Chilies and capsicums (whole and ground) – Specification
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0 Foreword

Whole Chillies and capsicum contain pungent components made up of capsaicinoids in which the amount differs from one variety to another.

Chillies are marketed as dry whole pods as well as in powder form. Chili peppers are used around the world to make a countless variety of sauces, known as hot sauce, chilly sauce, or pepper sauce.

This Tanzania Standard is being prepared to ensure the safety and quality of chillies and capsicum produced and or traded in the country.

In the preparation of this Tanzania Standard considerable help was derived from spices manufacturers in the country and from ISO 972:1997 (confirmed 2012), on Spices and Condiments.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with TZS 4 (see clause 2)

1 Scope

This Tanzania Standard prescribes requirements, sampling and test methods for chillies and capsicums belonging to the species Capsicum frutescens Linnaeus or Capsicum annum Linnaeus in the form of whole or ground chillies or Capsicums.

2 Normative References

Insert the opening statement and rearrange the standards in ascending order

Codex Stan 193
TZS 4, Rounding off numerical values
TZS 33, Spices and condiments – Sampling
TZS 1318, Spices and condiments – Determination of moisture content Entrainment method
TZS 1316, Spices and condiments – Determination of total ash
TZS 1317, Spices and condiments – Determination of acid insoluble ash
TZS 1319, Spices and condiments – Determination of non volatile ether extract
TZS 1315, Spices and condiments – Determination of extraneous matter and foreign matter content
TZS 109, Codes of hygiene for food processing units – General
3 Terms and definitions

For the purpose of this Tanzania Standard, the following definitions shall apply

3.1 unripe fruits

fruits not yet matured, the colour of which is considerably different from that of the batch under consideration. Generally the fruits are green or pale yellow in colour.

3.2 marked fruits

black or black stained fruits

3.3 fragments

small pieces of broken fruits

3.4 extraneous matter

extraneous matter includes:

a) All matter present in the sample which is not from chillies or capsicum of the variety under consideration;

b) All other foreign matter and, in particular, stalks, leaves, soil and sand.

Extraneous matter does not include unripe, marked or fragment fruits of the variety under consideration.

4 Requirements

4.1 General requirements

4.1.1 Chilies and capsicums are the dried pods (fruits) of plants of the genus Capsicum. In longitudinal cross-section, the pods are roughly triangular in shape, with the base of the attachment to the peduncle (stalk). The angles within this triangular shape may be opposite the point of attachment of the peduncle being generally very acute, but becoming obtuse in rare cases, depending on the species. The pods contain varying numbers of yellow/white, hard, disc-like seeds, 1 mm to 5 number and size of the seeds depend on the species.

When mature, the seeds are attached individually to a relatively soft (spongy) central core within the pod by individual placenta (seed stalks), but in dried commercial chillies the seeds often become detached from the central core and move freely within the pods. The placenta is known to contain the highest concentration of the pungent capsaicinoids.

The mature pods may vary in colour from dark blackish-red through orange-yellow to yellow-green, according to the species. The material pigmentation, particularly red, is affected by exposure to air and light during storage and the intensity decreases with time.
Dimensions may vary from 10 mm to 120 mm in length and 4 mm to 50 mm in diameter, depending on the species.

4.1.2 Ground chillies and ground capsicums

Ground chillies and ground Capsicums are the products obtained by grinding clean and dried whole chillies or capsicums respectively without any added matter. These products shall be in form
of powder of the characteristic colour from red to yellowish green and the maximum particle size is 500 microns.
Mixtures of chillies and capsicum as blended powders are common in order to maintain a constant capsaicinoid content (heat strength) or desired colour.

4.2 Odour and flavour
4.2.1 Odour
The odour of chillies and capsicums, in whole form and in powder form shall have a characteristic strong odour with acrid note, causing sneezing but not disagreeable. Chillies and capsicums, whole and ground, shall be free from musty odour.

4.2.2 Flavour
The flavour of chillies shall be characteristic of chillies, acridvery strong, very pungent and very persistent. The flavour of capsicums shall be acrid moderately strong moderately pungent and moderately persistent.

4.3 Freedom from pests and diseases etc.
Whole and ground chillies and capsicums shall be free from dirt, fungal growth, insect infestation, insect fragments and rodent contamination visible to the naked eye (corrected, if necessary for abnormal vision) with such magnification as may be necessary in any particular case. If the magnification exceeds x 10, this fact shall be stated in the test report.
Specific requirements (rearrange the subclauses numbers)

4.4 Extraneous matter
The proportion of extraneous matter when determined by the method described in TZS 1315 (see clause 2) shall not exceed 1 % (m/m).

4.5 Unripe, marked or fragment fruits
The proportion of fruits not in conformity with the description in clause 4.1 of whole chillies and whole capsicums shall be less than 5 % (m/m). The method for the determination of unripe, marked or broken berries is described in annex B

4.6 The ground chillies and capsicums shall be of such fineness that all of it passes through a 500 micron (0.500mm) sieve.

4.7 Chemical requirements
Whole and ground chillies and capsicums shall comply with the requirements given in table 1.
Table 1 – Requirements for chillies and capsicums, whole and ground

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Characteristic:</th>
<th>Requirements</th>
<th>Methods of test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Moisture per cent (m/m). max.</td>
<td>10</td>
<td>TZS 1318:</td>
</tr>
<tr>
<td>2</td>
<td>Total ash per cent (m/m) max</td>
<td>10</td>
<td>TZS 1316:</td>
</tr>
<tr>
<td>3</td>
<td>Acid insoluble ashes in HCl % (m/m) max</td>
<td>1.6</td>
<td>TZS 1317:</td>
</tr>
<tr>
<td>4</td>
<td>Crude fibre, per cent (m/m), max</td>
<td>30</td>
<td>Annex C</td>
</tr>
<tr>
<td>5</td>
<td>Non-volatile ether extract % (min.)</td>
<td>12</td>
<td>TZS 1319:</td>
</tr>
</tbody>
</table>

NOTE – Requirements in 2 to 5 are on dry matter basis.

5 Hygiene

Chillies and capsicums shall be prepared under good hygienic practices as stipulated in TZS 109: *Codes of hygiene for food processing units – General.*

6 Contaminants

Chillies and capsicums shall be prepared with special care under Good Manufacturing Practices, so that pesticides used in the Chillies and capsicums production do not leave residues and heavy metals in excess of the limit stipulated on clause 6.1 and 6.2 respectively.

6.1 Pesticide residues in Chillies and capsicums shall not exceed maximum residue limit as stipulated by Codex Alimentarius Commission.

6.2 Heavy metals in chillies and capsicum whole and ground should not exceed maximum residue limit as stipulated by Codex Alimentarius Commission in Codex Stan 193.

6.3 Mycotoxins
   Aflatoxin B1 5 ppb
   Total Aflatoxin 10 ppb

7 Packaging, marking and labeling

7.1 Packaging

7.1.1 Chillies and capsicums, whole and ground shall be manufactured and packed under hygienic conditions.

7.1.2 Whole chillies and capsicums

Whole chillies and capsicums shall be packed in clean and sound gunny bags, paper bags or paper cartons with polyethylene liner, food grade. The containers shall be free from any fungal or insect infestations and shall be free from any undesirable smell.

7.1.3 Ground chillies and capsicums

Ground chillies and capsicums shall be packed in clean, sound and sealed gunny bags, cloth, or paper bag or paper cartons with a polyethylene liner food grade or in tinplate or glass containers with tamper-proof screw or plastic stoppers, or aluminium foil packs or cellophane bags.
7.1.3.1 Ground chillies and capsicums supplied to institutions and individuals not involved in retail trade shall be supplied in quantities agreed to between the purchaser and supplier.

7.2 Marking and labelling

Opening statement to introduce TZS 538

7.2.1 The following particulars shall legibly and indelibly be marked or labelled on each container:

a) name of the product;

b) Trade name or brand name if any;

c) Name and physical and postal address of manufacturer and/or packer;

d) Batch or code number;

e) Net weight;

f) Best before date;

g) Country of origin;

h) Storage condition

7.2.2 Ground chillies and capsicums

Items a) to f) in clause 7.2.1 shall be marked on each individual container and on each package for dispatch.

7.3 The packages may also be marked with TBS certification mark.

NOTE – The TBS Standards Mark of Quality may be used by manufacturers only under licence from TBS. Particulars of conditions which the licences are granted may be obtained from TBS offices.

8 Methods of sampling and test

Whole chillies and capsicums and ground chillies and capsicums shall be sampled in accordance with TZS 33: and tested for compliance with the requirements of this Tanzania Standard as described in table 1

Samples of ground chillies and capsicums shall be analysed without further preparation other than thorough mixing
Annex A
Preparation of samples of chillies and capsicums for test

A.1 Field of application
The method described in this annex applies to whole chillies and capsicums

A.2 Apparatus

A.2.1 The following apparatus is required

- Grinding mill, which
  a) is made of material which does not absorb moisture
  b) is easy to take to pieces and clean, and has a minimum of dead space
  c) does not introduce any foreign body into the sample
  d) permits rapid and even grinding without causing heating
  e) avoids, as far as possible, contact with outside air
  f) can be adjusted so as to obtain particles which will pass a sieve of 500 micron aperture size (see 4.6)
  g) Permits complete recovery of all fragments of the sample (light and heavy parts)
  h) is free from rust

A.2.2 Sample container
A clean, dry, air-tight glass container or other suitable container of material which has no action on the test sample of such size that it will be nearly filled by the test sample.

A.3 Procedure

A.3.1 Divide the final lot sample into two samples A and B each of at least 100 g, for the following purposes

A.3.1.1 Sample A:

a) to identify the product (see 4.1.1)

b) to assess the odour and flavour (see 4.2)
c) to verify the absence of fungi, insects etc (see 4.3)

d) to determine the proportion of extraneous matter (see 4.4)

e) to determine the proportion immature, marked or broken berries (see 4.5)

A.3.1.2 Sample B after grinding, for various other tests (see 4.6).

A.3.2 Using the grinding mill grind a small quantity of Sample B and reject it. Then quickly grind the remainder of Sample B Transfer this test sample to the sample container and close the container immediately

Annex B
(Normative)

Determination of unripe fruits, marked fruits, and broken fruits and fragments
The method described in this annex applies to whole chillies and capsicums

B.1 Spread out the sample, the extraneous matter of which has been removed (as specified in TZS 1315: on a white sheet of matt paper. Segregate the unripe fruits, the marked fruits, and the broken and fragments by physical separation.

B.2 Weigh separately, to the nearest 0.1 g, these three categories of defective fruits. The masses \( m_0 \), \( m_1 \) and \( m_2 \) are obtained for unripe, marked, and broken fruits and fragments, respectively. Their percentages are calculated from the expressions given below.

B.2.1 Unripe fruits:
\[
\frac{m_0}{M} \times 100
\]

B.2.2 Marked fruits:
\[
\frac{m_1}{M} \times 100
\]

B.2.3 Broken fruits and fragments:
\[
\frac{m_2}{M} \times 100
\]

where

- \( M \) is the mass, in grams, of the initial sample;
- \( m_0 \) is the mass, in grams, of unripe fruits;
- \( m_1 \) is the mass, in grams, of marked fruits;
- \( m_2 \) is the mass, in grams, of broken fruits and fragments.

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Annex C

Crude fibre

C.1 Reagents

C.1.1 Petroleum ether:

C.1.2 Dilute sulphuric acid: 1.25 % (m/v) accurately prepared.

C.1.3 Sodium hydroxide solution: 1.25 % (m/v) accurately prepared.

C.1.4 Ethanol: 95 % (v/v)
C.2 Procedure:

Weigh accurately about 2.5 g of the ground material into a thimble and extract for about 1 hour with petroleum ether using a Soxhlet apparatus. Transfer the material in the thimble to a one-litre flask. Take 200 ml of the dilute sulphuric acid in a beaker and bring to boil. Transfer the whole of the boiling acid to the flask containing the fat-free material and immediately connect the flask with a water-cooled reflux condenser and heat so that the contents of the flask begin to boil within 1 minute. Rotate the flask frequently taking care to keep the material from remaining on the sides of the flask and out of contact with the acid. Continue boiling for exactly 30 minutes. Remove the flask and filter through fine linen (about 18 thread to the centimetre) or through a coarse acid washed hardened filter paper, held in a funnel and wash with boiling water until the washings are no longer acidic to litmus paper. Bring some quantity of sodium hydroxide solution to boil under reflux condenser. Wash the residues on the filter into the flask with 200 ml of boiling sodium hydroxide solution. Immediately connect the flask with the reflux condenser and boil for exactly 30 minutes. Remove the flask and immediately filter through the linen or the filter paper.

Thoroughly wash the residue with boiling water and transfer to a Gooch crucible prepared with a thin but compact layer of ignite asbestos. Wash the residue thoroughly first with hot water and then with about 15 ml of ethyl alcohol and with three successive washings of 15 ml of petroleum ether each. Dry the Gooch crucible and contents at 105 ± 1°C in an air-oven for 3 hours, cool and weigh. Repeat the process of drying for 30 minutes, cooling and weighing until the difference between two consecutive weighings is less than 1 mg. Incinerate the contents of the Gooch crucible in the muffle furnace at 550 ± 20°C until all the carbonaceous matter is burnt. Cool the Gooch crucible containing the ash in a desiccator and weigh.

C.3 Calculation

Crude fibre (on dry basis), per cent by mass

\[
= \frac{100(M_1 - M_2) \times 100}{M (100-H)}
\]

Where:  
\(M_1\) = mass in g of Gooch crucible and contents before ashing.  
\(M_2\) = mass in g of Gooch crucible containing asbestos and ash, and  
\(M\) = mass in g of the material taken for the test  
\(H\) = Moisture content of the sample as received in percent