Technical Specifications for the manufacture of:

WHEAT SOYA BLEND FOR YOUNG CHILDREN AND ADULTS – WSB *Plus* –

Specification reference: **WSB *Plus***
Version: **2.1**
Date of issue: 2nd, **February 2010**
Updated**: 30th March 2011**

1. INTRODUCTION

1.1 Product purpose

WSB *Plus* is a product for adults and children over than 6 months.

1.2 Product type

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

1.3 Standards and recommendations

WSB *Plus* 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.
- 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

WSB *Plus* 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 152-1985.
- 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*).

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.

2.2 Vitamins and minerals

Complete premixes must be purchased from a WFP approved supplier and used at the following rate per metric ton of finished product:
- 2 kg of vitamin premix (**FBF-V-10**).
- 8.0 kg of [$Ca(H_2PO_4)_2$. H_2O (Mono Calcium Phosphate)].
- And 7.6 kg of KCl (Potassium chloride).

Requirements for KCl and $Ca(H_2PO_4)_2$. H_2O are:
- Must meet at least food chemical codex (FCC).
- Particle size for KCl min 60% < 250 µm (microns).
- Particle size for $Ca(H_2PO_4)_2$. H_2O min 95% <250 µm (microns).

The composition of micronutrient premixes is presented in product specification.

Suppliers of WFP's micronutrient premixes are BASF (Stern Vitamin), DSM, Fortitech, Nicholas Piramal Healthcare and Hexagon Nutrition or their authorized dealer (addresses of suppliers are in annex). WSB suppliers can also contact Premix Facility of The Global Alliance for Improved Nutrition (GAIN) to order micronutrient premixes (Visit www.gainhealth.org/gpf or contact: premixfacility@gainhealth.org).

Micronutrient premixes must be delivered to the processor of **WSB *Plus*** 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 ^{o}C.

3. PROCESSING

3.1 Formula

WSB *Plus* is manufactured according to the following formula:

Table 1: **WSB *Plus*** *formula*

N°	Ingredients	Percentage (by weight)
1	Wheat	73.24
2	Whole soya beans	25
3	Vitamin/Mineral **FBF-V-10**	0.20
4	$Ca(H_2PO_4)_2$. H_2O (Mono Calcium Phosphate)	0.80
5	KCl (Potassium Chloride)	0.76

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 wheat to soya in the formulation.

3.2 Method of processing

WSB *Plus* 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 or roasting.

3.3 Processing guidelines

General process guidelines are provided in WFP handbook: Fortified Blended Food – Good Manufacturing Practice and HACCP Principles. Guidelines available on http://foodquality.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://foodquality.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 10% maximum

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

- Energy 380 kcal minimum
- Protein 16.0 % (N x 6.25) minimum
- Fat 6.0 % minimum
- Crude fibre 4.0 % maximum

4.3 Micronutrient

WSB *Plus* must be fortified to provide the following net micro nutrient **supplement** per 100g of finished product:

Table 2: Micronutrient rate and chemical form

	Target	**Chemical forms**
Vitamin/Mineral *FBF-V-10*		
Vitamin A	1,664 IU	Dry vitamin A palmitate 250 s.n
Thiamine	0.128 mg	Thiamine mononitrate
Riboflavin	0.448 mg	Riboflavin
Niacin	4.8 mg	Nicotinamide
Pantothenic acid	6.7 mg	Calcium d-pantothenate
Vitamin B6	1.7 mg	Pyridoxine hydrochloride
Folate	60 mcg	Folic acid
Vitamin B12	2 mcg	Vitamin B12 – 0.1% spray dried
Vitamin C	100 mg	Ascorbic acid
Vitamin D	4 mcg	Dry vitamin D3 100 CWS
Vitamin E	8.3 mg	Vitamin E 50% CWS
Vitamin K	100 mcg	vitamin K1 5% CWS
Iron (a)	4 mg	Ferrous fumarate
Iron (b)	2.5 mg	Iron-sodium EDTA
Zinc	5 mg	Zinc oxide
Iodine	40 mcg	Potassium iodate (KIO_3)
Carrier	qs	Malto dextrin
Other minerals		
Potassium	400 mg	Potassium chloride (KCl)
Phosphorus	200 mg	Mono calcium phosphate $Ca(H_2PO_4)_2$. H_2O
+ Calcium	130 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.

4.4 Flour characteristics

Particle size

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

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

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

4.5 Microbiology

WSB Plus shall not exceed the following levels of microbiological contamination:

Table 3: Limit of microorganisms in **WSB *Plus***

Microorganisms	**Maximum levels**
Mesophyllic aerobic bacteria	100,000 cfu per g
Coliforms	100 cfu per g
Salmonella	0 per 25g
Escherichia Coli	10 cfu per g
Staphylococcus	10 cfu per g
Bacillus cereus	50 cfu per g
Yeasts and moulds	1,000 per g

4.6 Contaminants

WSB *Plus* 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: 20 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 Additional Requirements

***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.

***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.

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

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

Consistency / Viscosity of porridge: Bostwick test: min 55 mm per 30 sec at 45^{o}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 **WSB *Plus*** should be between 0.01 and 0.2 pH units.

5. PACKAGING

WSB *Plus* must be packed in new uniform strong polypropylene bags of a net content of 25 kg, fit for export and multiple handing. All bags have separate plastic inner lining of 75 microns. Polypropylene bags, the outer bag must have a heat cut mouth to prevent fibrillation and have sewn single folder bottom. Bag specification: size 50 cm x 75 cm in dimensions, tare about 110g each. 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: **WSB *Plus***
- Net content: 25kg.
- Name and address of the supplier (including country of origin).
- Batch number (or SI).
- Production date.
- Wheat Soy Blend enriched with 12 vitamins and 6 minerals.
- Additional marking as per contractual agreement.

7. STORING

WSB *Plus* must be stored under dry, ventilated and hygienic conditions.

8. ANALYTICAL REQUIREMENTS

Table 4: List of compulsory tests and reference methods

No	Analyses/tests	Recommended level	Reference methods
Main composition			
1	Moisture	10 % *(maximum)*	ISO 712: 2009
2	Protein	16 % (N x 6.25) (*minimum)*	AOAC 981.10 ISO 20483:2006
3	Fat	6 % (*minimum)*	AOAC 954.02 ISO 11085:2008
4	Fibre	4 % *(maximum)*	AOAC 992.16 AOAC 985.29
Chemico-physical characteristics of flour			
5	Peroxide value	10 meq/kg fat, *(maximum)*	AOAC 965.33
6	Urease index	0.01-0.20 pH units	AOCS Ba 9-58 (1997)
7	Particle size	- 95% must pass through a 600 micrometer sieve. - 100% must pass through a 1,000 micrometer sieve	
8	Organoleptic (smell, taste, color)	Pleasant smell and palatable taste, typical color.	
9	Viscosity (Bostwick flow rate)	min 55 mm/30s (>15% dry matter porridge)	Mouquet & Treche, 2006
Vitamins			
10	Vitamin A	1664 IU	AOAC 992.04 AACC 86-03
Minerals			
11	Iron	6.5 mg	AOAC 944.02
12	Calcium	130 mg	AOAC 984.27
13	Potassium	400 mg	AOAC 984.27
Microorganisms			
14	Mesophyllic aerobic bacteria	100,000 cfu per g *(maximum)*	ICC No 125 AACC 42-11
15	Coliforms	100 cfu per g *(maximum)*	AOAC 2005.03
16	Salmonella	0 cfu per 25g	AACC 42-25B
17	E. coli	<10 cfu per g	AOAC 991.14
18	Staphylococcus	<10 cfu per g	AACC 42-30B
29	Bacillus cereus	50 cfu per g *(maximum)*	AOAC 980.31
20	Yeasts and moulds	1,000 cfu per g *(maximum)*	ICC No 146 AACC 42-50
21	GMO (*only if required*)	Negative	

** or equivalent*