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DRAFT TANZANIA STANDARD

Production, processing and handling of black tea - Code of practice

TANZANIA BUREAU OF STANDARD

0 foreword

Tea is an aromatic beverage widely consumed in the world. It is commonly prepared by pouring hot or boiling water over cured leaves of the tea plant, *Camellia sinensis* (L).

Black tea is derived from solely and exclusively, and produced by acceptable processes, notably withering, cutting, oxidation and drying from the leaves, buds and tender stem of varieties of the species *Camellia sinensis* known to be suitable for making tea for consumption as a beverage.

Black tea is usually graded on different scales of quality. Whole leaf teas are of the highest quality followed by broken leaves, fannings, and dusts. Whole leaf teas are produced with little or no alteration to the tea leaf. This results in a finished product with a coarser texture than that of bagged teas. Whole leaf teas are widely considered the most valuable, especially if they contain leaf tips.

1 scope

This Tanzania Standard prescribes a code of practice for production, processing, storage and distribution of black tea of *Camellia sinensis* (L) Cranz intended for human consumption.

This Tanzania Standard is a revision of the second version finalized in 2015. This third edition cancels and replaces the second edition TZS 373:2015 which has been technically revised.

2 Normative reference

The following referenced documents are indispensable for the application of this Tanzania Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

TZS 350, Black tea - Vocabulary

TZS 109, Code of hygiene for food processing units - General

The Environmental Management Act, 2004

3 Terms and definitions

For the purpose of this Tanzania Standard, terms and definitions given in TZS 350 (see clause 2) shall apply

4 Tea cultivation

4.1 Selection of agro-ecological zone

Tea should be grown in the agro-ecological zone as recommended by the Ministry responsible for agriculture and shall comply with environmental regulations from designated competent authority. Consideration for area suitable for tea cultivation shall include the following factors:

4.1.1 Soil

The soil should be well drained, a depth of at least 2 m, pH of between 4.5 - 5.5

4.1.2 Temperature

Air temperature should fall within the optimum range. The minimum should not be below 12 °C and maximum should be 30 °C. The mean should be about 25 °C for the part of the year when the conditions are most favourable.

4.1.3 Rainfall

Under normal condition, the area should receive a minimum rainfall of 1200 mm per year which ON is well distributed.

4.1.4 Altitude

Optimum altitude is between 800 M and 2500 M above sea level.

4.2 Nursery establishment and management

4.2.1 Site selection

The site should be accessible, near to reliable source of water, free from any kind of destruction (wind, fire), well-drained soil and where possible should be near fields and over shading by trees must be avoided. In cases where nurseries are allocated near water bodies, environmental regulations regarding water body protection shall apply.

4.2.2 Site preparation

The site should be cleared and other preparation shall not cause undesirable effects such as soil erosion, elimination of high value plant species such as rare plant species. The preparation shall not involve the use of fire.

4.2.3 Shed construction and bed lay-out

The shed shall be strong with the height of 2.4 m; Beds should be 1 m wide and length not exceeding 30 m. Other standards should conform to designated competent authority for tea.

4.2.4 Soil preparation and filling

Two types of soils should be used and before use, the soils have to be tested for pH. The subsoil pH should be 4.5 - 5.0 and the top soil should be pH of 4.5-5.5. Other preparations including the mixing of fertilizers, the filling of polythene tubes, Plug trays (speedling trays) should be in accordance with approved National guidelines.

4.2.5 Source of planting materials

The planting materials shall be the varieties of clonal tea recognized by a competent tea research institution.

4.2.6 Nursery management

Watering must be done as per requirement. Weeds, pests and diseases control must be done h a manner that the use of chemicals is minimized.

Hardening off and other nursery management and handling of seedlings during transplanting should be done according to approved guidelines.

4.3 Field establishment and management

4.3.1 Site selection

Site selection should consider all weather accessibility and proximity to the factory and should also conform to Forestry regulations as governed by Tanzania Forest Services Agency.

4.3.2 Land preparations

The preparation should be done in such a way that, soil erosion and the build-up of pests and diseases is minimized. There shall be no use of fire in land preparation. The land should be dug 60 cm deep to remove all plant roots and weeds. Approved guidelines should be followed.

4.3.3 Planting

Where there is no irrigation, planting shall be done during reliable rainfall. Appropriate spacing according to clones and the correct size of planting hole should be used as per approved guidelines.

4.3.4 Field management

4.3.4.1 Weed control

Weeds should be controlled in such way that the use of herbicides is minimized and safety precautions are observed. Under normal conditions the use of hand hoe to weed mature tea (3 or more years from planting) is not recommended. Appropriate methods and herbicides for weeding should be as per approved guidelines.

4.3.4.2 Fertilizer application

Under normal conditions fertilizer types and rates at different stages of crop and objectives of fertilizer application should comply with research recommendations.

4.3.4.3 Bringing young tea into bearing

Bringing young tea into bearing must be done timely by pegging or decentering. In either case it must be done correctly as recommended in the approved guideline.

4.3.4.4 Pruning

Pruning cycle should be according to the climatic condition of area (3 years or more) and should be done at the end of main rain season.

Pruning type must be applied according to pruning objective and prunings must remain in the field. Other practices of pruning should be as per approved guidelines.

4.3.4.5 Tipping

Tipping should be done at 15 cm from the pruning height

4.3.4.6 Filling vacanc

Vacancies in tea fields should be in-filled with respective clones

4.3.4.7 Irrigation

In case of irrigation, irrigation water shall be certified by relevant organization. Other environmental and water use regulations shall be complied. The user of irrigation shall seek for water saving techniques.

5 Harvesting practices

5.1 Green leaf plucking/ harvesting and handling

Plucking shall be done according to Tea regulation. The quality of the final product i.e. black tea, to a greater extent, depends on the appropriate harvesting and handling of the green leaf in the field and on the way to the factory.

5.2 Quality attributes of green leaf

a) Green leaf shall be harvested within the specified round length (days) as per ecological zone and means of harvesting

b) For the purpose of obtaining best quality tea, the standard of green leaf shall be as specified in Tea Regulations

c) Harvested green leaf shall be handled in a manner that minimizes bruising, crushing and any contamination

5.3 Handling of green leaf (In the field)

a) Harvested green leaf shall be handled in a manner that minimizes bruising, crushing and any contamination.

b) Inspection of harvested leaf shall be made and sorting conducted under a shade (from sun & rain) to remove unwanted materials.

5.4 Leaf transport and handling to processing plant

5.4.1 Handling of green leaf (collection centre to factory)

a) Properly harvested green leaf shall be collected into suitable containers, preferably aerated ones, and packed lightly to avoid crushing and heating while on transit to the processing factory

b) Harvested leaf shall be transported to the processing factory as soon as is possible within the same day of harvesting

5.4.2 Transfer of green leaf as per tea regulations

For green leaf from a party other than the processing factory owner, transfer of ownership is at the buying point that may be the collection shed or point of delivery at the factory

6 Factory for processing of black tea

6.1 Factory location

a) Tea processing factory shall be sited, as much as possible, at a place that is centrally located to the tea growing area, be it an estate or a congregate of farmers

b) The area should be easily accessible by road/railway

c) Site should be with adequate water resource, close enough to power supply (if available) and with assurance of energy supply to run the plant

d) Site should be far away from unpleasant and odorous premises e.g. waste dumps

6.2 Factory design and construction

6.2.1 Buildings

a) Shall be of a permanent nature dimensioned to easily accommodate black tea processing machinery and associated replacement parts

b) Shall be adequately spaced to enable ease of operations and personnel movements

c) Shall be not only well lit and ventilated but also proof from unwanted intruders such as rodents, birds and insects

d) May be provided with fans, humidifiers and dust extraction fans at appropriate places to provide a conducive atmosphere for black tea manufacture

e) Shall have floors and walls made out of non-corrosive materials and are easy to clean in order to maintain hygiene of the highest quality

f) Shall have adequate points of entrance both in number and size to allow movement of equipment, tools, operators and such other relevant materials

g) Shall be planned in such a way there is a logical flow of raw materials and the final product

6.2.2 Plant and equipment

a) Plant and equipment in the factory shall be out of corrosive material and shall have to comply with national requirements

b) Equipment for use in the factory shall have to meet safety requirements set by a recognized authority

c) Shall have to be provided with safety operating procedures

6.2.3 General conditions

a) The factory buildings, plant and equipment shall be maintained in the highest state of hygiene to conform with food standards set by a recognized authority

b) The surrounds to the plant shall have to conform with environmental statutory requirements such as discharge of effluent

c) The premises shall not be used for such other purposes and or activities other than those related to black tea manufacture

7 Processing

7.1 Reception and handling of green leaf

a) Tea is said to be made in the field therefore it requires proper handling of the green leaf before delivering to the processing factory.

b) The harvested leaf shall be weighed upon arrival at tea factory using Weigh Bridge or weighing scales.

c) Correct weight is important in order to determine the out turn ratio of made tea to green leaf and also to compare between field weight and factory weight.

d) Green leaf is to be inspected and quality must be verified using leaf count method.

e) Bruised and red leaf should be discarded

7.2 Withering

7.2.2 Green leaf delivered at Factory shall be spread evenly on the withering troughs and overloading of Green leaf should be avoided.

7.2.3 Natural or artificial withers will be maintained

7.2.4 Withering is the most critical process in black tea manufacture. The primary aims of withering are to reduce the moisture content of leaf and to soften it to withstand the rolling process.

7.2.5 There should be a proper supervision of temperature and humidity (hygrometers) readings in order to obtain good even withers.

7.2.6 The green leaf sifter should be applied to remove foreign matters from the withered leaf (e.g. sand and metals)

7.3 Rolling / CTC (crushing, tearing and curling)

The rotor vane, rollers and CTC machines should be closely monitored according to the manufacturing standards. The sharpening and changing or CTC rollers is important in order to produce good quality teas.

7.4 Oxidation

a) The rolled and cut leaf will be spread on oxidation units by using fermenting trolleys or continuous fermenting unit.

b) The temperatures and humidity of the oxidation room shall be maintained in accordance to factory location or area.

c) The proper oxidation time or period shall be monitored in order to produce a good quality cup of tea.

d) The teas should not be under or over oxidation.

7.5 Drying or firing

a) The fermented leaf is passed through the dryer to stop any further chemical reactions (to inactivate the fermenting enzymes) and only properly fermented leaf shall be sent to the dryer to arrest fermentation.

b) Supervision of the inlet and exhaust temperatures is important in order to produce properly dried teas.

c) When the stove is in use the stove pipes should be frequently checked for leakages to avoid smoke that will contaminated the made tea.

d) There should be a regular check of moisture content of the dryer mouth teas and a sensory tea tasting should be made at same time.

e) The firing section is important in tea manufacture because the working hours of the tea factory are determined by dryer output.

7.6 Sorting and grading

a) This process involves the separation of tea particles into grades of the fired teas and its importance cannot be overstated as it is here that the value of the final product is determined.

b) Sorting involves the use of vibrating machines contesting of various sieving meshing of standard mesh.

c) During sorting section it is expected to obtain standard grades that are required by the tea market and there are standard grades for Orthodox black teas and CTC black teas.

d) Recommended volumes of tea (free fall)

- i) BPI 245 370
- ii) PFI 280 310
- iii) PD 220 260
- iv) DI 160 280

7.7 Storage of un-packed graded teas

Normally graded teas are stored in bins which are air tight ready for packing in paper sacks or poly bags lined with plastic bag and the bins will keep the flavour and aroma of tea. Tea is hygroscopic and if left loose its quality will deteriorate.

7.8 Packing and packaging materials

The graded teas are weighed and packed in paper sacks lined with aluminium foil paper (two to three ply) and teas also weighed and packed in poly bags lined with nylon sheet according to market requirement.

8 Quality control

Processing of black tea shall be done in hygienic manner conforming to TZS 109 (see clause 2). Quality control should be observed throughout all stages of tea manufacturing by frequent moisture analysis and undergoing sensory tea tasting.

8.1 Plant and equipment hygiene

a) The material of the equipment used in the manufacturing of black tea shall be non-corrosive and nontoxic. This shall include any stage of manufacture and surfaces that come in contact with tea leaf and also cleaning agents

b) The design of processing equipment shall facilitate easy cleaning, inspection and maintenance of all surfaces in the manufacturing stages.

c) The electrical connections shall be installed away from the equipment to facilitate lighting and avoid any contact with personnel.

8.2 Employee hygiene

a) Medical examinations shall be conducted by authorized medical practitioner on every person before being employed. Routine examination shall be done after every six months to ensure every employee is fit and free from disease. There shall be record keeping of those conducted examinations for inspection purposes.

b) Management shall notify the medical authorities of any cases of outbreaks such as vomiting, diarrhoea, typhoid, dysentery or any other diseases in workers families.

c) No worker who is known or suspected of suffering from disorders mentioned above shall be allowed to work in the manufacturing facility.

d) Finger nails shall be kept short and hands shall be cleaned and washed with soap or detergent and water before work and after visiting sanitary facilities. Clean towels and hand drying facilities shall be provided for drying.

e) The employees shall be provided with clean protective clothing. Separate changing rooms shall also be provided. No workers shall be allowed to work without proper protective gear.

1) There shall be display and enforcement of notices. Eating, spitting, noise cleaning, use of tobacco or alcohol in any form and chewing of any form shall be prohibited within the manufacturing area.

g) Sufficient and suitable sanitary facilities including showers and changing rooms shall be provided, maintained clean and in good repair condition. These facilities shall be well lit and ventilated and equipped with self-closing doors. There shall also be hand washing facilities equipped with liquid soap within the toilet area and notices shall be posted requiring personnel to wash their hands after using toilets.

h) These sanitary facilities shall be provided separately for each sex.

8.3 Education and training

a) Employees shall receive appropriate training on personal hygiene and sanitary practices. There shall also be training on the importance of maintaining the use of protective gear during work and principles for the production of clean and safe black tea. There shall be record keeping of these training for inspection purposes.

b) Managers shall arrange for adequate and continuing training of workers in hygienic handling and in personal hygiene so that they understand the precautions necessary to prevent contamination of food. Training should include relevant sections of this code.

8.4 Waste management/disposal

a) The tea waste from the manufacturing facility shall be managed/ disposed in a manner that is approved by the authorized environmental management authority.

b) Facilities shall be provided for the storage of waste and inedible material prior to removal from the establishment. These facilities should be designed to prevent access to waste or inedible material by pests and to avoid contamination of food, potable water, equipment and buildings or roadways on the premises.

c) Waste material should be handled in such a way as to avoid contamination of food or potable water. Care should be taken to prevent access to waste by pests. Waste should be removed from the handling and other working areas as often as necessary and at least daily. Immediately after disposal of waste, receptacles used for storage and any equipment which has come into contact with the waste should be cleaned and disinfected. The waste storage area should also be cleaned and disinfected.

d) Facility shall have an efficient effluent and waste disposal system which should at all times be maintained in good order and repair. All effluent lines (including sewer systems) should be large enough to carry peak loads and should be so constructed as to avoid contamination of potable water supplies.

9 General requirements

9.1 Record keeping

Record keeping should be done along tea industry value chain for traceability purposes.

9.2 Environment

Every business in the tea production, processing and handling should observe environmental requirements as per National Environmental Management Act, (The Environmental Management Act, 2004).