



Technical Specifications for the manufacture of:

SUPER CEREAL *plus*

CORN SOYA BLEND

Specification reference: **SUPER CEREAL *plus*- Corn Soya Blend**

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1. INTRODUCTION

1.1 Product purpose

SUPER CEREAL *plus*- Corn Soya Blend is a product preferred for young children aged 6 months – 2 years. The product is to be used as a complement to breastfeeding. The product is NOT a breast-milk replacer.

1.2 Product type

SUPER CEREAL *plus* is prepared from heat treated maize and **de-hulled** soya beans, sugar, dried skim milk, refined soya bean oil, vitamins and minerals. If **SUPER CEREAL *plus*- 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. 50g of **SUPER CEREAL *plus*- 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 *plus*- 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.
- 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 *plus*- 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. Sugar, dried milk powder and soya bean oil shall be of optimal food quality and meet the Codex standards for these commodities. 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*).
- Be de-hulled (minimum of 85% hull removal).

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.

Sugar

- Conform to Codex STAN 212-1999. To meet particle size specification 100% through a 1000 microns screen, 95% through a 600 microns screen.

Dried Skim Milk

- Conform to Codex STAN 207-1999
- To meet particle size specification 100% through a 1000 microns screen, 95% through a 600 microns screen.
- To be provided with a certificate of analysis confirming absence of melamine.

Refined Soya Bean Oil

- Conform to Codex STAN 210-1999. Only refined-deodorised-bleached oils are acceptable.

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 a WFP approved supplier: BASF (Stern Vitamin), DSM, Fortitech, Nicholas Piramal, Hexagon Nutrition or their authorized dealers and GAIN premix facility. Addresses of premix suppliers are on <http://foodqualityandsafety.wfp.org>

Micronutrient premixes must be delivered to the processor of **SUPER CEREAL plus- 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 plus- Corn Soya Blend is manufactured according to the following formula:

Table 1: **SUPER CEREAL plus- Corn Soya Blend formula**

N ^o	Ingredients	Percentage (by weight)
1	Maize	58.30
2	De-hulled soya beans	20.00
3	Dried skim milk powder	8.00
4	Sugar	9.00
5	Refined soya bean oil	3.00
6	Vitamin/Mineral FBF-V-13	0.20
7	Dicalcium Phosphate anhydrous	1.23
8	Potassium chloride	0.27

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

3.2 Method of processing

SUPER CEREAL plus- 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 and dry extrusion.

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 and fortification guide in <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 Moisture content 7.0 % maximum

4.2 Nutritional value: it shall contain the following nutritional value per 100 g dry matter:

- Energy 410 kcal minimum
- Protein 16.0 % (N x 6.25) minimum
- Fat 9.0 % minimum
- Crude fibre 2.9 % maximum
- Ash 4.6 % maximum

4.3 Micronutrient

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

Table 2: Micronutrient rate and chemical form

	Target/100g finished product	Form
Vitamin/Mineral premix FBF-V-13		
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
Other minerals		
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.

4.4 Flour characteristics

Particle size

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.

Organoleptic: it shall have a pleasant smell and palatable taste.

4.5 Microbiology

Microbiological contamination of **SUPER CEREAL plus- Corn Soya Blend** shall not to exceed the following levels:

Table 3: Limit of microorganisms in SUPER CEREAL plus- Corn Soya Blend

Microorganisms	Maximum levels
Mesophyllic aerobic bacteria	10,000 cfu per g
Coliforms	10 cfu per g
Salmonella	0 cfu per 25g
Escherichia Coli	0 cfu per g
Staphylococcus aureus	0 cfu per g
Bacillus cereus	50 cfu per g
Yeasts and moulds	100 cfu per g

4.6 Contaminants

SUPER CEREAL plus- Corn Soya Blend shall be free from objectionable matter; not contain any substances originating from micro-organisms or any other poisonous or deleterious substances such as anti-nutritional factors, heavy metals or pesticide residues, in amounts which may represent a hazard to health.

- Permitted level of total aflatoxin: 5 ppb (B1, B2, G1, G2).
- Heavy metals: below levels specified in Codex Stan 193-1995, in particular Pb max 20 ppb and Cd max 100 ppb.

4.7 Shelf life

It shall retain above qualities for at least 18 months from date of manufacture when stored dry at ambient temperatures prevalent in the country of destination.

4.8 Fit for human consumption guarantee

Suppliers shall have to check the quality of their products and guarantee that they are '**fit for human consumption**'.

4.9 Additional Requirements

Peroxide value: max 10 meq/kg fat.

Consistency of 17% dry matter porridge (Bostwick test): min 100 mm per 30 sec at 45°C and at the proposed preparation dosage (i.e. 50g of product plus 250g water after a boiling at simmering point for five minutes).

Anti-nutrients: The urease index of **SUPER CEREAL plus- Corn Soya Blend** should be maximum 0.2 pH units.

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

Cooking time: It 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.

5. PACKAGING

SUPER CEREAL plus- Corn Soya Blend shall be packed in new uniform multilayer bags of a net content of 1.5 kg, fit for export and multiple handing and must be heat-sealed.

5.1 Primary packaging

Plastic foil

- PE60/Met polyester 12
- Characteristics of the metalized layer:

	12 Metallised	Method
Specific weight	1.4 g/cm ³	
Thickness base film	12.0 microns	
Yield	59.5 m ² /kg	
Tensile strength at break	21.0 kg/mm ²	ASTM D882
Elongation at break	100%	ASTM D882
Shrinkage	2.0%	ASTM D1204
Shrinkage (150°C 30')	0.2%	ASTM D1204
Optical density	2.2	
Permeability O ₂ (38°C – 45% RH)	1.5 cc/m ² /24h	ASTM D1484
Permeability Vapour (38°C – 90% RH)	1.5 cc/m ² /24h	ASTM E 96
Melting point	260°C	

Marking

Here are the basics that must be on the label to ensure that it is compliant with CODEX:

- Name of the product: **SUPER CEREAL plus- Corn Soya Blend**
- Logo: available on <http://foodqualityandsafety.wfp.org>
- Product type: Corn Soya Blend "Food for infants and young children 6 months and above"
- Ingredients: Corn, Soya, Sugar, Milk Powder, Vegetable Oil, Minerals and Vitamins
- Net Contents: 1.5 KG
- Name of supplier
- Batch number: see above printing
- Manufacturing date: see above printing
- Best used before: eighteen months after production date
- Preparation instructions:
 - [pictorial of opening the bag]
 - [pictorial of blending with water]
 - [pictorial of cooking]
 - [pictorial of feeding to infant]
 - [pictorial of closing the bag]

- Storage instructions: Store the closed bag in a cool, dry and hygienic place.
- Additional marking as per contractual agreement.

5.2 Outer packaging

Carton boxes

Dimensions: 400 x 280 s 210 (L x l x H)

Composition: 5 ply – 5 mm thickness

KB 2: 125 GMS
 S 6: 210 GMS
 F 2: 120 GMS
 S 6: 210 GMS
 K 2: 125 GMS

Marking:

- Name and logo of the product: available on <http://foodqualityandsafety.wfp.org>
- Extra logos:



Keep dry



Keep away from heat



Stack limitation



Do not destroy barrier



Top

- Additional marking as per contractual agreement.

6. STORING

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

7. ANALYTICAL REQUIREMENTS

Table 4: List of compulsory tests and reference methods

No	Analyses/tests	Recommended level	Reference methods (Or equivalent)
Main composition			
1	Moisture	7.0 % (<i>maximum</i>)	ISO 712-2009
2	Protein	16.0% (N x 6.25) (<i>minimum</i>)	AOAC 981.10 ISO 20483:2006
3	Fat	9.0 % (<i>minimum</i>)	AOAC 954.02 ISO 11085:2008
4	Crude fibre	2.9 % (<i>maximum</i>)	AOAC 962.09
5	Ash	4.6 % (<i>maximum</i>)	ISO 2171:2007
Chemico-physical characteristics of flour			
6	Peroxide value	10 meq/kg fat (<i>maximum</i>)	AOAC 965.33
7	Urease index	0.20 pH units (<i>maximum</i>)	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 (smell, taste, color)	Pleasant smell and palatable taste, typical color	
10	Consistency (Bostwick flow rate)	min 100 mm/30s for 17% dry matter porridge	WFP's SOP http://foodqualityandsafety.wfp.org
Vitamins			
11	Vitamin A	2770-4160 IU per 100g	AOAC 992.04 AACC 86-03
Minerals			
12	Iron	9.0-13.5 mg per 100g	AOAC 944.02 AACC 40-41B
13	Calcium	420-630 mg per 100g	AOAC 984.27
14	Potassium	650-970 mg per 100g	AOAC 984.27
Mycotoxins			
15	Aflatoxin (total)	5 ppb (B1, B2, G1, G2) (<i>maximum</i>)	AACC 45-16
Melamine			
16	Melamine	1 mg/kg <i>maximum</i>	
Microorganisms			
17	Mesophyllic aerobic bacteria	10,000 cfu per g (<i>maximum</i>)	ICC No 125 AACC 42-11
18	Coliforms	10 cfu per g (<i>maximum</i>)	AOAC 2005.03
19	Salmonella	0 cfu per 25g	AACC 42-25B
20	Escherichia Coli	0 cfu per g	AOAC 991.14
21	Staphylococcus aureus	0 cfu per g	AACC 42-30B
22	Bacillus cereus	50 cfu per g (<i>maximum</i>)	AOAC 980.31
23	Yeasts and moulds	100 cfu per g (<i>maximum</i>)	ICC No 146 AACC 42-50
24	GMO (<i>Only if required</i>)	Negative (< 0.9% of GMO material)	