

(Dzongkha Title)

DRAFT BHUTAN STANDARD

Specification for Whole Maize Grain, Degermed Maize Grits, and Maize Meal



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DRAFT BHUTAN STANDARDS FOR PUBLIC COMMENTS

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FOREWORD

This Bhutan Standard for Specification for Whole Maize Grain, Degermed Maize Grits, and Maize Meal 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 8 July 2020.

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.

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Introduction

Maize (corn) *Zea mays* L. is a seasonal Poaceae family, popularly grown cereals in many countries. In Bhutan it is grown in wide range of agro-climatic zones from southern foot hills to temperate regions of the country. Maize ranks second amongst popular food crops in terms of cultivated area and production that contributes to household food security in the country. Yellow maize varieties are dominantly popular in Bhutan that includes yangtsepa, tshig sampa, zerpa and baipa ashom (maize).

Most popular products from maize are maize grits (Kharang) that are mixed with rice or consumed alone as food and maize meal can be used for making cookies and snacks. The inclusion of maize grits in the food basket enhances diversification of food in schools as well as boost the local economy of our country leading to rice import substitution. Beaten and flattened maize from fresh grains is very popular that are sold commercially in eastern Bhutan.

In the recent years, fire roasted maize cobs are sold and consumed as snacks. Furthermore, the maize and whole plant parts play an important role in the livestock feed industry. It also holds an important cultural significance as ritual offerings and brewery products.

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

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BHUTAN STANDARD**Specification for Whole Maize Grain, Degermed Maize Grits, and Maize Meal****1 Scope**

This Bhutan Standard prescribe requirements to whole maize grain (*Zea mays* L.), degermed maize grits and maize meal for human consumption.

This standard does not apply to any maize grain used as seeds for propagation or other than those included in the scope.

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 1871: 2009 *Food and feed products — General guidelines for the determination of nitrogen by the Kjeldahl method*

ISO 3310 – 1 *Test sieves — Technical Requirements and Testing — Part 1: Test Sieves of Metal Wire Cloth*

ISO 6540 *Maize — Determination of Moisture Content (on milled grains and on whole grains)*

CXS 193-1995 *General Standards for Contaminants and Toxins in Food and Feed*

CXS 234-1999 *Recommended Methods of Analysis and Sampling*

BTS 139: 2019 SARS 00014: 2018 *Bhutan Standard for Food Hygiene-General Principles-Code of Practice*.

BTS 268: 2020 CXS 1-1985 *Bhutan Standard for the Labelling of Prepackaged Foods*.

3 Terms and Definitions

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

3.1 Appearances

The characteristics of the produce when inspected visually, such as sizes, shapes, and colours.

3.2 Contaminant

Contaminant means any biological or chemical agent, foreign matter not intentionally added which may compromise food safety or suitability.

3.3 Extraneous Matters

All organic and inorganic matter including grains from other cereals, other than the produce and products.

3.4 Defects

Are blemished grains which are insect or vermin damaged, stained, diseased, germinated, frost damaged, or otherwise materially damaged.

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3.5 Degermed Maize Grits

Product prepared from fully matured whole maize grains cleaned from impurities, mould, seeds of weeds and others cereals, by a grinding process in which the grain is comminuted to a suitable degree of fineness, and from which bran and germ are almost completely removed.

3.6 Maize Meal

Product obtained by grinding clean whole maize grain by the use of mill or other grinding process methods.

3.7 Whole Maize Grain

Are maize grains, *Zea mays* L., which contain all physiological parts and genetically occurring nutrients of the entire grain seed in their original proportion.

4 Quality Factors

4.1 Quality Factors - General

The whole maize grain, degermed maize grits and maize meal shall meet the following general requirements as listed below:

4.1.1 Shall have the characteristic colours and appearances

4.1.2 shall be free from objectionable flavours, odours,

4.1.3 Shall be free from living or dead insects and/or its parts

4.1.4 Shall be free from extraneous matter as specified in **table 1**.

4.2 Quality Factors - Specific

4.2.1 The whole maize grain, degermed maize grits and maize meal shall conform to the following specific quality factors as specified under **table 1**.

Table 1 – Quality Factors-Specific

S/N	Parameters	Limit			Recommended Test Methods
		Whole Maize grain	Degermed Maize Grits	Maize Meal	
1	Particle size	-	95% or more shall pass through a 2.00 mm sieve and 20% or less through a 0.71mm sieve	95% or more shall pass through a 0.85 mm sieve and 45% or more shall pass through a 0.71 mm sieve and 25% or less shall pass through a 0.210mm sieve	Type I method with sieve specifications as in ISO 3310 - 1 test sieves

2	Moisture, <i>Max</i> , %	14	14	13	ISO 6540
3	Protein (N x 6.25), Min, %	7	7	7	ISO 1871: 2009
4	Extraneous Matter, by weight, % <i>Max</i>	0.5%	0.5%	absent	Visual examination
5	Discoloration, by weight, % <i>Max</i>	5.0 %	0.5 %	absent	Visual examination
6	Defects (whole grain)	7.0 %	-	-	Visual examination

The test methods are only recommendation and laboratories may use any validated method of analysis.

5 Contaminants

5.1 Heavy Metal

5.1.1 The whole maize grain, degermed maize grits and maize meal shall conform to those maximum limits for heavy metals established by the General Standards for Contaminants and Toxins in Food and Feed (CXS 193-1995) or relevant national regulations.

5.1.2 If present, it shall not exceed the limits specified in **table 2**;

Table 2 – Heavy Metal Limits

S/N	Parameter	Limit, <i>Max</i> (mg/kg)
1	Lead (Pb)	0.2
2	Cadmium (Cd)	0.1

Laboratories may use any validated method of analysis.

5.2 Pesticide Residues

The whole maize grain, degermed maize grits and maize meal shall comply with those maximum residue limits established by the available Codex Alimentarius Commission or relevant national regulations on pesticide residues.

5.3 Mycotoxins

The whole maize grain, degermed maize grits and maize meal shall be free from Mycotoxins in amounts which may represent a hazard to health. If present, it shall not exceed the limits specified in **table 3**;

Table 3 – Mycotoxins

S/N	Parameter	Limit, <i>Max</i> (mg/kg)		
		Whole Maize grain	Degermed Maize Grits	Maize Meal
1	Total Aflatoxin (B1, B2, G1, G2)	0.02	0.02	0.02
2	Fumonisin	4	2	2
3	Deoxynivalenol (DON)	-	-	1

Laboratories may use any validated method of analysis.

5.4 Microbiological Requirements

The whole maize grain, degermed maize grits and maize meal shall conform to the following microbiological limits specified in **table 4**;

Table 4 – Microbiological Limits

S/N	Type of Microorganisms	Limits (<i>Max</i>)		
		Whole maize grain	Degermed Maize Grits	Maize Meal
1	<i>E. coli</i> per g	Absent	Absent	Absent
2	<i>Salmonella Spp.</i> per 25 g	Absent	Absent	Absent
3	Yeast and Mould, cfu/g	10 ⁴	10 ⁴	10 ³
4	Total plate count, cfu/g	-	10 ⁵	10 ⁵
5	<i>Staphylococcus aureus</i> , cfu/g	Absent	Absent	Absent

6 Hygienic Requirement

The whole maize grain, degermed maize grits and maize meal shall be prepared and handled in accordance with the BTS 139: 2019 SARS 0014:2018 Bhutan Standard on Food Hygiene - General Principles - Code of Practice or relevant national regulations.

7 Storage

7.1 The whole maize grain shall be stored in a clean, hygienic and food grade container.

7.2 The degermed maize grits and maize meal shall be packed in a clean and airtight food grade packing material.

- 7.3** The packing material, and the packed whole maize grain, degermed maize grits and maize meal shall be stored in a dry, cool and away from the direct sun exposure.
- 7.4** Suitable pest control program shall be in place and be effective to ensure that there are no signs of pest infestation.
- 7.5** Suitable waste management and waste disposal shall be in place.

8 Sampling

- 8.1** Sampling shall be done according to the recommended methods of analysis and sampling (CXS 234-1999) relevant to the provisions.

9 Packaging

9.1 Packing Material

- 9.1** The whole maize grain, degermed maize grits and maize meal shall be packed in airtight food grade packing materials which will safeguard the hygienic, nutritional and organoleptic qualities.
- 9.2** The packing material shall be made of substances which are safe and suitable for their intended use
- 9.3** When the whole maize grain, degermed maize grits and maize meal is packed in sacks, they shall be thermoplastic lined, clean, sturdy and properly sewn or sealed.

9.2 Labelling

The labelling shall be in accordance to BTS 268: 2020 CXS 1-1985 Bhutan Standard for the labelling of Prepackaged Foods.

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