

	<p align="center"><b>PRODUCT SPECIFICATIONS SHEET</b></p> <p align="center"><b>Supercereal with 10% sugar 1.5kg bags</b></p>	<p><b>UNICEF product number:</b> U239980</p> <p><b>Author:</b> ARF</p> <p><b>Revision:</b> ARF, MEFB</p> <p><b>Version:</b> 1.0</p> <p><b>Date:</b> 14.11.2019</p>
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**General Description:**

Supercereal is Corn Soy Blend with 10% sugar. It is a pre-cooked blend, packed in 1.5kg bags. Bags used to prepare a formulated supplementary food in form of a porridge or gruel suitable for adults and children over 5 years. Supercereal with 10% sugar consists of heat treated maize and soya beans, sugar, vitamins and minerals.

**Technical Specifications:**

Ingredients % by weight

Maize: 64.30

Whole soya beans: 24.00

Sugar: 10.00

Vitamin/Mineral FBF-V-13: 0.20

Dicalcium Phosphate anhydrous: 1.23

Potassium chloride: 0.27

Nutritional value per 100 g. dry finished product:

It shall contain not less than the following nutritional value per 100g dry product:

- Energy: 380 kcal minimum
- Protein: 14.0 % (N x 6.25) minimum
- Fat: 6.0 % minimum
- Crude fibre: 3.8 % maximum
- Ash: 4.1 % maximum
- Moisture: 10.0% maximum

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, adjust the ratio of maize to soya in the formulation.

**Example of Vitamin and mineral premix (FBF-V-13) content per 100 g flour:**

Vitamin A: 3460 IU (as dry Vitamin A Palmitate 250 Cold Water Dispersible Stabilized)

Vitamin D3: 441.6 IU (as Dry Vitamin D3 100 Water Dispersible Stabilized)

Vitamin E: TE 8.3 mg (as dry Vitamin E Acetate 50% Water Dispersible)

Vitamin K1: 30 µg (as dry Vitamin K1 5% Water Dispersible)

Vitamin B1: 0.2 mg (as Thiamine mononitrate)

Vitamin B2: 1.4 mg (as vitamin B2 fine powder)

Vitamin B6: 1 mg (as pyridoxine hydrochloride)

Vitamin C: 90 mg (as Ascorbic acid)

Pantothenic acid: 1.6 mg (as Calcium D Panthotenate)

Folate, (DFE): 110 µg (as Folic acid\*)

Niacin: 8 mg (as Niacinamide)

Vitamin B12: 2 µg (as Vitamin B12 0.1% or 1% Spray Dried)

Biotin: 8.2 µg (as Biotin 1%)

Iodine: 40 µg (as Potassium Iodide\*)

Iron: (a) 4 mg (as Ferrous fumarate fine powder)

Iron: (b) 2.5 mg (as Iron-sodium EDTA)

Zinc: 5 mg (as Zinc Sulphate Monohydrate)

Other minerals

Potassium: 140 mg (as 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

Phosphorus: 280 mg (calcium and phosphorus as 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.)

Carrier: Corn maltodextrin

\* Adequate dilution must be used in order to guarantee premix homogeneity

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

Characteristics of the finished blend:

It shall be of a uniform fine texture with the following particle distribution:

95% shall pass through a 600-micron sieve;

100% shall pass through a 1000-micron sieve.

**Organoleptic characteristics:**

Taste:

It shall have a pleasant smell and palatable taste, suitable for young children. Taste deviations such as an off taste or a bitter taste making the product unsuitable or unusable by the final consumer are not acceptable.

**Additional Product Specifications:**

Peroxide value: max 10.0 meq/kg fat.

Dispersibility:

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 cooking at simmering point for a minimum of five minutes and a maximum of ten minutes.

Consistency / Viscosity of porridge:

Bostwick test: 15% dry matter porridge should be a min 55 / max 110 mm per 30 sec at 45 degrees C and at the proposed preparation dosage (i.e. 40g of product plus 250g water after cooking at simmering point for five minutes).

Anti-nutrients:

The urease index of Supercereal with 10% sugar should be between 0.01 and 0.2 pH units.

Shelf-life:

12 months minimum, preferably 18 months from the date of manufacture when stored in a dry ambient temperature prevalent in the country of destination.

**Standards and recommendations**

Supercereal with 10% sugar 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.
- Codex standard for processed cereal -based foods for infants and young children. Codex Standards 074-1981, Rev 1-2006.
- General principles for addition of essential nutrients to foods: CAC/GL 09-1987 (amended 1989, 1991).
- Code of Hygienic Practice for Foods for Infants and Children CAC/RCP 66 – 2008.
- 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”.

## **Raw Materials**

### Main ingredients

Supercereal with 10% sugar 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.

The ingredients must be stored under dry, ventilated and hygienic conditions.

Only safe insecticides may be used for storage.

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 procuring country).

#### **Soya beans:**

Conform to Codex STAN 171-1989 (Rev.1-1995).

Be obtained from non-genetically modified varieties (if required by the procuring country).

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 micron screen.

#### **Vitamins and minerals**

Complete mineral and vitamin premix can not be produced by the Supercereal manufacturer itself and shall be supplied only from a restricted list of authorized suppliers of premix<sup>1</sup>:

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

- 2.0 kg of vitamin premix
- 12.3 kg of Dicalcium Phosphate Anhydrous.
- 2.7 kg of Potassium chloride.

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<sup>1</sup> List of authorised sources of premix established and updated by the World Food Programme (WFP), available at: [http://documents.wfp.org/stellent/groups/public/documents/manual\\_guide\\_proced/wfp251174.pdf](http://documents.wfp.org/stellent/groups/public/documents/manual_guide_proced/wfp251174.pdf)

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

Micronutrient premixes must be delivered to the finished product with a complete Certificate of Analysis (CoA) as well as a proof of purchase of premixes/s.

Micronutrient premixes must be stored in a dry, cool and clean place where the temperature is a maximum of 25 degree Celsius. Care must be taken during manufacturing to ensure these storage requirements are maintained and that any un-used portion of the micronutrient powder is protected from air, light, heat and moisture.

### **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>

### **Processing instructions:**

The production process shall be in accordance with the 'Code of Hygienic Practice for Foods for Infants and Children' and 'Code of Sound Manufacturing Practices' of the Codex Alimentarius (Volume 4, Second Edition, FAO Rome 1994).

General process guidelines can be found in WFP handbook: Fortified Blended Food – GMP and HACCP Principles; available: <http://foodqualityandsafety.wfp.org>

Supercereal with 10% sugar 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 extrusion or roasting.

### **Extrusion:**

Cleaned cereals and pulses/oilseeds/soya beans are mixed in the correct amount, gritted and precooked through extrusion at a temperature not exceeding 160°C.

The extrusion product is cooled to ambient temperature immediately after extrusion and milled into a fine flour.

### **Roasting /milling:**

Cereals and pulses/oilseeds/soya beans are separately roasted at a temperature not exceeding 180°C (recommended: cereals 10 min. at 140°C; pulses/oilseeds/soya beans 15 min. at 170°C). The roasted products are cooled to ambient temperature immediately after roasting, mixed in the correct amount and milled into a fine flour. Subsequently the flour is homogeneously mixed with the vitamin/mineral supplement and (if applicable) sugar and/or oil.

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Variation in nutrient specification:

The variation of the final product with respect to contents of protein and fat shall not exceed -5% of the specified value using standard analytical techniques. The moisture and crude fibre should not exceed five percent of the specified values. Products not meeting this requirement are liable for rejection.

Safety:

Super cereal with 10% sugar shall be free from objectionable matter. It shall not contain any substances originating from microorganisms, parasites or any other poisonous or deleterious substances like heavy metals, hormone residues, antibiotics, pharmacologically active substances or pesticide residues, in amounts which may represent a hazard to health. These measures shall take into account the specific nature of the products concerned and the specific population group for which they are intended.

-Heavy metals: below levels specified in Codex Stan 193-1995, Pb max 20 ppb and Cd max 100 ppb.

-Permitted levels of tropane alkaloids to be a maximum of 0.016 µg /Kg of bodyweight as established by the European Food Safety Authority (EFSA) to be the acute reference dose (ARfD) for atropine and scopolamine.

<https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2013.3386>

Microbiological and mycotoxin safety limits:

Mesophilic aerobic bacteria: 100,000 cfu per g

Coliforms: 100 cfu per g

Salmonella: 0 cfu per 25g

Escherichia Coli: <10 cfu per g

Staphylococcus aureus: <10 cfu per g

Bacillus cereus: 50 cfu per g

Yeasts and moulds: 1,000 cfu per g

Aflatoxin (Total): 20 ppb, maximum (total of B1, B2, G1, G2).

Deoxynivalenol (DON): 1.0 mg/kg maximum on dry matter basis

**Requirements for stability:**

The supplier should conduct shelf life studies to confirm shelf-life as per *Interagency Stability Study Requirements, Revision 7*.

**Analytical Requirements for each Certificate of Analysis per 100g:**

Moisture Max.: 10.0% (ISO 712: 2009)

Protein Min.: 14.0 g AOAC 981.10

Fat Min.: 6.0 g (AOAC 954.02)

Crude fibre Max.: 3.8 g (AOAC 962.09)

Total ash Max.: 4.1 g (ISO 2171:2007)

Peroxide value Max.: 10.0 meq/kg fat (AOAC 965.33)

Urease index Max.: 0.20 pH units (AOCS Ba 9-58 (1997))

Particle size: 95% must pass through a 600 microns sieve  
100% must pass through a 1,000 microns sieve (Organoleptic quality (smell, taste, color)  
Pleasant smell and palatable taste, typical color sensorial inspection  
Bostwick flow rate Min.: 55mm /30s for 15% dry matter porridge  
Vitamin A: 2770-4160 IU (AOAC 992.04)  
Iron: 9.6-14.4 mg (AOAC 944.02)  
Calcium: 350-520 mg (AOAC 984.27)  
Potassium: 610-910 mg (AOAC 984.27)  
Aflatoxin: (total) Max. 20 ppb (total of B1, B2, G1, G2) (AOAC 972.26)  
Deoxynivalenol: (DON) Max. 1.0 mg/kg (on dry matter basis) (EN 15891:2010)  
Mesophilic aerobic bacteria: < 100,000 cfu/g (ICC No 125)  
Coliforms: < 100 cfu/g (AOAC 2005.03)  
Salmonella: 0 cfu/25g (AACC 42-25B)  
Escherichia Coli: < 10 cfu/g (AOAC 991.14)  
Staphylococcus aureus: < 10 cfu/g (AACC 42-30B)  
Bacillus cereus: < 50 cfu/g (AOAC 980.31)  
Yeasts and moulds: < 1,000 cfu/g (ICC No 146)  
GMO: (only if required) Negative (< 0.9% of GMO material)

**Packaging:**

Packed in airtight sachets of 1.5 kg, sachet foil includes an aluminium layer to protect against UV light and humidity. The product should be packed under inert gas (e.g nitrogen) to prolong shelf life.

Primary packaging Plastic foil:

PE60/Met polyester 12

Characteristics of the metalized layer:

Specific weight: 1.4g/cm<sup>3</sup>

Thickness of the base film: 12.0 microns

Yield 59.5 m<sup>2</sup>/kg

Tensile strength at break 21.0kg/mm<sup>2</sup> (ASTM D882)

Elongation at break 100% (ASTM D882)

Shrinkage 2.0%

Shrinkage (150 degrees C 30) 0.2% (ASTM D1204)

Optical density 2.2

Permeability Oxygen (38 degrees – 45% RH) 1.5cc/m<sup>2</sup>/24h (ASTM D1484)

Permeability vapour (38 degrees C – 90% RH) 1.5 cc/m<sup>2</sup>/24h (ASTM E 96)

Melting point 260 degrees C

Outer packaging:

Carton boxes: Dimensions: 400 x 280 x 210 (Lx1xH)

Composition: 5 ply – 5 mm thickness, markings to indicate:

Keep dry, keep away from heat, stack limitation, do not destroy barrier, top of box.

Labelling:

The label of the product should contain the following information:

Name of the product;

Target age group

Manufacturers brand\*

List of ingredients in descending order, specifying quantities

Net content: 1.5kg

Kcal/100g

Batch number / lot number/ production date/ Expiry date;

Manufacturers storage conditions;

Directions for use;

Manufacturer name and address.

\*use of UNICEF logo on products is subject to prior approval

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Predelivery Inspection (PDI) is mandatory for this item

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**Storage and transportation:**

Supercereal with 10% sugar must be stored under dry ventilated and proper hygienic conditions below 30°C. Important note: food grade container shall be used for transportation.

Fumigation prior to shipment is required.