



INTERNATIONAL PEPPER COMMUNITY

8th Floor, BAPPEBTI Building, Ministry of Trade
Jl. Kramat Raya No. 172, Jakarta 10430, Indonesia
Email: mail@ipcnet.org; web: www.ipcnet.org

IPC Standard Specifications for Black/ White Pepper (Whole and Ground) and Whole Dehydrated Green Pepper

Adopted at the 43rd Annual Session of the IPC
held in Mysuru, Karnataka, India during 23rd – 25th Nov. 2015

December 2015

IPC Standard Specifications for Black/ White Pepper (Whole and Ground) and Whole Dehydrated Green Pepper¹

1. SCOPE

This standard applies to three commercial forms of Pepper (Black, White and Dehydrated Green – abbreviated as B,W, & DG) from harvested berries of *Piper nigrum* L. of the Piperaceae family.* This standard applies to dried or dehydrated peppers intended for food processing and for direct human consumption, including for catering purposes or for retailing. It does not apply to the product when indicated as being intended for further processing.

2. DESCRIPTION

2.1 Product Definition

- a) B, W, & DG Peppers are the processed fruits or berries of *Piper nigrum* L. having reached appropriate degree of development and/or maturity for the intended product purpose.
 - i. Black pepper – obtained from mature dried fruits or berries of *Piper nigrum* L.
 - ii. White pepper – obtained from fully mature or ripe fruits or berries, their outer pericarp removed.
 - iii. Dehydrated Green pepper – Obtained from immature or mature green pepper fruits or berries prepared and dried under controlled conditions. The berries should be of reasonably of uniform in size.
- b) Fruits or Berries are processed in an appropriate manner, by undergoing operations such as threshing, decorticating, cleaning, soaking, washing, drying or dehydrating, grinding, crushing, sieving and sifting; before the final packaging and storage.

2.2 Styles

B, W, & DG peppers may be offered in one of the following styles

- a. Whole-intact whole dried or dehydrated BWG berries
- b. Ground -ground B/W pepper berries that will pass completely through a sieve of nominal aperture size 500 μ m

¹ Adopted at the 43rd Annual Session of IPC held in Mysuru, India during 23rd – 25th November 2015

2.3 Varietal Types

Any commercially cultivated variety (cultivar) of *Piper nigrum* L. suitable for processing.

2.4 Trade Classes/Grades:

In accordance with the Physical and Chemical Characteristics in Tables 2, 3. & 5. B, W, DG pepper are classified into the following three classes/grades:

- Grade I
- Grade II
- Grade III

2.5 Definitions (for Terms Used Under Table No. 1, 2, 3, 4 & 5)

2.5.1 Extraneous matter.

All materials other than Pepper berries, irrespective of vegetative parts (stem, leaves etc.) or minerals (soil, sand) origin. Light berries, pinheads or broken berries are not considered as extraneous matter.

2.5.2 Light berries

Generally immature berries without kernel with an apparent density lower which will float in alcohol solution of density 0.8 to 0.82 at 25 °C.

2.5.3 Pin heads

Unfertilized berries with a diameter of less than 2mm with more angularity than normal berries, they have soft texture (collapse under applied pressure) and have less odour and flavour than Pepper berries.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Composition

Product as defined in Section 2.

3.2 Quality Factors

The Quality factors for whole Black, White and Dehydrated Green Peppers as well as Ground Black and White Peppers are given below in Tables shown as 1, 2, 3, 4 and 5.

Table 1: Basic Parameters of Black, White and Dehydrated Green Pepper

SECTION	BASIC PARAMETER	BLACK PEPPER (All forms)	WHITE PEPPER (All forms)	DEHYDRATED GREEN PEPPER (All forms)
3.2.1	General Size/ Shape	Whole dried Black pepper berries shall be unbroken with wrinkled pericarp. Diameter 2.5 –7.0 mm (approx.) and in Globular shape.	Whole dried White pepper berries shall be smooth surface, slightly flattened at one pole and small protuberance at the other. Diameter 2.0 -6.0 mm (approx.) and in Globular shape.	Whole Dehydrated Green Pepper berries shall be unbroken, with or without wrinkled pericarp. Diameter 2.0-6.0 mm (approx.) and in Globular shape.
3.2.2	Colour	Brownish to dark brownish or blackish colour and free from added colouring.	Matt grey to brownish to pale ivory white and free from added colouring.	Characteristic green, greenish or dark greenish and free from added colouring.
3.2.3	Sensory property	The flavour shall have a penetrating odour and hot, biting pungent taste characteristics of Black Pepper excluding mouldy and rancid odours. The product shall be free from foreign odours, flavours and free from any other harmful substances.	The odour and flavour shall be characteristic of White Pepper, slightly sharp and very aromatic, excluding mouldy and rancid odours. The product shall be free from foreign odours, flavours and free from any other harmful substances.	Pungent odour and flavour characteristic of Green Pepper, free from rancidity, mustiness, bitter taste and extraneous flavour. The product shall be free from foreign odours, flavours and free from any other harmful substances.

Whole Black, White and Dehydrated Green peppers are graded into 3 grades (Grade I, Grade II, Grade III) based on the physical and chemical characteristics after processing at appropriate levels.

Table 2: IPC Standard Specifications for Whole Black Pepper

Parameters	Grades		
	I	II	III
Physical			
Bulk Density (g/l), min	550.0	500.0	450.0
Light Berries/Corns(m/m)%, max	2.0	5.0	10.0
Extraneous Matter (m/m)%, max	1.0	2.0	2.0
Mouldy Berries/Corn(m/m) %, max	1.0	3.0	3.0
Insect Defiled Berries/Corns(% by wt.), max	1.0	2.0	2.0
Whole Insects, dead or alive (by count), max	Nil	Nil	Nil
Mammalian or/and Other Excreta (by count), max	Nil	Nil	Nil
Pinheads or broken berries % (m/m), max	1.0	2.0	4.0
Chemical			
Moisture (m/m)%, max	12.0	12.5	13.0
Total ash, % (m/m), max, on dry basis	6.0	7.0	7.0
Non-volatile ether extract % (m/m), min, on dry basis	7.0	7.0	7.0
Volatile oil % (ml/100 g)min, on dry basis ¹	2.0	2.0	2.0
Piperine content, % (m/m), min	4.0	3.5	3.0
Microbiology			
<i>Escherichia coli</i> (MPN/g), max	<3	<3	<3
<i>Salmonella</i> (detection / 25g)	Negative	Negative	Negative
Aflatoxin			
Aflatoxin Total (B1+B2+G1+G2) (μ g/kg), max	20	20	20

Table 3: IPC Standard Specifications for Whole White Pepper

Parameters	Grade		
	I	II	III
Physical			
<i>Bulk Density g/l, min.</i>	600.0	600.0	550.0
<i>Light Berries/Corns(m/m)%, max.</i>	1.0	2.0	2.0
<i>Extraneous Matter (m/m)%, max.</i>	0.8	1.5	2.0
<i>Dark Coloured Berries/Corn(m/m), %, max.</i>	2.0	5.0	10.0
<i>Mouldy Berries/Corn(m/m) %, max.</i>	1.0	3.0	3.0
<i>Insect Defiled Berries (% by wt.) Max.</i>	1.0	2.0	2.0
<i>Whole Insects, dead or alive (by count), max.</i>	Nil	Nil	Nil
<i>Mammalian or/and Other Excreta (by count), max.</i>	Nil	Nil	Nil
<i>* Broken berries %(m/m)max</i>	2.0	3.0	3.0
Chemical			
<i>Moisture (m/m)%, max.</i>	12.0	13.0	14.0
<i>Total ash, % (m/m) max, on dry basis</i>	3.5	4.0	4.0
<i>Non-volatile ether extract % (m/m) min, on dry basis.</i>	6.0	6.0	6.0
<i>Volatile oil % (ml/100 g), min, on dry basis</i>	1.5	1.5	1.0
<i>Piperine content, % (m/m), min</i>	4.0	3.5	3.0
Microbiology			
<i>Escherichia coli (MPN/g), maximum</i>	<3	<3	<3
<i>Salmonella (detection / 2g)</i>	Negative	Negative	Negative
Aflatoxin			
<i>Aflatoxin Total (B1+B2+G1+G2) (µg/kg), max</i>	20	20	20

Table 4: IPC Standard Specifications for Ground Black and Ground White Pepper

Parameters	Ground Black Pepper	Ground White Pepper
Chemical		
<i>Moisture (m/m) %, max</i>	12.0	13.0
<i>Total ash, % (m/m) max, on dry basis</i>	6.0	3.5
<i>Acid insoluble ash, % (m/m) max, on dry Basis</i>	1.2	0.3
<i>Non-volatile ether extract % (m/m), min, on dry basis</i>	6.0	6.0
<i>Volatile oil % (ml/100 gm),min, on dry Basis</i>	1.0	0.7
<i>Piperine content, %(m/m), min on dry Basis</i>	3.5	4.0
<i>Crude fiber, insoluble index, % (m/m) max, on dry basis</i>	17.5	6.5
Microbiological		
<i>Escherichia coli (MPN/g)</i>	<3	<3
<i>Salmonella (detection/25 gm)</i>	Negative	Negative
Heavy Metal		
<i>Arsenic mg/kg, max</i>	5	5
<i>Lead mg/kg, max</i>	10	10
<i>Cadmium mg/kg, max</i>	1	1
Aflatoxin*		
<i>Aflatoxin Total (B1+B2+G1+G2) (µg/kg), max</i>	20	20

Table 5: IPC Standard Specifications for Whole Dehydrated Green Pepper

Parameters	Grade		
	I	II	III
Physical			
<i>Insects (by count) % max</i>	NIL	NIL	NIL
<i>Extraneous matter % (max)</i>	0.5	1	1.2
<i>Dark coloured berries % (max)</i>	1	2	5
Chemical parameters			
<i>Moisture % (mm) max</i>	8	8	9
<i>Total Ash % (m/m) max on dry basis</i>	5	5	5
<i>Acid Insoluble Ash % (m/m) ,max on dry basis</i>	0.3	0.3	0.3
<i>Sulphur Dioxide (ppm), max</i>	500	500	500
Microbiology			
<i>Escherichia coli (MPN/g), max</i>	<3	<3	<3
<i>Salmonella (detection / 2g)</i>	Negative	Negative	Negative
Aflatoxin			
<i>Aflatoxin Total (B1+B2+G1+G2) (ppb), max</i>	20	20	20

The volatile oil content should be determined immediately after grinding

3.3 Classification of “Defectives”

The lot sample that fails to meet one or more of the applicable quality requirements, as set out in Section 3.2 should be considered as “defective lot”.

3.4 Lot Acceptance

A lot should be considered as meeting the applicable quality requirements referred to in Section 3.2 when the number of “defectives”, as defined in Section 3.3, does not exceed the acceptance number of the appropriate sampling plan. For factors evaluated on a sample average, a lot will be considered acceptable if the average meets the specified tolerance, and no individual sample is excessively out of tolerance.

4. FOOD ADDITIVES

- No food additives or flavouring are permitted in the products covered by the standard.

5. CONTAMINANTS

- 5.1 The products covered by this Standard shall comply with the maximum levels of the *General Standard for Contaminants and Toxins in Food and Feed* (CODEX STAN 193-1995).
- 5.2 The products covered by this Standard shall comply with the maximum residue limits for pesticides established by the Codex Alimentarius Commission.

6. FOOD HYGIENE

- 6.1 It is recommended that the products covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of the *General Principles of Food Hygiene* (CAC/RCP 1-1969), the *Code of Hygienic Practice for Spices and Dried Aromatic Herbs* (CAC/RCP 42-1995) and other relevant Codex texts.
- 6.2 The products should comply with all microbiological criteria established in accordance with the *Principles for the Establishment and Application of Microbiological Criteria for Foods* (CAC/GL 21-1997) apart from the specifications.
- 6.3 All the process should be performed in a manner that does not compromise the quality or safety of the product (CODEX STAN 1 – 1985).

7. WEIGHTS AND MEASURES

Containers shall be as full as practicable without impairment of quality and shall be consistent with a proper declaration of contents for the product.

8. MARKING OR LABELLING

- 8.1. The products covered by the provisions of this Standard shall be labeled in accordance with the *General Standard for the Labelling of Pre-packaged Foods* (CODEX STAN 1-1985) In addition, the following specific provisions apply:

8.2 Name of the Product

- 8.2.1. The name of the product shall be “Black Pepper”, “White Pepper” or “Dehydrated Green Pepper”, in dried or freeze dried or dehydrated forms.
- 8.2.2. The nature of the product may include an indication of the style as described in Section 2.2.
- 8.2.3. Origin of produce: country of origin and optionally name of regional, local place of production/trade.
- 8.2.4. Commercial Identification
- Grade (optional for ground forms)
 - Size (optional for ground forms)

- Variety (optional for ground forms)
- Net weight

8.2.5. Inspection mark (optional)

8.3 Labeling of Non-Retail Containers

Information for non-retail containers shall be given either on the container or in accompanying documents, except that the name of the product, lot identification, and the name and address of the manufacturer, packer, distributor or importer, as well as storage instructions, shall appear on the container. However, lot identification, and the name and address of the manufacturer, packer, distributor or importer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

9. PACKAGING AND STORAGE

The materials used inside the package must be new, clean, food-grade quality and to avoid causing any external or internal damage to the produce. It must protect the product quality and safety during transport and storage. To avoid condensation, a container that is permeable to air shall be used for packing and storing bulk material. Bulk materials should be stored in a clean dry, ventilated room, free from infestation and not exposed to direct sunlight

10. METHODS OF ANALYSIS AND SAMPLING

Provision	Method	Principle
Extraneous matter, % (m/m), max	IPC Method No.5	Visual examination
Light berries, % (m/m), max.	IPC Method No.3	Flotation
Pinheads or broken berries, % (m/m), max	Physical separation and weighing. ISO 959-1:1989	Visual examination
Bulk density, g/l, min.	IPC Method No.4	Separation by density
Broken berries, % (m/m), max.	Physical separation and weighing. ISO959-2:1998	Separation by density
Black berries, % (m/m) max.	IPC Method No.10	Visual examination
Moisture content, % (m/m), max.	IPC Method No.2	Distillation
Total ash % (m/m), max.on dry basis	AOAC Official methods-941.12/ ISO 928:1997	Gravimetric
Volatile oils % (ml/100 g) min, on dry basis.	AOAC Official methods-962.17/ ISO 6571:2008	Distillation
Non-volatile ether extract (m/m) % , min., on dry basis.	AOAC Official methods-940.29/ ISO 1108	Soxhlet extraction
Piperine content % (m/m), min	AOAC Official methods-987.07/ ISO 5564	Spectrophotometric
Acid-insoluble ash, % (m/m), max on dry basis	AOAC Official methods-941.12/ ISO 930:1997	Gravimetric
Crude fiber, insoluble index % (m/m), max on dry basis.	AOAC Official methods-920.169/ISO 5498	Gravimetric
Sulphur dioxide% (m/m), or in ppm (mg/kg), max.	ISO 5522	Titrimetric
Mammalian excreta in Black pepper	IPC Method No.7	Visual examination
Preparation of test sample for laboratories	IPC Method No.1	-
Salmonella	IPC Method No.12	Microbiological
Mouldy berries%(m/m), max	IPC Method No.9	Visual examination
Insects defiled%(m/m), max	IPC Method No.8	Visual examination
Whole insects dead/live%(m/m), max	IPC Method No.6	Visual examination
Salmonella sampling plan	IPC Method No.11	Microbiological
Aflatoxin ppb, max	AOAC Official methods-991.45/ASTA 24.1	Instrumental
<i>Escherichia coli</i> (MPN/g), max	FDA/BAM Ch.4	Microbiological

- Method of sampling - Sampling of Spices and Condiments ISO 958 – 1980.

References

1. ISO/TC 34/SC 7 Spices, culinary herbs and condiments
2. ISO 959-1:1998 •Pepper (*Piper nigrum* L.), whole or ground -- Specification -- Part 1: Black pepper
3. ISO 959-2:1998 Pepper (*Piper nigrum* L.), whole or ground -- Specification -- Part 2: White pepper
4. Indian Standard spices and condiments — Black pepper - Whole and ground. ICS 67.220.10. IS 1798 : 2010
5. Malaysian Standard. Specification for Black and white pepper, ground. MS 1102:2003. Department of Standards, Malaysia.
6. Official Analytical methods of the American Spice Trade Association (ASTA).
7. Sri Lankan Standards specifications for pepper Whole or ground (second revision). Part 1: Black pepper. SLS 105. 2010.
8. Sri Lankan Standards specifications for pepper Whole or ground (second revision). Part 2: White pepper. SLS 105. 2010.