



## **Technical Specifications for the manufacture of:**

### **MAIZE MEAL / Regional / International**

Specification reference: **Maize Meal for Regional and International Purchase**

Version: **3.3**

Date of issue: **23 May 2011**

## **1. INTRODUCTION**

### **1.1 Product purpose**

**Maize Meal** is a product for adults and children over than 2 years.

### **1.2 Product type**

**Maize Meal** is prepared from maize flour, vitamins and minerals.

### **1.3 Standards and recommendations**

**Maize Meal** 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.

- 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 ingredient**

**Maize Meal** shall be manufactured from fresh maize 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 maize are:

- Conform to Codex STAN 153-1985.
- Be obtained from non-genetically modified varieties (*if required by the contract*).

Maize 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

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://foodquality.wfp.org>

Micronutrient premixes must be delivered to the processor of **Maize Meal** 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 where the temperature is a maximum of 25 °C.

## 3. PROCESSING

### 3.1 Formula

**Maize Meal** is manufactured according to the following formula:

- Maize: 99.98 % by weight
- Vitamin/mineral premix: 0.025 % by weight (or 250g/ton)

### 3.2 Homogeneity of micronutrients

Theoretical calculations indicate that a mixing system with a Coefficient of Variation of 20% using iron as the indicator element. To conduct CV calculations see the WFP handbook: Fortified Blended Food- Good Manufacturing Practice and HACCP Principles and fortification guide on <http://foodquality.wfp.org>

### 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, 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** 14.0 % maximum

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

- Fat 2.0 % maximum
- Crude fiber 0.8 % maximum

### 4.3 Micronutrient

**Maize Meal** must be fortified to provide the following net micro nutrient **supplement** per kilogram of finished product:

*Table 1: Micronutrient rate and chemical form*

	<b>Target</b>	<b>Chemical form</b>
Vitamin A	1.0 mg/kg	Dry vitamin A palmitate 250 n.s
Vitamin B1	4.4 mg/kg	Thiamine mononitrate
Vitamin B2	2.6 mg/kg	Riboflavin
Vitamin B3	35.0 mg/kg	Nicotinamide
Folic acid	1.0 mg/kg	Folic acid
Vitamin B 12	0.008 mg/kg	Cyancobalamin
Iron	15 mg/kg	NaFeEDTA
Zinc	30 mg/kg	Zinc oxide

*Note:* Variable levels of micronutrients naturally present in maize may lead variable of micronutrients in finished product.

### 4.4 Flour characteristics

#### *Particle size*

If not specified otherwise in the contract (i.e. country specific requirement), it shall have a uniform fine texture with the following particle distribution:

- 90% must pass through a 1.4 mm sieve.

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

### 4.5 Microbiology

Microbiological contamination of **Maize meal** shall not to exceed the following levels:

*Table 2: Limit of microorganisms*

<b>Microorganisms</b>	<b>Maximum levels</b>
Mesophyllic aerobic bacteria	100,000 cfu per g
Coliforms	100 cfu per g
Salmonella	0 cfu per 25g
Escherichia Coli	10 cfu per g
Staphylococcus	10 cfu per g
Bacillus cereus	100 cfu per g
Yeasts and moulds	1,000 per g

## 4.6 Contaminants

**Maize Meal** 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. Specific limit of some contaminants and toxins is presented in table 3.

Table 3: Limit of contaminants and toxins

No	Contaminant and toxin	Limit
<b>Heavy metal</b>		
1	Arsenic (As)	0.10 ppm max.
2	Copper (Cu)	2.0 ppm max.
3	Lead (Pb)	0.10 ppm max.
4	Cadmium (Cd)	0.02 ppm max.
5	Mercury (Hg)	0.01 ppm max.
<b>Pesticide residues</b>		
6	Carbamate	< 10 ppb
7	Organochlorine	< 10 ppb
8	Organophosphorus	< 10 ppb
9	Pyrethroid	< 10 ppb
<b>Toxic or noxious seeds</b>		
10	Crotalaria (Crotalaria spp.)	Free
11	Corn cockle (Agrostemma githago L.)	Free
12	Castor bean (Ricinus communis L.)	Free
13	Jimson weed (Datura spp.)	Free
<b>Radiation</b>		
14	Radiation	10 Bq/Kg max.
<b>Mycotoxins</b>		
15	Aflatoxin (total B1+B2+G1+G2)	20 ppb max.

## 4.7 Additional Requirements

**Shelf life:** it shall retain above qualities for at least **6 months** from date of manufacture when stored dry at ambient temperatures prevalent in the country of destination.

**Peroxide value:** max 10 meq/kg fat.

**Genetically Modified Organisms (GMO):** < 0.9% (if required by the contract)

## 5. PACKAGING

**Maize Meal** shall be packed in new uniform strong polypropylene bags of a net content of 25 or 50 kg, fit for export and multiple handing. All bags have separate plastic inner lining. Polypropylene bags, the outer bag must have a heat cut mouth to prevent fibrillation and have sewn single folder bottom.

Tare of bag:

- 71g each for 25 kg bag

- 110g each for 50 kg bag

Bags made of woven PP are to be given special food grade “ultraviolet” treatment. Construction of fabric must be solid to sustain harsh handling. The inner liner should be heat-sealed and outer bags double stitched.

Two (2%) percent marked bags (included in the price) must be sent with the lot.

## 6. MARKING

- Name of the product: **Maize Meal**
- Net content.
- Name and address of the supplier (including country of origin).
- Batch number (or SI).
- Best before date.
- Additional marking as per contractual agreement.

## 7. STORING

**Maize Meal** must be stored under dry, ventilated and hygienic conditions.

## 8. ANALYTICAL REQUIREMENTS

*Table 4: List of compulsory tests and reference methods*

No	Test	Recommended level	Reference method*
1	Organoleptic	Pleasant smell; Typical taste and color	
2	Moisture content	14.0 % max	ISO 712: 2009
3	Fat	2.0% max	AOAC 954.02 ISO 11085:2008
4	Crude fiber	0.8% max	AOAC 992.16 AOAC 985.29
5	Mesophyllic aerobic bacteria	100,000 cfu/g max	ICC No 125 ICC No 133 AACC 42-11
6	Yeast and Mould	1,000 cfu/g max	ICC No 146 AACC 42-50
7	Peroxide value	10 meq/kg fat max	AOAC 965.33
8	Total aflatoxin (B1+B2+G1+G2)	20 ppb max	AOAC 972.26 AACC 45-16 ISO 16050
9	Granulation	90% thru 1.4 mm sieve	AACC 66-20
10	Vitamin A	1.0 mg/kg	AOAC 992.04 AACC 86-03
11	Iron	15.0 mg/kg	AOAC 944.02 AACC 40-41B
12	Zinc	30.0 mg/kg	AOAC 999.10 AACC 40-75

\* Or equivalent