



Technical Specifications for the manufacture of:

## SUPER CEREAL

### CORN SOYA BLEND

Commodity code: **MIXCSB000**

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*This version replaces the versions 14.1 and 15.0*

*The adjustments are:*

*1. Addition of limit (1.0 mg/kg) and compulsory test for DON.*

*2. Updated product purpose*

## 1. INTRODUCTION

### 1.1 Product purpose

**SUPER CEREAL- Corn Soya Blend** is a product for children older than 5 years of age and adults.

### 1.2 Product type

**SUPER CEREAL- Corn Soya Blend** is prepared from heat treated maize and soya beans, vitamins and minerals. If **SUPER CEREAL- Corn Soya Blend** is consumed as a porridge or gruel, it should be prepared by mixing an appropriate proportion of flour and clean water (i.e. 40g of **SUPER CEREAL- Corn Soya Blend** with 250 g of water) followed by a boiling time at simmering point from five to ten minutes.

### 1.3 Standards and recommendations

**SUPER CEREAL- Corn Soya Blend** shall comply, in terms of raw materials, composition or manufacture, except when specified otherwise in the contract, with the following guidelines or standards of Codex Alimentarius.

- Guidelines on Formulated Supplementary Foods for Older Infants and Young Children, CAC/GL 08-1991 of the Codex Alimentarius.
- Codex standard for processed cereal-based foods for infants and young children. CODEX STAN 074-1981, Rev. 1-2006, of the Codex Alimentarius.
- Code of Hygienic Practice for Foods for Infants and Children CAC/RCP 66 - 2008 of the Codex Alimentarius.
- Recommended International Code of Practice: General Principles of Food Hygiene CAC/RCP 1-1969 Rev 4 - 2003 including Annex “Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its application”.

- General principles for addition of essential nutrients to foods: CAC/GL 09-1987 (amended 1989, 1991), of the Codex Alimentarius.

## 2. RAW MATERIALS

### 2.1 Main ingredients

**SUPER CEREAL- Corn Soya Blend** shall be manufactured from fresh maize grain and soy beans of good quality, free from foreign materials, substances hazardous to health, excessive moisture, insect damage and fungal contamination and shall comply with all relevant national food laws and standards. Requirements for the raw materials are:

#### *Maize*

- Conform to Codex STAN 153-1985.
- Be tested for aflatoxin (recommended method AACC 45-05 or AOAC 26.049 / 1984).
- Be obtained from non-genetically modified varieties (*if required by the contract*).

#### *Soya beans*

- Conform to Codex STAN 171-1989 (Rev.1-1995).
- Be obtained from non-genetically modified varieties (*if required by the contract*).

Maize and soya beans must be stored under dry, ventilated and hygienic conditions. Only safe insecticides (i.e. phosphine) may be used for fumigation control. Where needed, fumigation must be performed by certified operators.

### 2.2 Vitamins and minerals

Micronutrient premixes are used at the following rate per metric ton of finished product:

- 2.0 kg of vitamin premix (**FBF-V-13**).
- 12.3 kg of Dicalcium Phosphate Anhydrous.
- And 2.7 kg of Potassium chloride.

Requirements Potassium chloride and Dicalcium Phosphate Anhydrous are:

- Must meet at least food chemical codex.
- Particle size for Potassium chloride min 60% < 250 µm (microns).
- Dicalcium Phosphate Anhydrous, compliant with food chemical codex, min 95% < 250 micron, total aerobic viable count < 1000 CFU/g, yeast < 10 CFU/g, mould < 100 CFU/g, and enterobacteria negative in 1 g.

The composition of micronutrient premixes is presented in product specification.

Complete micronutrient premixes must be purchased from GAIN Premix Facility or any of the GAIN approved suppliers, a complete list is at the following link: <http://gpf.gainhealth.org/suppliers/current-suppliers>

Micronutrient premixes must be delivered to the processor of **SUPER CEREAL- Corn Soya Blend** with a complete Certificate of Analysis as well as with a Proof of purchase of premixes. The two documents must be presented with other documents for payment.

Micronutrient premixes must be stored in a dry, cool and clean place.

## 3. PROCESSING

### 3.1 Formula

**SUPER CEREAL- Corn Soya Blend** is manufactured according to the following formula:

Table 1: SUPER CEREAL- Corn Soya Blend formula

Nº	Ingredients	Percentage (by weight)
1	Maize	78.30
2	Whole soya beans	20.0
3	Vitamin/Mineral <b>FBF-V-13</b>	0.20
4	Dicalcium Phosphate Anhydrous	1.23
5	Potassium chloride	0.27

To ensure that the nutritional targets for protein and fat are met, the processor should check the fat and protein content of soya and if necessary make **adjustments** to the ratio of maize to soya in the formulation.

### 3.2 Method of processing

**SUPER CEREAL- Corn Soya Blend** shall be processed as a partially pre-cooked food under conditions which permit improvements in the digestibility of starches and proteins and in particular the de-activation of trypsin inhibitors in soya as indicated by the urease test. Preferred heat treatments include wet extrusion, dry extrusion or roasting.

### 3.3 Processing guidelines

General process guidelines are provided in WFP handbook: Fortified Blended Food – Good Manufacturing Practice and HACCP Principles; available on <http://foodqualityandsafety.wfp.org>

### 3.4 Homogeneity of micronutrients

Theoretical calculations indicate that a mixing system with a Coefficient of Variation of 10% using iron as the indicator element, will enable product to meet the above variation target on 95%, provided that all conditions of mixing are rigorously applied. To conduct these calculations see the WFP handbook: Fortified Blended Food- Good Manufacturing Practice and HACCP Principles and fortification guide on <http://foodqualityandsafety.wfp.org>

### 3.5 Food safety and risk assessment at manufacturing premises

For compliance with Codex standards the processor must be able to demonstrate by principle and practice the adoption, implementation and recording of:

- Good Manufacturing Practice
- Hazard Analysis Critical Control Point program

In this context an appointed WFP Inspector/Quality Surveyor is entitled to visit the factory without prior notice during any period when WFP product is being manufactured to check that the GMP and HACCP systems are in place. The Inspector/Quality Surveyor may request to see:

- **Records** (i.e. names of people in charge of the process and quality control, temperatures of the process, mixing times / quantity, cleaning schedules, etc).
- **Procedures** (e.g. cleaning, personnel hygiene, HACCP, sampling and analysis).
- **Instructions** (e.g. process instructions, cleaning instructions).
- The **quality manual** for the process or factory.

The manufacturer must be **registered under national food law** as a processor of foods for human consumption.

## 4. PRODUCT SPECIFICATIONS

### 4.1 General requirements

**SUPER CEREAL- Corn Soya Blend** shall be suitable for young children and adults after a boiling at simmering point for a minimum of five minutes and a maximum of ten minutes.

Finished product must have a pleasant smell and palatable taste. It shall have a uniform fine texture with the following particle distribution:

- 95% must pass through a 600 microns sieve.
- 100% must pass through a 1,000 microns sieve.

Energy density of finished product should be minimum 380 kcal/100g flour.

#### ***Consistency***

Flow rate (Bostwick test) of 15% dry matter porridge should be minimum 55 mm per 30 sec at 45°C and at the proposed preparation dosage (i.e. 40g of product plus 250g water after a boiling at simmering point for five minutes).

#### ***Dispersiveness***

It shall be free from lumping or balling when mixed with water of ambient temperature.

### **4.2 Specific requirements**

**SUPER CEREAL- Corn Soya Blend** must be fortified to provide the following net micro nutrient **supplement** per 100g of finished product specified in table1.

It must also comply with other requirements specified in table 2.

**Table 1: Micronutrient rate and chemical form**

	Target/100g flour	Form
<b>Vitamin/Mineral premix FBF-V-13</b>		
Vitamin A	3460 IU	Dry Vitamin A Palmitate 250 Cold Water Dispersible Stabilized
Vitamin D3	441.6 IU	Dry Vitamin D3 100 Water Dispersible Stabilized
Vitamin E TE	8.3 mg	Dry Vitamin E Acetate 50% Water Dispersible
Vitamin K1	30 µg	Dry Vitamin K1 5% Water Dispersible
Vitamin B1	0.2 mg	Thiamine mononitrate
Vitamin B2	1.4 mg	Vitamin B2 fine powder
Vitamin B6	1 mg	Pyridoxine hydrochloride
Vitamin C	90 mg	Ascorbic acid
Pantothenic acid	1.6 mg	Calcium D Panthotenate
Folate, (DFE)	110 µg	Folic acid*
Niacin	8 mg	Niacinamide
Vitamin B12	2 µg	Vitamin B12 0.1% or 1% Spray Dried
Biotin	8.2 µg	Biotin 1%
Iodine	40 µg	Potassium Iodide*
Iron (a)	4 mg	Ferrous fumarate fine powder
Iron (b)	2.5 mg	Iron-sodium EDTA
Zinc	5 mg	Zinc Sulphate Monohydrate
<i>Carrier</i>		Corn maltodextrin
		* Adequate dilution must be used in order to guarantee premix homogeneity
<b>Other minerals</b>		
Potassium	140 mg	Potassium Chloride with 0.5% silicon dioxide as anticaking agent, compliant with food chemical codex, min 90%<425 micron and min 60%<250 micron
Calcium	362 mg	Dicalcium Phosphate Anhydrous, compliant with food chemical codex, min 95%<250 micron, total aerobic viable count <1000 CFU/g, yeast<10 CFU/g, mould <100 CFU/g, and enterobacteria negative in 1 g.
Phosphorous	280 mg	

*Note: Variable levels of micronutrients (i.e iron, zinc, etc.) naturally present in maize and soya may lead to variable amount of micronutrients in finished product.*

### 4.3 Contaminants

#### 4.3.1 Heavy metals

**SUPER CEREAL- Corn Soya Blend** shall be free from heavy metals in amounts which may represent a hazard to health.

#### 4.3.2 Pesticide residues

**SUPER CEREAL- Corn Soya Blend** shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

The product shall be prepared with special care under good manufacturing practices, so that residues of those pesticides which may be required in the production, storage or processing of the raw materials or the finished food ingredient do not remain, or, if technically unavoidable, are reduced to the maximum extent possible.

These measures shall take into account the specific nature of the products concerned and the specific population group for which they are intended.

#### 4.3.3 Mycotoxins

**SUPER CEREAL- Corn Soya Blend** shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity. Maximum level of Deoxynivalenol (DON) is 1.0 mg/kg (on dry matter basis).

#### 4.3.4 Other contaminants

The product shall be free from residues of hormones, antibiotics as determined by means of agreed methods of analysis and practically free from other contaminants, especially pharmacologically active substances.

### 4.4 Hygiene

4.4.1 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 *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to these products.

4.4.2 To the extent possible in good manufacturing practice, the products shall be free from objectionable matter.

4.4.3 When tested by appropriate methods of sampling and examination, the products:

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and – shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

### 4.5 Shelf life

It shall retain above qualities for at least 12 months from date of manufacture when stored dry at ambient temperatures prevalent in the country of destination.

### 4.6 Fit for human consumption guarantee

Suppliers shall have to check the quality of their products and guarantee that **SUPER CEREAL- Corn Soya Blend** is ‘fit for human consumption’.

## 5. PACKAGING

**SUPER CEREAL- Corn Soya Blend** must be packed in new uniform strong polypropylene (PP) bags of a net content of 25 kg, fit for export and multiple handling. All bags have separate inner polyethylene liner. The outer polypropylene bags must have a heat cut mouth to prevent fibrillation and have sewn single folder bottom. Bags made of woven PP are to be given special food grade “ultraviolet” treatment. Construction of fabric must be solid to sustain harsh handling.

Bag specification:

- Outer PP bag:
  - Size (dimension): 52 cm x 87 cm
  - Density: 80 grams per square meter (gsm)
  - Weight: 75g
- Inner LDPE liner:
  - Size: fit to outer PP bag
  - Thickness: 100 microns
  - Density: 92gsm
  - Weight: 83-95g (variable with size of inner liner)

The inner liner must be heat-sealed and outer bag is double stitched with suitable thread.

The bags of finished product must pass the drop test (after each drop, there shall be no rupture or loss of contents) following the principles of the drop test standard (EN 277, ISO 7965-2 or equivalent) with following sequence:

- Butt dropping: Bag is dropped from a height of 1.20m on the bottom and the top of the bag.
- Flat dropping: Bag is dropped from a height of 1.60m twice on one flat face and twice on the opposite flat face.

Two percent marked bags (included in the price) must be sent with the lot.

## 6. MARKING

- Name and logo of the product: available on <http://foodqualityandsafety.wfp.org>
- Net content.
- Name and address of the supplier (including country of origin).
- Production date.
- Additional marking as per contractual agreement.

## 7. STORING

**SUPER CEREAL- Corn Soya Blend** must be stored under dry, ventilated and hygienic conditions.

## 8. ANALYTICAL REQUIREMENTS

The principal tests in table 2 must be performed in order to check if the quality of the **SUPER CEREAL- Corn Soya Blend** meets above requirements. Additional tests may be defined in case of further quality assessment is required.



Table 2: List of compulsory tests and reference methods

No	Tests	Requirements	Reference method (Or equivalent)
1	Moisture	Max. 10.0%	ISO 712
2	Protein	Min. 14.0 g/100g flour (N x 6.25)	AOAC 981.10
3	Fat	Min. 6.0 g/100g flour	AOAC 954.02
4	Crude fibre	Max. 4.0 g/100g flour	AOAC 962.09
5	Total ash	Max. 4.1 g/100g flour	ISO 2171:2007
6	Peroxide value	Max. 10.0 meq/kg fat	AOAC 965.33
7	Urease index	Max. 0.20 pH units	AOCS Ba 9-58 (1997)
8	Particle size	- 95% must pass through a 600 microns sieve. - 100% must pass through a 1,000 microns sieve	
9	Organoleptic quality (smell, taste, color)	Pleasant smell and palatable taste, typical color	Sensorial inspection
10	Bostwick flow rate	Min. 55mm /30s for 15% dry matter porridge	WFP's SOP <a href="http://foodqualityandsafety.wfp.org">http://foodqualityandsafety.wfp.org</a>
11	Vitamin A	2770-4160 IU/100g flour	AOAC 992.04
12	Iron	9.4-14.1 mg/100g flour	AOAC 944.02
13	Calcium	340-510 mg/100g flour	AOAC 984.27
14	Potassium	580-870 mg/100g flour	AOAC 984.27
15	Aflatoxin (total)	Max. 20 ppb (total of B1, B2, G1, G2)	AOAC 972.26
16	Deoxynivalenol (DON)	Max. 1.0 mg/kg (on dry matter basis)	EN 15891:2010
17	Mesophilic aerobic bacteria	< 100,000 cfu/g flour	ICC No 125
18	Coliforms	< 100 cfu/g flour	AOAC 2005.03
19	Salmonella	0 cfu/25g flour	AACC 42-25B
20	Escherichia Coli	< 10 cfu/g flour	AOAC 991.14
21	Staphylococcus aureus	< 10 cfu/g flour	AACC 42-30B
22	Bacillus cereus	< 50 cfu/g flour	AOAC 980.31
23	Yeasts and moulds	< 1,000 cfu/g flour	ICC No 146
24	GMO (only if required)	Negative (< 0.9% of GMO material)	