxidize. The heat generated during this process dries them out and their complete fermentation is prevented. **Caffeine rate is higher in yellow tea than the green tea.**

Green Tea

Green tea is called as «non-oxidized» or «non-fermented» in general.
The leaves are harvested when they are fresh, and primarily dried out without exposing them to the oxidation event.

Oolong Tea

Oolong tea is generally known as «semi-fermented» or «semi-oxidized».

Tea in Our Country,

There is not any clear information about on which date the tea has entered in to our country, however the first attempt related with the Tea Farming, which has been seen on the breakfasts, started after 1840s, in the period of Sultan Abdülhamit. In this period, the saplings or seeds brought from The Far East have been planted in Bursa, İstanbul, and Selanik regions, but have not been succeeded.

As printed publications «Çay Risalesi» (Booklet of Tea) of Seyyid Mehmet İzzet Effendi was published in 1877, and the work of Mehmet Arif named as «Çay hakkinde Malumat» (Information about Tea) was published in 1910.

Although the studies related with its cultivation have been started in 1880, even individually, the first tea garden has been established in 1923, Rize.

The report of Prof Ali Riza Erten named as «Tea May be Cultivated in the East Black Sea Region» prepared in 1918, soon after Zihni Derin has come to Rize between the years 1924-1927 and leaded and monitored the establishment of tea facilities,

Tea in Our Country,

Report of Prof Şevket Hatipoğlu in relation with tea (It is published as a book named Tea Economy in 1938).
The first tea harvest has been realized in 1938,
The Tea Law was enacted in 1940, and tea farming has been secured,
The First Tea Factory has been opened in 1947 in Rize fener Mah., with the name of Central Tea Factory with a capacity of 60 tonnes/ day, and Asım Zihnioğlu was appointed as manager (In Pursuit of a Green)

Today there are 190 Tea Factories in total as 47 large and small public and 143 (2019) private sector factories in our region.

In 2019, total amount of harvested tea is 1,403 thousand tonnes in the region.
The amount of semi-finished product is approximately 270 thousand tonnes.

Characteristic, colour, and flavour of a tea depend on various factors.

These are;

Place of plantation (Altitude, Climate-soil, Direction, etc.)
Seasonal change (March-April-May = Spring)
Cultivation methods (Slip-Seed)
Nipping methods (By Hand-Scissors-Machie)

Storing the last leave and transporting

Leave processing (CTC-ORTODOX-MIXED)

Tea brewing

Soil Structure of The Areas, on Which Tea Can be Cultivated,

Tea plant is not very selective with regard to the structure of the soil. It can be grown on all kinds of soil; Sandy, Clay, Humic, etc. However, ncak it may be more yielding on lands rich in nutrients.

The important criteria regarding the lands, on which the tea plant shall be growth, is the pH value of the soil. The tea plant may not be cıltivated on lands, which PH degree is above 6. The pH range, which it is the most yielding, is 3.5-4.5.

Climate Requests of the Tea Plant,

When the provinces, which the tea plant is cultivated in our country, are considered, it is understood that what the climate requests are. The tea plant is cultivated better in the regions, primarily which day and night temperature difference is less, particularly which the temperature does not drop to minus degrees and the air temperature does not drop under 15 degree, including the nights. When the temperature drops under 10 degrees, the development stops in the tea plant, and the plant enters into the dormant period.

At least 2000 mm precipitation per year and balanced rains is the situation desired by the tea plant. The relative humidity must be approximately 70% in the areas, which the tea plant is cultivated (70% - 80%)

Number of sunny days is also efficient in the cultivation of the tea plant. 55-60 sunny days per year is ideal. It is known that the tea plant is developed as most yielding at 25 degrees and medium fair atmosphere (Cloudy).

- **Plant Nutrients for Tea Plant,**
- It is essential to have sufficient and balanced plant nutrients in the soil in order the tea plant be yielding, as in all other plants.
- The nutrients, which the tea plant needs most, are N-P-K.

- N (NITROGEN)
- According to the soil analyses conducted in our region, N amount is found high in 76% of the lands. This is because the tea lands are rich in terms of organic substances, as well as due to using plenty of fertilizer with N in tea areas.
- Excessive use of nitrogen decreases pH of the lands and have negative effects on yielding, in addition to the wasting the sources.

- P (PHOSPHOR)
- In the studies conducted in our Region in 1970s, it has been found that phosphor was insufficient in 70% of the tea lands, and it has been seen that this rate was decreased to 30% at the beginning of the 2000s, by adding P into the fertilizer rations and monitoring. Phosphor plays an important role particularly in metabolism events and rhizogenesis.

Plant nutrients for Tea Plant

K (POTASSIUM)

In the soil analysis conducted in 1980, in our region, it has been revealed that our lands are more rich in terms of Potassium, compared to the other main nutrients: nitrogen and phosphor.

In these studies, 30% of our lands have been found poor in terms of potassium. It has been determined that this rate was increased to 70%, in the analyses conducted in 1990s, and finally K substance has also been added into the fertilizer rations.

Potassium is more efficient than the other nutrient elements, in obtaining quality fresh tea leaves and achieving quality products. Therefore, monitoring the lands in terms of potassium is of importance.

These three main elements are very important particularly in terms of photosynthesis, thus energy generation and yielding in the plant.

Other plant nutrients important for Tea Plant;

Calcium, is efficient in using nitrogen and in rhizogenesis. In case of excessiveness, it prevents the tea plant to intake the other plant nutrients (Lands having Basic Characteristic).

Magnesium is efficient in carbonhydrate formation together with the photosynthesis. Besides, it is also important, as it is one of the main components of clorophyll substance. It is efficient on the aroma and odour of the product.

Sulphur, Iron, Manganese, and Zinc They are efficient in the areas, which the calcium and magnesium is efficient in the plant, and they are the substances needed particularly for chlorophyll formation, energy generation and protein synthesis obtained by photosynthesis. Their other features are, they are efficient in using N, P, and K more effectively.

Although the main functions of the nutrients such as **Boron, Copper, and Molibden** are not clear as the other elements, it is known that the resistance of the plant against diseases and pests decreases in case of lack of these.

Fertilization in Tea Plant 2 kinds of fertilizers: Organic fertilizer and Chemical fertilizers, are used in also tea plant, as in other plants.

They are applied as mixing plant wasted referred as **Organic fertilizers, barnyard manure, and green manure** into the soil in blighted form.

It cannot be said that the barnyard manure is generally used correctly in our region and country.
Barnyard manure is sufficient as 1-2 tonnes per decare. In the tea gardens, which 2 tonnes of barnyard manure is used per decare, fertilization may not be needed for the following 2 years. Tea wastes (Pruning) and fabrication wastes are generally used as Green manures.
Chemical fertilizers are generally administered as composite (as NPK is combined in certain rates (Tea Manure = 25:5:10). They may be administered as 26% N, Ammonium Nitrate or Ammonium Sulphate, or as Calcium-Ammonium Nitrate.

Other Types of Fertilizers,

Organomineral fertilizers are the fertilizers having both organic and chemical nutrients in their structures.

Microbial fertilizers are the fertilizers having useful bacteria together with some nutrient elements in their structures. They absorb the nitrogen in the air, and helps the plant's nutrition.

Fertilizers containing enzyme decompose the fat, protein, and starch, which exist in the plant cells, but not utilized by the plant completely, and transform into a form, which the plant shall use more easily.

These type of fertilizers amy be applied to the plant in solid or liquid forms through the leaves and soil.

Fertilization in Tea Plant,

In our country

TOTAL PRODUCED DRY TEA IS APPROXIMATELY: 270,000 TONNES

AMOUNT OF FERTILIZER USED IN THE REGION IS APPROX.

80 THOUSAND TONNES

(2000 ₺/ton= 160,000,000 ₺)

Fertilizers sold by the fertilizer cooperatives (Registered)

+

Private Fertilizer Sellers

Many of our producers do not make income – expense calculation, as well as use an amount much more than the amount to be applied **(recommended; 60 Kg per decare)**.

This cause many environmental problems, as well as unnecessary economic losses.

IMPROPER FERTILIZATION METHOD

TEA FARMING

1.Preparation of land, The land is weeded from all other plants as in all agricultural activities, and the land is cultivated + fertilized, and made available to be planted.

2.Bringing the slip or seed together with the land, In each way, planting must be carried out with 60 cm intervals over the row having at least 1 m of row spacing.
Selection of the seed or type of slip is important in order to achieve a good yield in the future (The most yielding species have been adapted to our region).

(ÇAYKUR‘s project of improvement of suitable local species in our region is continued successfully).

Project funded by EUROPEAN UNION

TEAWAY
Promoting Tea as the Engine of Growth for the Black Sea Basin Area

Black Sea CROSS BORDER COOPERATION

Common borders. Common solutions

3. Care, Tea garden must be checked frequently, and all other plants must be cleaned out by hand. Shape pruning must not be omitted depending on the development of the plant.
Pruning is important regarding the tea plant forms a good surface. Yielding increases depending on the width of the surface.
Thickening of the branch, which is pruned or cut from a certain height as it is grown much, slows down, and sub-branches are formed on this branch. Thus, a wide surface is created.
(Surfacing)
Attention must be paid to the thickness of the branch in the first prunning, the branches, which their diameters did not exceed approx. 0.5 cm, must not be cut, if possible. Obtaining quality offshoots from thin and weak branches is not possible.
4. Harvesting, Harvesting must be commenced gradually, on the saplings that are over 3 years, however attention must be paid in not damaging the plant much.

PROPER PRUNNING FORM

IMPROPER PRUNNING FORM

TEA FARMING

4. Harvesting, Harvesting must be commenced gradually, on the saplings that are over 3 years, however attention must be paid in not damaging the plant much.

Harvesting is the most important problem of our country's tea farming. Tea producers do not display sufficient sensitivity in the matters of harvesting both promptly and in accordance with the quality.

There are various reasons of this. However, any reason must not prevent picking up the teas (promptly) that have reached maturity.

It is impossible to obtain quality tea product from the tea, which did not reach maturity for picking up, as well as it is impossible to produce quality produc from the tea, which apasses harvesting maturity.

PROCESSING AND ALCHEMI OF TEA LEAF

Dry teas having different sensorial properties, chemical and biochemical contents from the offshoots of the tea plant containing two or three leaves, are produced by applying different processing techniques. When the tea production techniques in the world are considered, the tea may be classified under three main groups. These are:

1. Fermented (oxidized) teas are the teas we know as black tea.
2. Non-fermented teas are the teas known as green tea.
3. Semi-fermented teas are the teas, which are produced locally in the world, and consumed limitedly, the tea named as Oolong is leading the teas falling under this group.
4. Even a very small amount of White Tea is obtained from the top non-blossomed buds, after withering under suitable conditions.

According to the most recent ratings conducted today, ünümüzde en son yapılan oranlamalara göre dünyada üretilen çayın;

70% of the tea produced in the world is consisted of black tea (fermented tea),
23 % of it is consisted of green tea (non-fermented tea),
and 7 % of it is consisted of Oolong tea (semi-fermented tea).

Black tea is widely consumed in all European countries, including Turkey, in Middle East, in African and American continental countries.

Green tea is consumed primarily in Japan, and in China, Indonesia, Vietnam, India, Sri Lanka, and in some African countries, including Morocco.

Consumption amount of the green tea is increasing also in our country in recent years.

SOME QUALITY TERMS IN BLACK TEA

Colour The green colour of the tea leave turns into copper red as a result of oxidation. A pleasant taste with apple scent is formed.

Blackness of the Tea, Blackness of the tea occurs due to the drying of the sap that is accumulated on the surface.

Tea gets black more in the warehouse.

High firing temperatures cause more black teas be formed.

Newly pruned pit's leave is more black.

In less withered teas, the apperance of the tea is black.

Why Do Brown Teas Occur?

- Teas with small leaves contain less sap, and are not curled as better as the teas with big leaves. Therefore, they do not become black.
- Excessive withering so as to drying occurs with rough and hard leaves is effective in the formation of Brown.

Theflavine

Brightness, vitality, and roughness are determined via **TF** amount.

While it was high at the beginning of the oxidation, it decreases gradually. Therefore, initially the sourness and brightness of the steep is high.

The sourness and brightness of the steep decreases with the alongation of oxidation period. At lower temperatures it is formed more.

There is a positive link between the market price of the black tea and TF amount. Thereforei TF amount in the produced black tea is desired to be at the highest possible level.

Faulty applications in curling, oxidation, and drying are among the possible reasons of the fact that TF content is not at the desired level despite the high level of extract in teas.

Thearubigin

It is lower at the beginning of the oxidation, and it increases gradually. The strength of the steep increases in parallel to its amount.

In case the temperature increases, their formation accelerates. This has negative impacts on the various features of the black tea.

TF & TR Ratio

Quality of black tea is determined via TF and TR amount and ratio. The ration of this compound is mainly determined via the colour, structure, thoughness, vitality, and brightness of the tea liqueur.

Vivid and bright tea products are formed as a result of short oxidation duration and low oxidation temperature. Under the conditions of long oxidation duration and hot oxidation, less vivid, blurred tea liqueur and tea products having more density are formed.

TF/TR ratio is 1/10 or 1/12 in a good black tea. When this ratio is 1/25 or above, brightness, sourness, and strength in the tea steep decrease significantly.

It is accepted that they have effects on the sourness of the tea together.

Aroma

Tea aroma is a tea-scented compound in lemon yellow colour, easily freezing, and in astringence.

Black tea aroma is formed in withering and during enzyme oxidation.

More aromatic teas are obtained from the tea plant with small leaves, growing up in the tea gardens above sea level, at which the precipitation is relatively less and nights are cold.

Aromatic teas may be sold with a price of 2-3 times of the normals, in the international markets.

Creaming

One of the most important features of the tea is creaming capacity. When the steep cools down, precipitate particles are formed named as «cream», which are relatively dispersed in a thin manner. These particles are generally in the form of TF, TR, ve caffeine mixture.

A colour of light brown, light reddish and clear colour are the indicators of a good quality. Dark and blurry cream is always deemed as the sign of ordinary teas.

CHEMICAL COMPOUNDS OF TEA

1. PHENOLIC COMPOUNDS

1.1 Primary Phenolic Substances

They are the phenolic compounds present in the tea offshoots.

A - Flavanols (Cathechins)

B – Flavanols and Glycosides

C – Phenolic Acids and Depsides

D – Leucoanthocyanins

1.2 Secondary Phenolic Compounds

Secondary Phenolic Substances are the subtances formed by the oxidation and polymerization of the primary phenolic substances existing in the Green tea offshoots.

Despite these are not present in fresh tea offshoots, they constitute 20-25% of the dry substance content of black tea. 15% of these substances may migrate into the tea steep.

The taste and colour of the black tea steep is completely consisted of this secondary phenolic substance.

The most effective two polyphenols are TF and TRs on the quality of the tea steep.

CHEMICAL COMPOUND OF TEA

Theaflavine (TF):

They are formed as a result of combination and oxidation of flavanols.
It constitutes 0.,3-2 % of the dry substance content of black tea, and 1-6 % of dry extract.
They are in neutral characteristic, orange colour, and they are dissolved by ethyl acetate.
9 different TF compounds may exist in the tea, and theaflavin monogellat and theaflavindigellat are those mostly found.

Thearubigins (TR)

They are formed as a result of combination and polymerization of aflavins with the other polyphenols preent in the tea.
They constitute 7-17 % of the dry substance of black tea, and 30-60 % of the dry extract.
They are in acidic characteristic. They are brown compounds.
They form the dark colour of the tea steep.

CHEMICAL COMPOUND OF TEA

2. NITRO SUBSTANCES

There are 21 types of free and bound aminoacids, tea aroma, and theanine in the fresh tea offshoot.

3. CARBONHYDRATES

In the fresh tea leaves;

Starch 1-2 %, 0.5 % in black tea; Saccharose 0.3- 0.5 %; Glucose 0.2-0.3 %; Fructose % 0.1-02 %.

Cellulose, hemicellulose, and pectic substances 6- 8 %.

4. ALKOLOIDS

Caffeine 2 - 4.5 %

5. MINERAL SUBSTANCES: (K, Ca, P, Mg, Fe, Mn, Al, Cu ve S) 5%

6. ORGANIC ACIDS; Oxalic acid,Malic acid, Succinic acid, Cuinic Acid, Some hormones

7. COLOURING SUBSTANCES; Chlorophyll, Carotenoid

8. AROMATIC SUBSTANCES

9. VITAMINS; C and B vitamins

10. ENZYMES; Polyphenol Oxidase, Peroxidase, pectinase, etc.

Gold Type (Gold-headed)

It is in orange colour.

It occurs when there is villus in excessive amount on the buds and when it is suitable for manufacturing.

Withering must be good and curling must not be carried out in a very severe manner.

Silver Type

It occurs when the villus is covered insufficiently via the sap as a result of severe withering or very light curling.

Gray Type

the primary reason is the damage occured during grading. Damage of the villus by severe curling is another factor. Golden-headed is formed from some part of the remaining villus, and the general view is seen in gray as a result of mixing them with black colour.

Black Type

This distinction is almost impossible. Reason of this is not excessive drying. This is caused by lacking villus on the buds.

Humidity in Newly Picked Up Leaf: 75-80%, depending on the conditions
Humidity in Withering: Ratio of water decreases to 50-55% with withering.
Humidity in curling: The more uniform the withering of the tea leaves, the greater success in curling.
Teas, which have been withered excessively and began to dry, are broken easily, and lead to low quality tea production by turning into scales as a result of curling.
A light pressure must be applied to the less withered teas having high water content, and high pressure must be applied to the teas having lower water content.
Humidity in Oxidation: Humidity rate at the end of oxidation is approx. 45-50 %
Humidity in Dry Tea: The humidity in packed black tea is maximum 7%, in the TFC (Turkish Food Codex) Tea Communique.
Although the accepted goal is 2.5-3% in the tea industry, it is observed that the humidity can be formed within different ranges between 1-5% during the day.
The fact that the humidity rate is 5% or close levels when exiting the oven, shall no doubt shorten the storage life of tea.
It must be 2-4% after firing, maximum 5% before sacking up, and maximum 6% before packaging.

Project funded by EUROPEAN UNION

TEAWAY
Promoting Tea as the Engine of Growth for the Black Sea Basin Area

Black Sea CROSS BORDER COOPERATION

Fabrication Procedures in Black Tea

APPLICATIONS

Common borders. Common solutions

There are two processing methods in Black Tea Production:

Orthodox

CTC(Cut, Tear, and Curl method)

ACCORDING TO PRODUCTION MODEL

COUNTRIES	BLACK TEA PRODUCTION METHOD (Number of facilities)	
	CTC %	ORTHODOX %
India	80	20
Sri Lanka	6	94
Kenya	100	-
Indonesia	10	90
Turkey	1	99

CTC (Cut Tear Curl method):

It is a method commonly used in the production of black tea. As it is consumed particularly in the form of drained tea, it is the production method that have to be preferred in obtaining the teas to be used in the planned production of the teas.

Teas, which are produced by this production method, are in the forms of smaller particles that enables more rapid and stronger brewing.

In the CTC production method, the leaf is withered in the same manner, but it is passed through the cylinders of a CTC machine revolving in different speeds (rolled) in stead of curling.

The remaining oxidation and drying stages are same as the orthodox method.

It has not been able to be the method which is applied in our country mostly.

Project funded by EUROPEAN UNION

TEAWAY
Promoting Tea as the Engine of Growth for the Black Sea Basin Area

Black Sea CROSS BORDER COOPERATION

	Activity	Carried out by	Cevap Verilmesi Gereken Sorular
PRE-REQUISITE	HARVESTING AND KEEPING	I. Producer II. Factory	DUE CARE IN HARVESTING? Time of Harvesting, Conformity to qualities, Conformity to the quota and Keeping
	Purchasing Selling	I. Producer II. P.team	Are the purchasing houses opened at the time of Announcement? Does the team pay attention due care in purchasing?
	Keeping in the Purchasing House	1. Team 2. Factory	Are the purchasing houses are suitable physically? Are the teas purchased shipped respectively?
	Transporting to Factory	1. Transporter 2. Factory	Are the vehicles suitable for tea transportation? Who makes the assignments? Is there stacking in the factory? Burning status? Transportation loss, binding the COVERS of the vehicles

Picking Up, Transportation, Storing, and Sales – Purchasing Methods of Tea

Harvesting; It is the most appropriate method for harvesting the tea to pick up by hand. Until 1970s, tea harvest was carried out by hand also in our region. In many African countries it is still carried out by hand.

In some countries it is carried out by hand, as well as machines.

In our country mostly it is carried out via scissors. It is seen that harvesting with machines is being developed newly in our country.

Harvesting via scissors appears as the worst method among the harvesting methods. Because, when a narrow area and sharp scissors meet with the strong human arms, the tea branches are harvested depending on the arm strength of the person, without regard to whether it is wood or offshoot.

In harvesting with machines this situation is less.

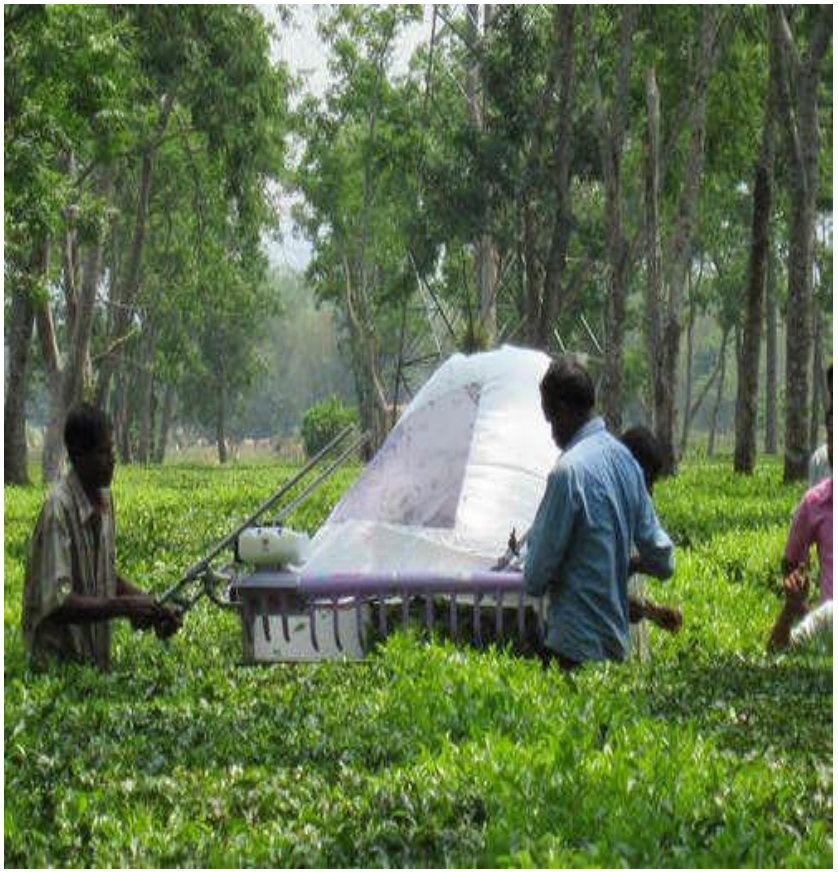
Collecting machine placed on the surface of the tea plate, cuts less woody parts compared to the scissors.

Failing to use the manpower, which may carry out this work, and besides the fact that the farmers do not collect their own teas, but carry out harvesting via daily wages, makes the suitable harvesting of the tea difficult. Furthermore, in recent years, the workers receives daily wages against kilogram, and this causes collecting products with very lower quality in tea harvest.

Project funded by EUROPEAN UNION

TEAWAY
Promoting Tea as the Engine of Growth for the Black Sea Basin Area

Black Sea CROSS BORDER COOPERATION



Common borders. Common solutions

Common borders. Common solutions

- **PURCHASING PROCEDURES OF FRESH TEA PRODUCT;**
  Determining the points, at which purchasing shall take place (Number of Tea gardens, Producers, etc.),
  If tea shall be kept at the points of purchase, then arranging the environment in a manner to keep tea,
  Establishing the purchasing team (Reliable, Honest, Smart, and Talented)
  Weighing and recording materials to be needed (Calibration and delivery)

  Planning the loading and transportation procedures
  Weighing the product received at the factory and recording the weights

  Entering the product amounts purchased daily into the accounts of the farmers separately

  Checks..

  Payments…

Picking Up, Transportation, Storing, and Sales – Purchasing Methods of Tea,

Transportation, The harvested teas must be brought to the purchasing- selling points with the baskets without damaging, jamming, pressing much. Until recent years, it has been done like this. The works has been done in this way from the years, in which tea has arrived into our country, until 1980s, although the conditions were much worse.

In parallel to the improvement of the conditions, the poducers have chosen the easy ways in harvesting, transporting, and storing matters, and in parallel to this quality of the raw material has decreased (decrease of raw material quality brought the decrease in also value of the tea along with it).

However, also procurement of some foreign-originated teas with much lower prices, have effects on the raw material prices.

The harvested tea offshoots must be waited – accumulated in cool environments– and transported to the purchasing points without damaging.

Until the sale is actualized, it must be spread so as to be ventilated in the shade, if possible, and warming must be prevented.

The puchased teas must be laid regularly at the tea purchasing houses, and ventilated by stirring when necessary, and delivered to the facility so as to enter into the curling machine at the end of 24 hours, ***Fabrication withering duration is included into this period.***

	Activity	Carried out by	Questions That Have to be Answered
Fabrication Procedures	Withering	Factory / Workshop	Settings of the machine used? Is there enough heat and air inlet? Are the speed settigns appropriate? Bunker-Traf kenarlarından çay dökülmesi ?
	Curling		Are the conveyors are set throughly? Are there any tea losses in loading? Is serial loading – unloading carried out? Is the time and capacity suitable?
	Fermentation		Settings of the machine used? Are there enough Heat – Humidity and air inlets? Is spreading in desired thickness ensured?
	Drying		Is there any air leakage in the ovens? Is the tea spread in desired thickness? Is the drying is appropriate in terms of time and capacity? Are the fiber removers are appropriate – Vibration and height

PRODUCTION OF BLACK TEA

Stages of black tea production:

There are 7 main processes in the production of black tea: Unloading the fresh tea, Withering, Curling, Oxidation, Drying, and Grading, and packaging, Storing.

UNLOADING THE FRESH TEA

The vehicles are unloaded at the factories according to their entry order. However, in the vehicles, which are loaded by mobile purchasing, order is not considered, the vehicle is unloaded firstly (Burning).

Today, unloading process is carried out via the machines in many factories. In such case, the fresh tea leaves in an amount of tea to be processed in an hour by the Factory are unloaded into the withering basins. If more unloading occurs, then undesired thickness, non-uniform sprawl, and discoloration occur.

WHAT IS WITHERING?

The first necessary process of the black tea production is withering. Withering is the process transforming the tea leaf, of which the water inside of it is minimized by vaporizing with hot air, into suitable form for physical curling process.

The water at the level of 70-80, which the fresh tea leaves contain, decreases to 50-55%.

-In normal conditions, to ensure the withering is good, the thickness of the fresh tea laid into the withering basins must not exceed 25 cm.

At that time, the weight of the tea per square meter is approx. 25 Kg.

The traf thicknesses may be increased and also be decreased on the heads of the offshoots with monitoring the changes occurring inthe structure of the fresh tea, on the last days of offshooting periods.

Dry and fresh air must be administered in sufficient amount to the tea to be withered, in ensuring the sufficient and required withering process. For this, the fans supplying air must have the sufficient capacity to provide enough air, and the channels tranfering the air and the withering basins must be leakproof.

WHAT IS WITHERING?

For ensuring homogenous withering, while the tea laid onto the withering units continues its journey, in some cases the bottom part of the laid tea, which contacts with the Traf cloth, dries excessively, and loses its features. More than one mixers have to be mounted in the centre of the basin, in case of need, in order to avoid this negativity. Rubber is attached on the tips of these mixing rakes, and it is ensured that the band is not damaged, in case they contact with the conveyor material (polyester band).
Setting the rakes with a distance of 1 -1.5 cm from the mentioned band and operating them such, shall be useful in stirring and plowing the whole tea.

SOME WITHERING TECHNIQUES

Withering is generally carried out in two ways: Natural and Artificial (By Force) :

-Natural Withering: The tea offhoots are withered under the natural air and temperature conditions. In natural withering, the leaves are laid down onto the shelves with a spacing of 10-15 cm, varying as 0.5 kg per square meter.

Despite it takes a time of 16-20 hours, better quality values are generated than the withering by force.

In natural withering, providing large amount of air, as well as its low temperature, are the most important advantages. The most important disadvantage of natural withering is the fact that withering is dependent entirely on the weather conditions.

-Artificial Withering: The main purpose of artificial (by force) withering is ensuring a uniform and good withering by contacting the tea leaf with the air having enough drying power at suitable degree.

-Currently, the system applied generally in Turkey is artificial Mobile system. In this system, the fresh tea to be poured by the automatic fresh tea loading machine (bunkers) is directly proportional with the speed of the band and pouring thickness. These bands are adjusted according to the tea processing conditions, and regular feeding of the withering basins in suitable thickness is ensured. The mobile withering system must not be stopped during the manufacturing, except the necessary cases.

TEMPERATURE DELIVERED TO THE WITHERING UNITS

The temperature of the air to be delivered to the withering, may vary between the ambient temperature and 32ºC depending on the freshness of the tea, wetness status, weather and working conditions.
Withering duration may be shortened through applying high temperature. However, **rapid withering have negative effects on the quality of the black tea**.
In case of excessively withered teas, the appearance of the dry tea is brown, its steep colour is light and greenish.

PRIMARY FACTORS AFFECTING THE WITHERING

Leaf type: Withering of the tea leaves, which are collected from different tea plants, and having less or much water content, small or big, young or seedy, is different.
Although the water is removed easily in young leaves, removal of water in seedy leaves takes longer time.
The stem and rough leaf ratio among the tea offshoots taken into withering is also important, withering of the stem is more difficult.
Status of the leaf: In case the tea leaves are squeezed and broken before the withering, then this shall have a significant impact on the withering.
Drying of the damaged leaves during withering, affects the appearance of the black tea and quality of its steep negatively.
Laying thickness: Laying thicker or thinner than required, has negative impact on the uniformity of the withering. In order the withering be good, the thickness of the fresh tea laid on the withering basins must not exceed 25 cm.
Withering duration: It is impossible to specify a certain withering duration to be applied in general. Despite this duration is 16-20 hours in natural withering, it is shorter in withering by force. It is applied as approx. 6 hours in Turkey on the Mobile Withering Systems.
Drying capacity of air: The speed of the air and increasing the volume of it is more efficient than increasing the temperature in withering process.

Indicators of withered leaf

-Being floppy, weak, and sapless,

-Not being vivid and bright,

-The stem parts are in a limber form without breaking.

If the withering is not sufficient:

Insufficient withering causes a metalic or herb-like taste similar to brass in the steep.

In less withered teas the appearance of the dry tea is black, the colour of its steep is rough and weak.

Failing to carry out the curling process as desired, causes the plant's sap to run down the machines or conveyor bands during curling, and disappear.

CURLING

It is the process of crushing, breaking down, bending the withered tea leaf on different tea manufacturing machines, and spreading of the cell sap onto the surface of the curled leaf, and the starting of oxidation.

Curling machines are designed according to two-times curling system in general at the tea factories.

The First Curling (Flat Curling)

The first curling process is carried out on the flat (leaf) curling machines.

Although the capacities of these machines are different, a standard curling machine may take at least 300-350 kg withered leaves when loaded gradually in a long time.

A standard curling machine is loaded and unloaded for 8 times in a shhift, and curling duration is at least **45** minutes from the time of loading.

After the first curling, curls are unloaded gradually.

They are screened through fresh tea screens at the factories that have rotorvanes, after being passed from the rotorvane, and at those that do not have rotorvanes, directly from the screens.

However, recommendation is not using rotorvanes.

After the teas are ventilated on the fresh tea screens, press or core curling machines for the second curling.

The Second Curling

The second curling process is carried out on press or core curling machines.

Press curling is recommended.

It is ensured that the rough leaves, which are not broken down enough in the first curling, be broken down more on core curling or in press curling under pressure, the cell membrane of the leaf is cracked and cell sap is removed, and better oxidation conditions are prepared.

Press Curling

In press curling, the curling duration is **40** minutes.

At least 3 times press is applied to the teas within press curling, within this period.

A press is applied with a pressure of 90-135 kg onto the tea for 5-6 minutes. After 5-6 minutes, press is lifted up, and the machine is operated without press for 5-6 minutes. Thus, the heat of the tea, which is warmed up due to excessive friction during the pressure, is decreased.

Core Curling: Curling duration in core curling is **15** minutes.

FERMENTATION (OXIDATION)

Fermentation is the event of that the chemical compounds existing in the cell sap of the curled fresh tea leaf are changed biologically with the impact of **oxidase** enzyme, and the formation of the desired colour, sourness, brightness, odour, and aroma in black tea.

As a result of oxidation, the green colour of the tea leaf turns into a copper red, and a pleasant taste with apple-scent is formed.

Oxidation is stage, in which the quality id formed or destroyed in black tea.

Oxygen constitutes the base of the oxidation.

A great amount of oxygen is needed for the formation of Theaflavine (TF).

Fermentation duration is inversely related with the ambient temperature.

A normal fermentation period may be considered as 3 hours from the start of curling.

Factors Affecting the Oxidation

Duration, Heat, Humidity, Laying Thickness and Density, Oxygen Concentration

Conditions of the oxidation room and other factors (Collecting Standard, Young or Seedy Leaves)

FERMENTATION (OXIDATION)

Duration; Duration of the oxidation is not the period which the teas remain in the oxidation part, but it is the period from the start of curling to the completion of oxidation. It must not exceed 3.5 hours.

Oxidation duration is decreased or increased in order to remove the defects in curling and withering stages, to bring the colour and odour status to the desired level, when necessary.

With the expansion of the oxidation duration, the sourness and brightness of the steep is decreased.

When the oxidation duration is increased, more colour and less quality occurs in the steep of the tea, and when it is decrased then less colour and more quality occurs.

Fermentation duration is inversely related with the ambient temperature.

A normal fermentation period may be considered as 3 hours from the start of curling ermentation duration.

Humidity of the air delivered to fermentation: 90-95 %

FERMENTATION (OXIDATION) (TEMPERATURE)

The most appropriate temperature fot oxidation is 24-26ºC. (for an ideal oxidation)

Oxidation slow down unde 21ºC and above 32ºC.

When the temperature exceeds 50ºC, oxidation slows down very much, and if it increases more, then it stops completely.

The temperature of the air delivered to the fermentation unit, has an important effect also on the quality of the final product.

The brightness and vividness in the tea liqueur increases with the oxidation carried out at low temperatures.

Vividness decreases based on the high temperature, and a matt and dull colour is formed.

More Theaflavine is formed at lower temperatures.

Brightness, vividness, toughness are determined by the amount of TF.

In case the temperature increases, formation of Thearubigine is accelerated. This affects the various features of the black tea negatively.

Disadvantages of surplus temperatures are more than the lower temperatures.

In order to be able to avoid the darkening in the colour of the product, it must be ensured that the humidity rate is kept high.

It is known that the enzyme activities on the leaves continue for 24 hours more from the time the tea offshoots are harvested. It is revealed with the researches that the phenolic compounds increase as long as they are stored under suitable conditions during this period, and after 24 hours these activities stop, then begin to decrease.

This process must be considered in commencing the curling process in terms of the quality.

Laying Thickness and Density

Temperature increases on the tea leaves depending on the laying thickness.
In case escalation is seen on the leaves during oxidation, the thickness is decreased.
Laying the leaves very thin causes the loss of temperature and failing of oxidation to be carried out in suitable manner.
It must a thickness which air can reach (**Maximum 15 cm).**
Laying thick leads to better results, compared to laying thin that is deemed favorable.

A great amount of oxygen is needed for the formation of TF.
In case **Tfreash air** cannot be delivered, then the temperature towards the bottom parts of the places on which the tea leaves are laid down shall increase, and there shall be parts which sufficient oxygen cannot reach. TR formation shall accelerate on this parts, and as a result features of the produced tea shall be affected negatively.
The withered tea leaf particles must contact well with air (O_2) during oxidation. Thus, the catechins may transform into theaflavine and thearubigine.
Excessive air causes lower temperatures and accelerates drying and cooling down with vaporization. It is not favourable.
Conditions of oxidation room; In a status which the humidity and temperature may be controlled and kept, which is not affected directly from the sunshine..

DRYING

The purpose of drying is to stop the enzyme activities, and to establish the environment that shall prevent the loss of achieved features and and formed substances. Tea becomes available to be stored, packaged, and transported by means of this.

Drying is the process of minimizing the humidity rate to 2.5-3.5% levels by firing the tea leaf, which is curled and fermented.

Factors affecting the drying process

Temperature of the air entering into the oven

Flow rate of the air entering into the oven

Thickness of the leaves on the pallet

Duration of staying of the teas within the oven

Drying temperatures

Entrance temperature in drying is 95-105 ^{0}C,

Exiting temperature of drying is kept at 50-60^{0}C depending on the exhaust hood shape of the ovens. (100-50 is ideal)

DRYING

Oven Settings

There are primarily two setting in the ovens.
The first one is thickness (pallet) setting, and it enables that the teas are laid down in thin or thick layers.
The second one is cycle (Belt /variator) setting, and it determined the period of staying within the oven.

Other factors affecting the drying capacity of the oven:
Curling status of the ovened tea affects the oven capacity significantly.

Matters to be Considered in Drying:

Fresh and clean air must be blown into the ovens,

Loading of the ovens must be followed up carefully,
The flow rate of the hot air entering into the oven must be measured (20 thousand cubic meters per hour for an oven with a capacity of 15 tonnes)
Engine belts must be checked. The air entering into the ovens must not leak outside, except the kiln shaft.
Oven Heaters must be kept clean,

PROCESS OF PASSING THROUGH THE FIBER REMOVERS (CLEANING OUT THE FIBERS)

Cleaning out the fibers existing in the content of the ovened and dried teas is the first and the most important.

Although there are various systems for this, the most appropriate system for tea is the system currently used in our region. This system is consisted of the plastic drum and the conveyor part, which removes the fibers cleaned out by the mat on which this drum rubs against, out of the system.

Another part that serves an important function is the relays, which provides vibration by revolving under the conveyor band (Vibration Relays).

The dust, fiber, and wastes within the teas, which are placed on the conveyor that is on the move by means of the static electricity generated on the fiber holders, are cleaned out.

The teas, of which the wastes and fibers are removed sufficiently, are sent to the grading department in order to be classified.

Fiber remover systems must work effectively in order the fibers, which deteriorate the quality values of out tea, as well as cause the blocking of screen holes on Middleton and pakkas easily, are removed.

Matters to be Considered in Grading process:

Attention must be paid to that the vibrating relays under the fiber removers work continuously,

It must be ensured that the tea passing over the convetor band is in certain thickness and laid down on the band regularly.

Proximity of the drums to the Transport must be checked, and the mechanism required to get closer or move away must be in working condition

It must be ensured that the drums are on the scale, and it must not be in a position such one side is lower and the other is higher

It must be ensured that the mats are attached to the drum at full length and rub against with a certain pressure properly.

GRADING

Grading is the seperation process depending on the thinness, thickness, and quality of the ovened teas by screening through the screens, of which the standard is determined.

The humidity rate contained by the teas must be 3%, in order to be graded well, and this value must not exceed 4%.

As the humidity of the teas that are hanged on and are not stored in good condition shall increase and they shall gain elasticity, their grading may not be carried out well, and they get mouldy in a short period and become hazardous for health.

Classification of teas

The teas coming from the oven are initially screened through the screens named as Middleton in grading.

In general, the produced teas are grouped in 2 classes as Manufacturing break and broken teas.

Teas arriving grading after exiting drying and eliminated without being subjected to any crushing process (passing through the 1st Group of Middletons) are called **manufacturing break teas**.

They are (OF), (BOP), and (OP) teas.

OP: Orange Pekoe
FOP: Flowery Orange Pekoe
GFOP: Golden Flowery Orange Pekoe
TGFOP: Tippy Golden Flowery Orange Pekoe
TGFOP 1: Tippy Golden Flowery Orange Pekoe One
FTGFOP: Finest Tippy Golden Flowery Orange Pekoe
FTGFOP 1: Finest Tippy Golden Flowery Orange Pekoe One
SFTGFOP: Special Finest Tippy Golden Flowery Orange Pekoe
SFTGFOP 1: Special Finest Tippy Golden Flowery Orange Pekoe One
For broken leaves, the letter “B” is added to the name as in BOP (Broken Orange Pekoe), FBOP, GBOP, TGBOP, etc.
For smaller grades used in teabags, fannings and dust grades are used, for example: OF, OPF, FBOPF, FD, GD.

Common borders. Common solutions

BROKEN TEAS:

Teas obtained as a result of crushing the teas remaining over the Middleton screen and pakka screens numbered 10 mechanically, and re-screening are called **broken teas** (passing through crushing).

F (FANNING):

They are fine-structured teas.

B0P2 (BROKEN ORANGE PEKOE TWO)

BP(BROKEN PEKOE)

They are the teas having more rough particles.

D (DUST):

They are the teas in form of powder, as it can be understood by its name.

Matters to be Considered in Tea Storing

Tea must be stored in a storage that is planned and built suitably.

Teas must be stored separately depending on their types and offshooting periods within the storage.

Storage temperature must be 5-25 ^{0}C for black tea.

The relative humidity within the storage must be 50-60%, and humidity must not exceed 65%.

Packaging;

Suitable material must be chosen for tea packaging, packages shall be in a structure that enables the storage of tea for a long period.

As the tea absorbs the humidity easily due to its natüre, the packages must be made from non-permeable materials so as to prevent this.

The most suitable packaging is double package: a bag sewed from canvas inside, and nylon out of it. This packaging form provides easiness and safety in transportation. The openings of the packages are bound with suitable ropes.

Kraft sacks or big bags may also be used for tea package.

In some countries, sacks or boxes covered with alluminium folio inside are also used.

Size of the packages are chosen by the companies.

QUALITY CONTROL DEPARTMENT IN THE FACTORIES

Quality Control laboratories are the places, at which the conformity / non-conformity of the products are determined first.

Quality Control laboratories are needed in order to determine the quality features of the produced teas and understand whether the expected quality values are achieved in the product or not.

Obligation of ensuring quality for each stage is present within the stages before any good reaches to the final stage.

For this, checks and measurements are needed in the production stages.

Despite the checks may be carried out by hand and eyes, measurements are the processes requiring instruments and materials.

Quality must be determined based on the metrology, rather than abstract assessments (examination by hand / eyes).

It must be checked frequently whether the measuring devices are measuring accurately or not, and non-conformities must be remedied, if any.

This is called **Calibration**.

Calibration is the legal obligation in case of measurement devices, and it is mandatory to carry out this in certain intervals so as to be in different time periods for each device.

Assessing the Sensory Features of the Black Tea

Features of the sample	Assessment	Scoring
Appearance of Dry Tea	It must be in a proper appearance, and in black or dark copper colour, it must not contain fibers and wastes.	10
Colour of Steep	It must be in dark red and reddish appearance, and bright, it must not be dull and blurry, sedimented or dark.	25
Sourness, Saturity	It must be sour so as to pull the tongue and must have a saturity feature.	30
Colour and Odour of Steep Residue (Pulp)	It must be homogenous and and in an appropriate copper red colour, green leaves must be as few as possible, the leaves in the pulp must be bright and must not be darkened.	15
Aroma of the Steep	It must be specific to black tea and pleasant.	20

TASTING

Matters to be Considered During the Sensory Assessment Analysis:
It is useful that the laborants follow up the production stages starting from withering the tea until they become semi-product, at the tea factories.
A good taste-tester must be able to understand from which stage of the production the negativeness felt during tasting is caused.
For instance, he/she must know that the drying occurring in fresh leaf in withering shall display itself in dry tea as scales.
As the tasting analysis is an analysis we conduct using our sense organs;
Those smoking cigarettes must not smoke just before the tasting analysis, and must not use odorizers such as fragrant soaps, cologne, etc.
The taste-tester must carry out tasting analyses taking samples from the burnt or wet teas when they face with in their factories, in order to improve themselves, and must use this feelings during tasting these out-of-standard teas, laterwards.

Examination with sense on dry tea sample

Sensory examination must be conducted in a laboratory illuminated with a flourescent lamp giving a light of 40 lux.
The sample is examined by hand initially, smelt,
A sample of 2.80 gr is taken on a weigh with a precision of ± 0,1 gr.
The sample taken is placed into a special porcelain ware of 150 ml and approx. 140 ml distilled water at boiling degree is added into it.
The cover of the cup is closed and waited for 5-6 minutes.
This liquid obtained is called liqueur.
This liqueur is taken to a separate cup (tasting bowl).
The tea leaves remaining in the porcelain cup is transfered onto the cover by turning down the cup and striking with the other hand rigidly.
First, the dry tea and then the steep waste (pulp), and later the liqueur is examined.
The temperature of the liqueur must be up to 43-44 ^{0}C during tasting.
Liqueur is taken from the tasting bowl with a spoon with a volüme of 8 ml.
The sample must not be swallowed in tasting.
The colour of the liqueur is the most important feature that have to be examined, in taste-tester's taking the final decision about the quality of the tea.
The Taste-tester obtaines the initial observations on the steep status, saturity and sourness features of the liqueur by examining the colour and brightness of the liqueur.
Benchmarking is very important in tasting. If the scoring is made by benchmarking, then the decisions exact.

Product features that have to be carried by the Black and Green Teas;

Both the black tea and the green tea must be in a colour and odour specific to them.

They must never contain foreign substances.

Their physical and chemical features must be in compliance with the table, which is prepared visually in Tea Communique (below).

17 Haziran 2015 ÇARŞAMBA Resmî Gazete Sayı : 29389

TEBLİĞ

From the Ministry of Food, Agriculture and Livestock:

TURKISH FOOD CODEX TEA COMMUNIQUE (COMMUNIQUE NO: 2015/30)

Purpose

ARTICLE 1 – (1) The purpose of this communique is to determine the conditions related with the production, preparation, processing, labelling, keeping, storing, transporting, and placing on the market of black tea, green tea, aromatized black and green tea, and black and green tea without caffeine in compliance with its technique and in a hygienic manner and product features.

Scope

ARTICLE 2 – (1) This Communique includes the black tea, green tea and aromatized black and green tea, and black and green tea without caffeine.

(2) It does not include the black and green teas, in which the dried herbals and/or fruits added, soluble teas and tea extracts.

Basis

ARTICLE 3 – (1) This Communique is prepared based on the Turkish Food Codex regulation published on Official Gazette with repeating number of 28157 3 and dated 29/12/2011.

Definitions

ARTICLE 4 – (1) In this Communique;

a) Black tea refers to the product obtained as a result of withering, curling, crushing, oxidation, and drying the top buds and fresh leaves following it and offshoots with fresh single leaf, fresh two leaves and fresh three leaves and the fresh stem parts linking them each other of different types of Camellia sinensis specie,

17 Haziran 2015 ÇARŞAMBA Resmî Gazete Sayı : 29389

TEBLİĞ

b) Emissitious Pochette refers to the pochettes, with or without ropes, produced from a substance and material suitable to contacting with food, containing the teas in suitable size produced under this Communique, in certain basis weights, and having the feature of filtering the colour, taste, and aroma specific to the product it contains, in hot water,
c) Black / green tea without caffeine refers to the tea, in which the caffein amount does not exceed 0.1% in weight in dry substance,
ç) Foreign substance refers to all kinds of substances, which the origin is not tea, such as plant and animal originated substances, Stones, plastic, and similar substances, and artificial substances,
d) Green tea refers to the non-oxidized product obtained as a result of processing with production stages such as enzyme inactivation, curling, crushing, drying of the top buds and fresh leaves following it and offshoots with fresh single leaf, fresh two leaves and fresh three leaves and the fresh stem parts linking them each other of different types of : Camellia sinensis specie.

17 June 2015 WEDNESDAY Official Gazette Number : 29389

Product features

ARTICLE 5 – (1) The products under this Communique shall be:

a) In an appearance, colour, taste, and odour specific to it.

b) Not contain foreign substances.

c) İn conformity with the physical and chemical features provided in Annex-1.

Addtives

ARTICLE 6 – (1) Any additives may not be added into the products that are under this Communique.

Aromatizers and food components having aromitizing feature

ARTICLE 7 – (1) The aromitizers and the food components having aromitizing features to be used in the products under this Communique shall be in compliance with the provisions of Turkish Food Codex Aromatizers and Food Components Having Aromatizing Features Regulation published on Official Gazette with repeating number of 28157 3 and dated 29/12/2011.

Contaminants

ARTICLE 8 – (1) The amounts of the contaminants within the products under this Communique shall be in compliance with the provisions of Turkish Food Codex Contaminants Regulation published on Official Gazette with repeating number of 28157 3 and dated 29/12/2011.

17 Haziran 2015 ÇARŞAMBA Resmî Gazete Sayı : 29389

Contaminants

ARTICLE 8 – (1) The amounts of the contaminants within the products under this Communique shall be in compliance with the provisions of Turkish Food Codex Contaminants Regulation published on Official Gazette with repeating number of 28157 3 and dated 29/12/2011.

Pesticide residuals

ARTICLE 9 – (1) The amounts of the pesticide residuals within the products under this Communique shall be in compliance with the provisions of Turkish Food Codex Maximum Residual Limits of Pesticides Regulation published on Official Gazette with repeating number of 29099 and dated 25/8/2014.

Hygiene

ARTICLE 10 – (1) The products under this Communique shall be in compliance with the provisions of Turkish Food Codex Food Hygiene Regulation published on Official Gazette with repeating number of 28145 and dated 17/12/2011 and Turkish Food Codex Microbiolgic Criteria Regulation published on Official Gazette with repeating number 28157 3 and dated 29/12/2011.

17 Haziran 2015 ÇARŞAMBA Resmî Gazete Sayı : 29389

Packaging

ARTICLE 11 – (1) The packaging of the products under this Communique shall be in compliance with the provisions of Turkish Food Codex regulation of Substances and Materials Contacting With Food published on Official Gazette with repeating number of 28157 3 and dated 29/12/2011.

(2) The products under this Communique and offered for consumption directly are placed in the market as readily-packed.

17 Haziran 2015 ÇARŞAMBA Resmî Gazete Sayı : 29389

Labelling

ARTICLE 12 – (1) The products under this Communique shall be in compliance with the provisions of Turkish Food Codex Labelling Regulation published on Official Gazette with repeating number of 28157 3 and dated 29/12/2011 and the following provisions. In addition to these provisions:

a) On the label of the black and green teas offered in emissitious bags for sale, the expression «teapot emissitious bag» or «emissitious bag» is placed on the same face with the product name, depending on the usage.

b) If the products under this Communique contain aroma, the product name is expressed as «….. Aromatized black / green tea».

c) In case the products under this Communique are produced as a mixture with other dried plants and/or fruit particles, then the product is not named as «black tea» or «green tea». The name of the product is named as «….. And black/green tea mixture» and/or black/green tea and ….. Mixture», provided to be in the same colour and font.

17 Haziran 2015 ÇARŞAMBA Resmî Gazete Sayı : 29389

Transportation and Storage

ARTICLE 13 – (1) The products under this Communique shall be in compliance with the provisions of Turkish Food Codex Food Transportation and Storage Regulation.

Sampling and analysis methods

ARTICLE 14 – (1) In sampling the products under this Communique the rules in Turkish Food Codex Sampling and Analysis Methods Section must be followed. The sample is analysed with the internationally accepted methods.

ÖZELLİKLER	DEĞERLER			
	Siyah çay	Siyah Çay (Süzen poşet)	Yeşil Çay	Yeşil çay (Süzen poşet)
Toplam Toz Çay Miktarı (g/g)(%) (Tanecik Boyutu ≤ 355 µ)	En çok 14	En çok 35	En çok 14	En çok 35
Okside Olmamış Parça (g/g) (%)	En çok 8	En çok 8	-	-
Toplam Kül (Kuru Maddede) (g/g) (%)	En az 4 - En çok 8	En az 4 - En çok 8	En az 4 - En çok 8	En az 4 - En çok 8
Su Ekstraktı[2] (Kuru Maddede) (g/g) (%)	En az 29	En az 32	En az 32	En az 32
Ham Selüloz (Kuru Maddede) (g/g) (%)	En çok 16,5	En çok 15,0	En çok 16,5	En çok 15,0
Suda Çözünen Külde Alkalilik (KOH Cinsinden) (Kuru Maddede) (%)	En az 1-En çok 3	En az 1-En çok 3	En az 1-En çok 3	En az 1-En çok 3
% 10'luk Hidroklorik Asitte Çözünmeyen Kül (Kuru Maddede) (g/g) (%)	En çok 1	En çok 1	En çok 1	En çok 1
Kafein (Kuru Maddede),(g/g) (%)	En az 1,6	En az 1,6	En az 1,6	En az 1,6
Suda Çözünen Kül (Toplam Küle Göre), (g/g) (%)	En az 45	En az 45	En az 45	En az 45
Nem Oranı (g/g) (%)	En çok 7	En çok 7	En çok 7	En çok 7
Toplam Polifenol (Kuru Maddede), (g/g) (%)	-	-	En az 11	En az 11
Toplam Kateşin (Kuru Maddede), (g/g) (%)	-	-	En az 7	En az 7

ÖZELLİKLER	DEĞERLER			
	Siyah çay	Siyah Çay (Süzen poşet)	Yeşil Çay	Yeşil çay (Süzen poşet)
Toplam Toz Çay Miktarı (g/g)(%) (Tanecik Boyutu ≤ 355 µ)	En çok 14	En çok 35	En çok 14	En çok 35
Okside Olmamış Parça (g/g) (%)	En çok 8	En çok 8	-	-
Toplam Kül (Kuru Maddede) (g/g) (%)	En az 4 - En çok 8	En az 4 - En çok 8	En az 4 - En çok 8	En az 4 - En çok 8
Su Ekstraktı[2] (Kuru Maddede) (g/g) (%)	En az 29	En az 32	En az 32	En az 32
Ham Selüloz (Kuru Maddede) (g/g) (%)	En çok 16,5	En çok 15,0	En çok 16,5	En çok 15,0
Suda Çözünen Külde Alkalilik (KOH Cinsinden) (Kuru Maddede) (%)	En az 1-En çok 3	En az 1-En çok 3	En az 1-En çok 3	En az 1-En çok 3
% 10'luk Hidroklorik Asitte Çözünmeyen Kül (Kuru Maddede) (g/g) (%)	En çok 1	En çok 1	En çok 1	En çok 1
Kafein (Kuru Maddede),(g/g) (%)	En az 1,6	En az 1,6	En az 1,6	En az 1,6
Suda Çözünen Kül (Toplam Küle Göre), (g/g) (%)	En az 45	En az 45	En az 45	En az 45
Nem Oranı (g/g) (%)	En çok 7	En çok 7	En çok 7	En çok 7
Toplam Polifenol (Kuru Maddede), (g/g) (%)	-	-	En az 11	En az 11
Toplam Kateşin (Kuru Maddede), (g/g) (%)	-	-	En az 7	En az 7

Common borders. Common solutions

Common borders. Common solutions

***Any additives may not be used in tea.**

***If aromitizer or a food substance having the feature of aromatizing, then the relevant provisions of the legislation are applied.**

***As it has to be in compliance with the provisions of Turkish Food Codex Contaminants Regulation, it also complies with the provisions of Turkish Food Codex Regulation of Maximum Residual Limits of Pesticides.**

***Factories must operate in accordance with the Food Hygiene Regulation.**

***Besides, black tea or green tea must be in conformity with Turkish Food Codex Microbiologic Criteris – to the following criteris.**

		n	c	m	M	Method
1.10. Coffee and tea 1.10.1. Tea (green, black), herbal and fruit teas and their mixtures (including emissitious bag teas)	Yeast and mould	5	2	10^4	10^5	ISO 7954
	Salmonella	5	0	0/25 g-mL		EN/ISO 6579

Analyses recommended to be conducted continuously,

1. **Sensory examination (degutation)**
2. **Humidity (max 4%) – (7% in packed tea)**
3. **Volume (Volume of Tea) gr/lt = cm3 =Standard package size..**
4. **Extract (Communique -min 29 / 32 %)**
5. **Waste / stem (Cellulose) (Max: 16.5)**
6. **Dust (Max: 14 – 35 Emissitiour)**

Other analyses which have to be followed legally)

1. **Caffeine**
2. **Ash,**
3. **Non-oxidized Particle**
4. **Alkalinity in Water-Soluble Ash % (It is conducted in order to understand whether alkali carbonates are present or not, thus whether anything has been added into the food or not)**
5. **Ash non-soluble in 10 % acid % (It is conducted for the presence of inorganic substances, and substances such as metals)**
6. **Total Poliphenole Green Tea**
7. **Catechin, Green Tea**

17 Haziran 2015 ÇARŞAMBA Resmî Gazete Sayı : 29389

Labelling

ARTICLE 12 – (1) The products under this Communique shall be in compliance with the provisions of Turkish Food Codex Labelling Regulation published on Official Gazette with repeating number of 28157 3 and dated 29/12/2011 and the following provisions. In addition to these provisions:

a) On the label of the black and green teas offered in emissitious bags for sale, the expression «teapot emissitious bag» or «emissitious bag» is placed on the same face with the product name, depending on the usage.

b) If the products under this Communique contain aroma, the product name is expressed as «….. Aromatized black / green tea».

c) In case the products under this Communique are produced as a mixture with other dried plants and/or fruit particles, then the product is not named as «black tea» or «green tea». The name of the product is named as «….. And black/green tea mixture» and/or black/green tea and ….. Mixture», provided to be in the same colour and font.

Kanun No: 5262 **Kabul Tarihi : 1.12.2004**

(Law No: 5262) **Date of Adopting: 1/12/2004**

Organic farming Law;

PART ONE

Purpose, Scope and Definitions

Purpose

ARTICLE 1. —The purpose of this Law is to determine the procedures and principles regarding to take necessary measures to ensure that the organic products and inputs are developed in order to offer quality products to the consumer.

Scope

ARTICLE 2. — This Law includes the matters on carrying out the control and certification services regarding the performance of organic farming activities, and the auditing procedures and principles and power, duty and responsibilities of the Ministry.

Definitions

ARTICLE 3. — In this Law;

a) Ministry refers to the Ministry of Agriculture and Rural Affairs,

b) Organic farming activities refer to producing or cultivating organic products or inputs using soil, water, plant, animal, and natural sources …

c) Control and certification institution refers to the real or legal persons authorized by the Ministry in order to control and certificate all stages of the organic product or input from the production to the arrival to the consumer,

REGULATION ON THE PRINCIPLES OF ORGANIC FARMING AND APPLICATION

PART ONE
General Provisions

PART ONE
Purpose, Scope, Basis, and Definitions
Purpose
ARTICLE 1 – (1) The purpose of this Regulation is to determine the principles and procedures regarding the protection of ecologic balance, performance of organic farming activities, arrangement, development, and generalizing of organic farming production and marketing.
Scope
ARTICLE 2 – (1) This Regulation includes the techniques and administrative matters regarding production or procurement of all kinds of herbal, animal and water products in accordance with the organic farming method, yeasts used as food or feed, collection of products from the forests and natural areas in accordance with the organic farming principles, processing, packaging, labelling, storing, transporting, marketing, controlling, certificating, auditing and criminal provisions.
Dayanak
ARTICLE 3 – (1) This regulation is prepared based on the Organic Farming Law dated 1/12/2004 and numbered 5262.
Definitions…

ORGANIC TEA FARMING

1. AS SHOWN ABOVE, IT HAS TO BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT LEGISLATIONS.

2. Each stage of the production is controlled

3. On the basis of voluteering

Entirely organic materials are used from the selection of seed / sapling (in Herbal production) in each stage, including packaging stage.
Chemical or synthetic fertilizers, Agricultural Pest Controls, antibiotics, modified gens (GMO), etc. may not be used in any manner.

It can be said easily that one of the most important reasons of the increase od some diseases in worlwide, which the global problems are grown, (particularly decrease of Biological diversity) (such as the decrease in Bird, Insects, and fish species in our Region) is using uncontrolled input.
Particularly in agriculte, the applications intended for more income, means to declare war agaisnt the Nature. Who Wins…

Good Agricultural Applications.. A Production Model having a flexible legislation...

Project funded by EUROPEAN UNION

TEAWAY
Promoting Tea as the Engine of Growth for the Black Sea Basin Area

Black Sea CROSS BORDER COOPERATION

Tea pickers get US$4 per day for 20 kg (44 lbs) at Sri Lanka's tea plantations.

2019 AVERAGE PRICES

PRICES OF FRESH TEA LEAF IN SRI LANKA COLOMBO ₺/KG

		Price (Rs)	Rs/$	$	TL
	Fresh Tea Leaf	100	0,005	0,54	3,996
		80	0,005	0,432	3,197
	PRICE OF FRESH TEA LAEAF IN KENYA ₺/KG				
				$	TL
				0,2	1,,5
				0,3	2,2

World Auction Price of Tea sold:						
Year	International price (US$/Kg)					
	India	Bangladesh	Sri Lanka	Indonesia	Kenya	Limbe Malawi
2007	1,62	1,17	2,51	1,33	1,66	1,05
2008	2,00	1,62	2,83	1,51	2,18	1,37
2009	2,18	1,98	3,15	1,80	2,29	1,58
2010	2,29	2,61	3,28	1,82	2,54	1,58
2012	2,23	2,14	3,25	1,97	2,72	1,61

2020 ORTALAMA FİYATLAR
SRİ LANKA COLOMBO BORSASI ÇAY FİYATLARI ₺/KG

Process	Elevation	Price (Rs)	Rs/$	$	TL
Orthodox	Uva High	525,28	0,0054	2,836512	20,99019
	Western High	562,87	0,0054	3,039498	22,49229
	Uva Medium	566,86	0,0054	3,061044	22,65173
	Western Medium	545,96	0,0054	2,948184	21,81656
	Low Grown	680,51	0,0054	3,674754	27,19318
CTC	Western High	501,62	0,0054	2,708748	20,04474
	Western Medium	484,52	0,0054	2,616408	19,36142
	Low Grown	466,49	0,0054	2,519046	18,64094
Orthodox & CTC - Combine	Uva High	525,28	0,0054	2,836512	20,99019
	Western High	554,31	0,0054	2,993274	22,15023
	Uva Medium	566,86	0,0054	3,061044	22,65173
	Western Medium	529,16	0,0054	2,857464	21,14523
	Low Grown	666,43	0,0054	3,598722	26,63054

MOMBASA BORSASI KENYA

	SALE 35 HELD ON 31/08, 01 &02/09/2020			SALE 35 HELD ON 26 & 27/08/2019		
COUNTRY	PRIMARY	SECONDARY	TOTAL	PRIMARY	SECONDARY	TOTAL
Kenya	2.19	1.12	2.09	2.28	1.15	2.20
Uganda	1.43	0.96	1.31	1.23	0.78	1.10
Rwanda	2.86	2.14	2.79	2.99	1.96	2.89
Burundi	2.24	1.21	2.13	2.43	1.45	2.37
Zambia	-	-	-	-	-	-
Tanzania	1.39	0.89	1.15	1.23	0.73	1.01
D R of Congo	-	-	-	-	-	-
Mozambique	-	-	-	-	-	-
Madagascar	-	-	-	-	-	-
Malawi	-	-	-	-	-	-
Zimbabwe	-	-	-	-	-	-
Ethiopia	1.24	0.97	1.00	-	-	-
Total	**2.11**	**1.09**	**1.98**	**2.17**	**1.01**	**2.04**

	TO DATE: 2020			TO DATE: 2019		
Kenya	2.09	1.07	2.02	2.26	0.99	2.17
Uganda	1.34	0.85	1.20	1.23	0.69	1.06
Rwanda	2.93	2.00	2.80	2.77	1.96	2.65
Burundi	2.29	1.36	2.18	2.18	1.42	2.13
Zambia	-	-	-	-	-	-
Tanzania	1.31	0.78	1.13	1.42	0.63	1.12
D R of Congo	-	-	-	-	0.55	0.55
Mozambique	0.90	0.67	0.79	0.54	0.66	0.65
Madagascar	-	-	-	-	-	-
Malawi	-	-	-	1.80	-	1.80
Zimbabwe	-	-	-	-	-	-
Ethiopia	1.50	0.84	1.16	1.70	0.83	1.15
Total	**2.05**	**1.04**	**1.94**	**2.15**	**0.91**	**1.99**

TEA PRICES IN THE NEIGHBOUR COUNTRY, IRAN

Iran exported a total of **13,000 tons** of tea worth **$18 million** during the first 10 months of the current Iranian year (March 21, 2018-Jan. 20).

According to Habibollah Jahansaz, the head of Iran Tea Organization, the main export destinations included India, Uzbekistan, Tajikistan, Turkmenistan, Afghanistan, Iraq, Canada, Australia, Spain, the Czech Republic, Azerbaijan and Georgia, the Young Journalists Club reported.

1,38 $/1 KG. = 10 Tl /kg.

Common borders. Common solutions

- Thank You For Attending.