

DRAFT BHUTAN STANDARD

© Copyright 2024

The National Standards Body of Bhutan

August 2024

Price group A

འབྲུག་ཉ་ཁག་ཅུ་གི་གནས་ཚད། དབྱེ་རིམ་དང་ལྗོངས་རིམ།

DRAFT BHUTAN STANDARD

Asparagus – Classification and Grading

DRAFT BHUTAN STANDARD FOR THE PURPOSE OF WIDE CIRCULATION

PDF disclaimer

This PDF may contain embedded typefaces. In accordance with Adobe's Licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The Bhutan Standards Bureau accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

COPYRIGHT PROTECTED DOCUMENT

© BSB 2024

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from BSB at the address below in the country of the requester.

Director General
Bhutan Standards Bureau
Rijug Lam
Thimphu-11001
Tel: 00975-2-325104/325401
Fax: 00975-2-323712/328298
Web: www.bsb.gov.bt
Published in Thimphu, Bhutan

Table of Contents

FOREWORD	iv
Introduction.....	v
Asparagus – Classification and Grading	1
1 Scope	1
2 Normative References	1
3 Terms and Definitions	1
3.1 Classification	1
3.2 Grading	1
3.3 Sound	1
3.4 Square Cut	1
4 Minimum Requirements	2
5 Classification	2
6 Grading	3
6.1 Grading by Length	3
6.2 Grading by Diameter	3
7 Tolerances	4
7.1 General	4
7.2 Quality Tolerances	4
7.3 Size Tolerances	4
8 Presentation	5
8.1 Uniformity	5
8.2 Packaging	5
8.3 Labelling	5
9 Sampling	5
10 Requirements for Contaminants	6
11 Testing Methods	6
12 Storage and Transportation	6
Bibliography	7

BTS XXX: 2024

FOREWORD

This Bhutan Standard for Asparagus-Classification and Grading was adopted by Bhutan Standards Bureau after the draft finalized by the Food and Agriculture Technical Committee TC 02 and approved by the Bhutan Standards Bureau Board (BSB Board) on Date Month Year.

This standard is subjected to systematic review after five years to keep pace with the market trends, industrial and technological developments. Any suggestions and further information may be directed to the concerned Technical Committee.

DRAFT BHUTAN STANDARD FOR THE PURPOSE OF WIDE CIRCULATION

Introduction

Asparagus (*Asparagus officinalis*) belongs to the family Liliaceae with the potential for commercialization in Bhutan. It is an important perennial vegetables grown from 1700m to 3000m above mean sea level. It has an economic lifespan of 15 years and is grown for its shoots (spears). Mary Washington is a notified variety while UC-157 is a released asparagus variety in Bhutan. Currently, Mary Washington is the most cultivated among the two.

The use of standard remains voluntary and when referenced by regulatory authorities as a basis for legislation, the standards become mandatory.

འབྲུག་ཉ་ཁག་ཅུ་གི་གནས་ཚད། དེའི་ཁྲི་དང་ལྗེ་ཁྲི་

DRAFT BHUTAN STANDARD

Asparagus – Classification and Grading

1 Scope

This standard applies to requirements for fresh asparagus shoots of commercial varieties of asparagus grown from *Asparagus officinalis* L., of the Liliaceae family, offered to consumers after preparation and packaging.

Asparagus shoots is classified into four groups according to colour:

- a) white asparagus, completely white.
- b) violet asparagus, having tips of a colour between pink and violet or purple and part of the shoot white.
- c) violet/green asparagus, part of which is of violet and green colouring.
- d) green asparagus having tips and most of the shoot green.

This document is applicable to all asparagus except white and violet asparagus with a diameter less than 8 mm and green and violet/green asparagus with a diameter less than 3 mm packed in uniform bundles or unit packages.

This document does not apply to processed asparagus.

2 Normative References

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

ISO 4186:1980 - *Asparagus — Guide to storage*

ISO 6882:1981 - *Asparagus — Guide to refrigerated transport*

CAC/RCP 44-1995, *Code of Practice for the Packaging and Transport of Fresh Fruits and Vegetables*

CODEX STAN 1-1985, Rev. 1-199, *Codex General Standard for the Labelling of Prepackaged Foods*

CODEX STAN 193-1995, *Codex General Standard for Contaminants and Toxins in Food and Feed*

BTS 139: 2020 SARS 0014: 2018, *Food hygiene- General principles – Code of practice*

3 Terms and Definitions

For the purpose of this standard, the following terms and definitions shall apply;

3.1 Classification

Involves grouping item into categories of classes based on shared quality.

3.2 Grading

Assessing and assigning a numerical or descriptive rating to produce.

3.3 Sound

Produce not affected by rotting or deterioration making it unfit for consumption.

3.4 Square Cut

The cut made at 90° angle, creating edges that are perpendicular to each other.

4 Minimum Requirements

4.1 In all classes, subject to the special provisions for each class and the tolerances allowed, the asparagus:

- 4.1.1 Shall be whole.
- 4.1.2 Shall be sound.
- 4.1.3 Shall be clean and free from visible foreign matter.
- 4.1.4 Shall be fresh in appearance and fresh-smelling.
- 4.1.5 Shall be practically free from pest and/or pest damage.
- 4.1.6 Shall be practically free from any wounds and/or bruises.
- 4.1.7 Shall be free from rots and suitable for handling and transportation.
- 4.1.8 The cut at the base of the shoots shall be as clean as possible.
- 4.1.9 Shall be free of abnormal external moisture, excluding condensation following removal from cold storage.
- 4.1.10 Shall not have a foreign smell.
- 4.1.11 Neither hollow, split, peeled nor broken. However, small cracks which have appeared after harvesting are allowed so long as they do not exceed the limits specified in Clause 6.
- 4.1.12 When asparagus reach their destination, they shall be in a satisfactory condition.
- 4.1.13 When asparagus are packaged in a bunch, to ensure a sleek appearance, the outer surfaces of the suckers' end parts shall be trimmed as clean as possible.

5 Classification

Asparagus are divided into three classes:

5.1 Extra class

- 5.1.2 Shoots in this class shall be of superior quality, very well formed and practically straight.
- 5.1.3 They shall be characteristic of the variety.
- 5.1.4 The tips shall be very tight and in a closed state.
- 5.1.5 The external appearance of the product shall have no defects.
- 5.1.6 The packaging shall not affect the presentation and quality of ingredients.
- 5.1.7 Very slight traces of rust caused by non-pathogenic agents on the shoot, which can be removed by regular peeling, shall be allowed.
- 5.1.8 For the white asparagus group, the tips and shoots shall be white; only a faint pink tint is allowed on the shoots.
- 5.1.9 Green asparagus shall be green for at least 95 % of the length.
- 5.1.10 The cut at the base of the shoots shall be as square as possible. However, to improve presentation when the asparagus is packed in bundles, those on the outside may be slightly beveled, so long as the beveling does not exceed 1 cm.
- 5.1.11 Asparagus of this class shall show no traces of woodiness.

5.2 Class I

5.2.1 Shoots in this class shall be of good quality and well formed.

5.2.2 They shall be characteristic of the variety.

5.2.3 The tips shall be tight and closed but may be slightly skewed.

5.2.4 Slight rust traces caused by non-pathogenic agents, which can be removed by regular peeling, shall be allowed.

5.2.5 For the white asparagus group, a faint pink tint may appear on the tips and the shoots.

5.2.6 White asparagus of this class shall show no traces of woodiness.

5.2.7 For the other groups, a trace of woodiness on the lower part is permissible, provided this woodiness disappears by normal peeling by the consumer.

5.2.8 Green asparagus shall be green for at least 80% of the length.

5.2.9 The cut at the base of the shoots shall be as square as possible.

5.3 Class II

This class includes shoots which are not included in the higher classes but satisfy the minimum requirements specified in Clause 4.

5.3.1 Asparagus in this class are less smooth than the other classes.

5.3.2 They have less tight and more curved tips.

5.3.4 There may be slight rust traces caused by non-pathogenic agents, which can be removed by regular peeling by consumers.

5.3.5 The tips of white asparagus may have a colouration including a green tint.

5.3.6 The tips of violet asparagus may be slightly green.

5.3.7 Green asparagus shall be green for at least 60% of the length.

5.3.8 Asparagus in this class may have a slight woodiness.

5.3.9 The cut at the base of the shoots may be slightly oblique.

6 Grading

Size is determined by the length and diameter of the shoot.

6.1 Grading by Length

Asparagus are divided into three sizes according to their length:

a) Long - longer than 17 cm.

b) Short - 12 cm to 17 cm.

c) Tip- shorter than 12 cm.

6.1.1 Class II asparagus placed into packages shall have the following specifications:

a) White and violet asparagus shall be between 12 cm and 22 cm in length.

b) Green asparagus shall be between 12 cm and 27 cm in length.

6.1.2 The maximum difference in length of shoots packed in firmly bound bundles shall not exceed 5 cm.

6.2 Grading by Diameter

6.2.1 The diameter of the shoots shall be measured at 2.5 cm from the cut end.

6.2.2 The minimum diameters for different classes of asparagus are given in table 1:

Table 1 — Minimum diameter values according to group and class

Group	Class	Diameter (mm) Min	The range in size between produce in the same package or bundle shall not exceed (mm)
White and Violet	Extra Class	12	8
	Class I	10	10
	Class II	8	No uniformity requirement
Violet/Green and Green	Extra Class and Class I	3	8
	Class II	3	No uniformity requirement

7 Tolerances

7.1 General

Tolerances in respect of quality shall be allowed in each package or in each lot for produce presented in bulk for produce not satisfying the requirements of the class indicated.

7.2 Quality Tolerances

7.2.1 Extra Class

The tolerance is 5 % by number or mass of shoots not satisfying the requirements of the class, but meeting those of Class I or, exceptionally, coming within the tolerances of that class, or having slight unscarred cracks appearing after harvesting.

7.2.2 Class I

The tolerance is 10 % by number or mass of shoots not satisfying the requirements of the class, but meeting those of Class II or, exceptionally, coming within the tolerances of that class, or having slight unscarred cracks appearing after harvesting.

7.2.3 Class II

7.2.3.1 The tolerance is 10 % by number or mass of shoots satisfying neither the requirements of the class nor the minimum requirements, with the exception of produce affected by rotting or any other deterioration rendering it unfit for consumption.

7.2.3.2 In addition to the above, 10% by number or mass can be allowed for hollow shoots or shoots showing very slight cracks due to washing.

7.2.3.3 In no case there shall be more than 15% hollow shoots in each package or bundle.

7.3 Size Tolerances

7.3.1 For all classes, the tolerance is 10 % by number or mass of shoots not corresponding to the size indicated and deviating from the specified limits with a maximum deviation of 1 cm in length.

7.3.2 For all classes, the tolerance is 10 % by number or mass of shoots not corresponding to the size indicated and deviating from the specified limits with a maximum deviation of 2 mm in diameter. In no case shall the diameter be less than 3 mm.

8 Presentation

8.1 Uniformity

The contents of each package, each unit package or each bundle in the same package shall be uniform and contain only asparagus of the same origin, quality, colour group and size.

Nevertheless, with respect to colour, shoots of a different colour group may be allowed within the following limits:

8.1.1 White asparagus: 10 % by number or weight of violet asparagus in the Extra class and Class I, and 15% in Class II.

8.1.2 Violet, violet/green and green asparagus: 10 % by number or weight of asparagus of another colour group.

For Class II, a mixture of white and violet asparagus is allowed provided it is appropriately marked.

The visible part of the contents of the package, unit package or bundle shall be representative of the entire contents.

8.2 Packaging

8.2.1 Asparagus shall be packed in such a way as to protect the produce properly.

8.2.2 Asparagus shall be packed in each package in compliance with the *Code of Practice for the Packaging and Transport of Fresh Fruits and Vegetables* (CAC/RCP 44).

8.2.3 The use of materials, particularly of paper or stamps bearing trade specifications is allowed, provided the printing or labelling has been done with non-toxic ink or glue.

8.2.4 Stickers individually affixed to the produce shall be such that, when removed, they neither leave visible traces of glue nor lead to skin defects. Information lasered on single vegetable should not lead to flesh or skin defects.

8.3 Labelling

8.3.1 The following basic information is required for the purpose of labelling:

8.3.1.1 The name of the product and/or variety.

8.3.1.2 Group; according to produce color.

8.3.1.3 The trademark or brand name, if any.

8.3.1.4 The name and address of the producer or packer/distributor.

8.3.1.5 The code or lot number.

8.3.1.6 The net mass or gross mass.

8.3.1.7 The class of product.

8.3.1.8 The producing country.

8.3.1.9 Size; expressed as minimum and maximum diameters. For example, 12mm – 20mm.

8.3.1.10 Date of packaging.

8.3.1.11 Any other marking required by the purchaser.

8.3.1.12 A reference to this document, i.e. BTS (optional).

9 Sampling

Sampling methods to be used for ascertaining conformance to the requirements of this specification shall be in accordance with internationally accepted methods or national methods recognized internationally.

10 Requirements for Contaminants

10.1 The produce shall comply with the maximum levels of the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995).

10.2 The produce shall comply with the maximum residue limits for pesticides established by the Codex Alimentarius Commission.

10.3 The produce should comply with any microbiological criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria for Foods (CAC/GL 21-1997).

10.4 The maximum level for contaminants shall be:

a) Cadmium: 0.1 mg/kg.

b) Lead: 0.1 mg/kg.

11 Testing Methods

The organoleptical and visual inspections, sniffing, tasting, weighing and measuring of the asparagus should be done upon the request of the customer. If necessary, internationally validated test method shall be used.

12 Storage and Transportation

12.1 Processing, packaging, storage areas and transport vehicles shall be free from bad odour that could affect the produce.

12.2 Asparagus in packages shall be kept in the shade.

12.3 They shall not be left in the rain or cold and or be allowed to freeze. They shall not be loaded and unloaded in these conditions.

12.4 The storage and transport of asparagus should be done in accordance with ISO 4186, ISO 6882 and the recommended international Code of Practice for Packaging and Transport of Fresh Fruit and Vegetables (CXC 44).

13 Hygiene

The manufacturer shall comply in accordance with BTS 139:2020 SARS 0014:2018, *Food hygiene-General principles – Code of practice*.

Bibliography

ISO 4186 :1980 - *Asparagus — Guide to storage.*

ISO 6882:1981 - *Asparagus — Guide to refrigerated transport.*

ISO 20981: 2020 *Asparagus — Specification and test methods.*

CAC/RCP 44-1995, *Code of Practice for the Packaging and Transport of Fresh Fruits and Vegetables.*

CODEX STAN 1-1985, Rev. 1-199, *Codex General Standard for the Labelling of Prepackaged Foods.*

CODEX STAN 193-1995, *Codex General Standard for Contaminants and Toxins in Food and Feed.*

Codex Stan 225-2001 – *Asparagus.*

OECD - International Standards for fruits and vegetables – *Asparagus.*

UNECE Standard FFV-04 concerning the marketing and commercial quality control of asparagus - 2017 edition.

Thai Agricultural Standard, TAS 1500-2004 – *Asparagus.*

BTS 139: 2020 SARS 0014: 2018, *Food hygiene- General principles — Code of practice.*

Kanno, A., & Yokoyama, J. (2011). *Asparagus. Wild Crop Relatives: Genomic and Breeding Resources*, 23–42. https://doi.org/10.1007/978-3-642-20450-0_3.

Vegetable Section, Horticulture Program, ARDC Wengkhar. (2012). *Asparagus production data 2010-11, 2011-2012* [Data set]. Department of Agriculture, Ministry of Agriculture and Livestock.

Vegetable Section, Horticulture Program, NCOA Yusipang. (2019). *Asparagus production 2019* [Leaflet]. Department of Agriculture, Ministry of Agriculture and Livestock.

FOOD AND AGRICULTURE TECHNICAL COMMITTEE (TC 02)

Organization

National Dairy Development Centre, MoAL, Thimphu
Bhutan Agro Industries Limited, Thimphu
Bhutan Exporters Association, Phuentsholing
Bhutan Food and Drug Authority, MoH, Thimphu
Bhutan Livestock Development Corporation Limited, Thimphu
Department of Agriculture, MoAL, Thimphu
Department of Agriculture, MoAL, Thimphu
Department of Agricultural Marketing and Cooperatives, MoAL, Thimphu
Department of Agricultural Marketing and Cooperatives, MoAL, Thimphu
Department of Industry, MoICE, Thimphu
National Post Harvest Centre, DAMC, MoAL, Paro
Competition and Consumers Affairs Authority, MoICE, Thimphu
Competition and Consumers Affairs Authority, MoICE, Thimphu
Bhutan Standards Bureau, Thimphu

Representative(s)

Mr. Phuntsho T Norbu (Chairperson)
Ms. Tashi Dema
Mr. Tshering Yeshe
Ms. Yeshe Lhamo
Mr. Birendra Dhakal
Mr. Namgay Thinley
Mr. Bal Bahadur Rai (Alternate)
Mr. Dawa Tshering
Mr. Jamyang Lophyal (Alternate)
Mr. Tashi Dorji
Ms. Sonam Lhamo
Mr. Jigme Dorji
Ms. Tshewang Choden (Alternate)
Mr. Karma Wangdi,
Offtg. Director General
(Ex-officio member)

Member Secretary

Cheki Zangmo
Standardization Division
Bhutan Standards Bureau

SUB COMMITTEE ON FRUITS AND VEGETABLES (TC02/SC15)

Organization

National Post Harvest Centre, DAMC, MoAL, Paro

Bhutan Food and Drug Authority, MoH, Gelephu

Bhutan Soul Farmers, Paro

National Centre for Organic Agriculture, DoA, MoAL,
Thimphu

Representative(s)

Mr. Sujan Pradhan (Chairperson)

Mr. Thinley Penjor

Mr. Lhundup Dukpa

Ms. Tshering Yangchen

Member Secretary

Cheki Zangmo

Standardization Division

Bhutan Standards Bureau