



Technical Specifications for the manufacture of:

SUPER CEREAL - WHEAT SOYA BLEND with Sugar (1.5 kg Unit Packing)

Commodity code: **MIXWSB040 (1.5kg)**

Version: **1, adopted 2019**

Replacing: **This is a first version**

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The key highlights are:

- Super Cereal – WSB+ with Sugar in 1.5kg unit packing*
- Revising total aflatoxin limit from 20 ppb to 10 ppb*

1. INTRODUCTION

1.1 Product purpose

SUPER CEREAL- Wheat Soya Blend with Sugar (hereafter called the product) is intended for children older than 5 years of age and adults.

1.2 Product type

The product is prepared from heat treated wheat and soya beans, vitamins and minerals. If the product 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 the product with 250 g of water) followed by a boiling time at simmering point from five to ten minutes.

1.3 Standards and recommendations

The product shall comply, in terms of raw materials, composition or manufacture, except when specified otherwise in this 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.
- General standard for contaminants and toxins in food and feed: CODEX STAN 193- 1995.

2. RAW MATERIALS

2.1 Main ingredients

The product shall be manufactured from fresh wheat and soy beans of good quality and shall comply with all relevant national food laws and standards. Requirements for the raw materials are:

Wheat

- conform to Codex STAN 199-1995
- 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*).

Note: Wheat and soya beans shall be free from the following toxic or noxious seeds in amounts which may represent a hazard to human health.

– Crotalaria (*Crotalaria* spp.), Corn cockle (*Agrostemma githago* L.), Castor bean (*Ricinus communis* L.), Jimson weed (*Datura* spp.), and other seeds that are commonly recognized as harmful to health.

Wheat 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. It shall be done as specified in the GAFTA Standard for Fumigation¹.

2.2. Sugar

Refined sugar shall conform to Codex STAN 212-1999. Sugar must be milled to meet particle specification: 100% through a 1mm screen, 95% through a 600-micron screen.

2.3 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 100% < 600 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 table 2.

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 the product 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.

¹https://www.gafta.com/write/MediaUploads/Trade%20Assurance/Gafta_Standard_for_Fumigation_WEB.PDF

Micronutrient premixes must be stored in a dry, cool and clean place. Follow storage recommendations from the supplier of micronutrient premix in case labelled on shipped boxes and/or bags.

2.4 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. The guidelines for this calculation is shown at <http://foodqualityandsafety.wfp.org/coefficient-of-variation-calculator>

3. PROCESSING

3.1 Formula

The product is manufactured according to the following formula:

Table 1: SUPER CEREAL- Wheat Soya Blend with Sugar formula

| Nº | Ingredients | Percentage (by weight) |
|----|---------------------------------|------------------------|
| 1 | Wheat | 63.30 |
| 2 | Whole soya beans | 25.00 |
| 3 | Sugar | 10.00 |
| 4 | Vitamin/Mineral FBF-V-13 | 0.20 |
| 5 | Dicalcium Phosphate anhydrous | 1.23 |
| 6 | Potassium chloride | 0.27 |

To ensure that the nutritional targets of finished product are fully met, the processor should check the quality of incoming materials i.e. fat and protein contents of soya and if necessary, make adjustments to the ratio of wheat to soya in the formulation. All formulation adjustments shall be documented and reported to WFP.

3.2 Method of processing

The product 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 (see specification). Preferred heat treatments include wet extrusion, dry extrusion and drum drying.

Note: Roasting is not acceptable.

3.3 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

The product 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

The product must be fortified to provide the following net micro nutrient **supplement** per 100g of finished product specified in table 2.

It must also comply with other requirements specified in table 4.

Table 2: Micronutrient rate and chemical form

| | Target/100g flour | 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 |
| Carrier | | 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 wheat and soya may lead to variable amount of micronutrients in finished product.

4.3 Contaminants

4.3.1 Heavy metals

The product shall be free from heavy metals in amounts which may represent a hazard to health.

4.3.2 Pesticide residues

The product 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

The product 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 other contaminants in amounts which may represent a hazard to health.

4.4 Hygiene

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.

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

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

The product covered by the provision of this specification 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.

4.6 Fit for human consumption guarantee

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

5. PACKAGING

5.1 General requirements

The product covered by the provision of this specification must be packed in appropriate packaging which safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product. The packaging shall be made of substances which are safe and suitable for their intended use.

Note: Packaging requirement can also be agreed as per contractual requirements.

5.2 Product net weight

- 1.5 – 2.0 kg Net weight and follow contract requirement for specified net weight,
- Average net weight of the batch should not be less than specified net weight,
- Weight and quantity tolerance must meet The International Organization of Legal Metrology International Recommendation OIML R 87².

² OIML R 78 Quantity of commodity in pre-packages https://www.oiml.org/en/files/pdf_r/r087-e04.pdf, latest edition to be followed

5.3 Primary packaging

Sachets shall be:

- Food grade materials compliant with the last amendments of national regulations in the country of production (if not existing: compliance with EU or FDA legislations requested).
- Optimized shape to avoid space loss in the sachets and cartons
- Properly sealed with no leakages (test example: ASTM F2338 – 09, ASTM D3078 – 02 or equivalent)
- The sachets must be placed in an appropriate way in the carton box during the packing process to avoid packaging damage
- The laminate must include a barrier layer to highly reduce permeability of oxygen and water vapour. The minimum requirements³ are:
 - WVTR < 1.5 g/m².day (38°C/90% RH) (ASTM F1249-06 or equivalent)
 - OTR < 5 cc/m².day (23°C/0% RH) (ASTM D-3985 or equivalent)
- Reverse printing is highly recommended

Typically, a laminate composed of polyester* + metallized polyester* (typical thickness: 70-90 microns) or equivalent can be used.

*e.g. PE, PET, PP

- Nitrogen flushing should be applied during the filling of the powder in sachets

5.4 Secondary packaging

The product shall be packed in cartons suitable for the humanitarian supply chain.

It is under supplier responsibility to select a packaging material that will resist to multiple handling and up to 2 meters stacking.

Cartons shall be:

- New, manufactured from well-constructed double walled corrugated board
- With an edge crush resistance of 60ECT = 60 lbs/in eq 11 kN/m (ISO 3037) and a specific weight of 700 to 1000 grams per square meter
- fully filled for maximum strength and dimensions adjusted to the load
- The fluting must be vertical, supporting the load
- The carton should be plain brown
- No stapling will be accepted
- firmly closed (top and bottom)

Unless otherwise specified in the contract, two percent (2%) empty, marked cartons (included in the price) must be sent with the lot.

5.5 Stuffing in Containers

If pallets are used inside containers: it is highly recommended to have 3 first bottom layers placed as column stacking, the rest can be interlocked (cross-stacking) for load stability. Pallet must be wrapped in a suitable manner (locked to the pallet, enough containment force) and the cartons should be banded when necessary. The cartons must be secured to pallets in order to prevent any damage to the contents or packaging during shipment. Pallet used should be strong enough to support the charge during transportation. Pallets shall be stackable (minimum double stock) without damage to the cartons during shipment.

If no pallets are used inside container: dunnage (of strong sheets such as carton, plywood...) should be placed inside each container at every three layers of cartons to provide the required stacking strength. In

³ Suppliers must submit packaging Certificate of Analysis indicating WVTR and OTR compliance to WFP with other documents for payment.

addition, protecting material like air bag, carton, polystyrene, can be used. Also, kraft paper must be adhered to all internal sides, door, and floor of container. Kraft paper also need to be placed on the top of packaging.

For shipping containers, unless fully shrink-wrapped pallets are used, and unless otherwise specified in the contract, it is highly recommended to place desiccant in container at appropriate location in order to absorb moisture. Supplier needs to use high quality desiccant and calculate the quantity of desiccant based on:

- Efficiency of desiccant
- Length of time in transit in container
- Container capacity

Supplier needs to provide in the offer the type of desiccant and quantity to be used for the consignment.

Table 3: Guideline on the quantity to be used for calcium chloride-based desiccants:

| Estimated days in container | 20 ft container | 40 ft container |
|------------------------------------|------------------------|------------------------|
| 15-59 days | 9.00 kg | 17.50 kg |
| 60-89 days | 11.25 kg | 22.50 kg |
| 90-120 days | 13.50 kg | 25.00 kg |

Better alternative material can be used upon agreement with WFP.

Empty containers/vehicles shall be clean, pest free and free of damage, odours and previous cargo remains. Ventilation holes must remain clear and unsealed.

6. MARKING

The labelling of the product covered by the provision of this specification shall comply with CODEX STAN 1-1985 The following information should be available on bags and carton:

Bags

- Name of the product: **SUPER CEREAL- Wheat Soya Blend with Sugar**
- Logo: available on <http://foodqualityandsafety.wfp.org>
- Product type: Wheat Soya Blend with Sugar
- Ingredients: Wheat, Soya, Sugar, Minerals and Vitamins
- Net Contents: As per contract requirement (e.g. 1.5 KG or 2.0 KG)
- Name & address of supplier
- Name & address of manufacturer
- Batch number: see above printing
- Manufacturing date: see above printing
- Best before end eighteen months after production date
- Preparation instructions: *artwork need to be checked beforehand*
 - [pictorial of opening the bag]
 - [pictorial of blending with water]
 - [pictorial of cooking]
 - [pictorial of feeding to adult]
 - [pictorial of closing the bag]
- Storage instructions: Store the closed bag in a cool, dry and hygienic place.
- Additional marking as per contractual agreement.

Carton box

- Name and logo of the product: available on <http://foodqualityandsafety.wfp.org>
- Extra logos: Keep dry; Keep away from heat; Stack limitation; Side up Picto
- Name & address of supplier
- Name & address of manufacturer
- Batch number: see above printing
- Manufacturing date: see above printing
- Best before end eighteen months after production date
- Not for sale
- Additional marking as per contractual agreement.
- Artwork templates for sachets and carton boxes are available on:
<http://foodqualityandsafety.wfp.org>

7. STORING

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

8. ANALYTICAL REQUIREMENTS

Additional tests may be defined in case further quality assessment is required. The following analytical plans are currently utilized by WFP and shared only for suppliers' information. Suppliers should follow its own food safety and quality management plan. Additionally, WFP reserves the rights to change these plans at any time.

Table 4: List of compulsory tests and reference methods

| No | Tests | Requirements | Reference method (or equivalent validated methods) |
|----|------------------------------------|--|--|
| 1 | Moisture | Max. 7.0% | ISO 712: 2009 |
| 2 | Protein | Min. 16.0 g/100g flour (N x 6.25) | ISO 20483 AOAC 992.23 EN ISO 16634-2:2016 |
| 3 | Fat | Min. 6.0 g/100g flour | ISO 11085 |
| 4 | Crude fibre | Max. 3.8 g/100g flour | ISO 5498 AOAC 962.09 |
| 5 | Total ash | Max. 4.5 g/100g flour | ISO 2171 / AOAC 923.03 |
| 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 (smell, taste, color) | Pleasant smell and palatable taste, typical color | Sensorial inspection |
| 10 | Consistency (Bostwick flow rate) | Min. 55mm /30s for 15% dry matter porridge | WFP's SOP http://foodqualityandsafety.wfp.org |
| 11 | Vitamin A | 2780-4170 IU/100g flour | AOAC 992.04 |
| 12 | Iron | 10.2-15.2 mg/100g flour | AOAC 944.02 |
| 13 | Calcium | 360-550 mg/100g flour | AOAC 984.27 |
| 14 | Potassium | 620-920 mg/100g flour | AOAC 984.27 |
| 15 | Aflatoxin (total) | Max. 10 ppb (total of B1, B2, G1, G2) | ISO 16050 / EN 12955 |
| 16 | Deoxynivalenol (DON) | Max. 1.0 mg/kg (on dry matter basis) | EN 15891:2010 |
| 17 | Mesophyllic aerobic bacteria | < 100,000 cfu/g flour | ISO 4833-1:2013 ICC No 125 AACC 42-11.01 |
| 18 | Coliforms | < 100 cfu/g flour | ISO 4832:2006 AOAC 2005.03 AACC 45-15.02 |
| 19 | Salmonella | 0 cfu/25g flour | ISO6579-1:2017 AACC 42-25.03 |
| 20 | Escherichia Coli | < 10 cfu/g flour | AOAC 991.14 ISO 16649-2:2001 |
| 21 | Staphylococcus aureus | < 10 cfu/g flour | EN ISO 6888-2:2004 AACC 42-30.04 |
| 22 | Bacillus cereus | < 50 cfu/g flour | AOAC 980.31 ISO 7932:2004 |
| 23 | Yeasts and moulds | < 1,000 cfu/g flour | ISO 21527-2:2008 ICC No 146 AACC 42-50.02 |
| 24 | GMO (only if required) | Negative (< 0.9% of GMO material) | ISO 21569 ISO 24276 |