World Food Programme

Technical Specifications for

RICE – FORTIFIED – 25% BROKEN

Commodity Code: **CERRIC100**
Version: **1, adopted 2018**
Replacing: **16, adopted 2016**
Date of **OSCQ** Issue: **17.12.2018**

This version replaces the versions 16, 23/02/2016
The adjustments are:
1. Separation of specification from Vitamin and Mineral Premix Kernels specifications
2. Shelf life of Fortified Rice

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1. SCOPE

This specification applies to **Fortified Rice with 25% broken kernels**, as defined below, that WFP purchases and distributes to beneficiaries.

This specification constitutes the description of product and processes related to the food **Fortified Rice with 25% broken kernels** as purchased by WFP. All **Fortified Rice with 25% broken kernels** purchased by WFP shall conform to this specification unless otherwise stipulated per contract.

2. PRODUCT PURPOSE

Fortified Rice is a more nutritious substitute for standard milled rice varieties. Enriched with essential vitamins and minerals, **Fortified Rice** will be used in WFP programmes where rice is a staple food.

3. DEFINITIONS

Rice: *Oryza sativa* in any form.
Paddy: Rice kernels that are still in the inedible husk (lemma) also called "rough rice".
Brown rice: Rice kernels with husk removed by milling (caryopsis).
White rice: Polished rice kernels with the husk, bran and germ removed by milling (endosperm).
Kernel part: 10% the length of a rice kernel.
Chalky kernel: Rice kernel that wholly or partially has a chalky, non-transparent appearance.
Immature kernel: Whole or broken rice kernel that is unripe or undeveloped.
Yellow kernel: Whole or broken white rice kernel that has turned wholly or partially yellow. This includes parboiled rice kernels that have turned partially or wholly light brown.
Red kernel: Whole or broken white rice kernel with a red-coloured pericarp (bran) covering 2.5 parts (25.0%) or more of the surface.
Broken kernel: Piece of a rice kernel with length less than 7.5 parts (75.0%) of whole rice kernel.
Damaged kernel: Kernel that is obviously damaged to the naked eyes due to moisture, heat, fungi, insects or other.
Foreign material: Matter other than rice, including husk and bran detached from rice kernels.
Reasonably well milled: Bran has been largely removed from the rice kernel.
Vitamin and mineral premix kernels: Rice product that is fortified and has the appearance of a rice kernel. Also known as "fortified kernel" and "micronutrient kernel". Acceptable technologies for the production process of this product include extrusion or coating, provided that evidence that supports that the product meets the nutritional and safety requirements as specified in the technical specifications for **Vitamin and**

Mineral Premix Kernels is made available. Fortification using dusting technology is not acceptable, as the resulting fortified rice does not withstand pre-washing or decanting of excess water, steps in the cooking process in many of the target countries where the fortified rice will be used.

4. REFERENCES

- WHO Guideline 2018: Fortification of rice with vitamins and minerals as a public health strategy
- Recipient country regulatory requirements
- Good Manufacturing Practices (GMPs) of food products
- Codex standard for rice CODEX STAN 198-1995
- Codex Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969)" Rev 3 1997 Amended (1999) including Annex "Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its application"
- Food Safety Management System; ISO 22000
- WFP Technical Specifications for Vitamin and Mineral Premix Kernels

5. COMMODITY SPECIFICATION

5.1 General requirements

5.1.1 Contaminants

Heavy metals

The commodity shall be free from heavy metals in amounts which may represent a hazard to health. The commodity shall comply with those maximum residue limits established by the Codex Alimentarius Commission in CODEX STAN 193-1995, General Standard for Contaminants and Toxins in Food and Feed

Pesticide residues

The product shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

Mycotoxins

The commodity shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

- Shall not contain more than 5 ppb Ochratoxin A or 20 ppb Total Aflatoxins

5.1.2 Non-GMO Status

The commodity shall comply with Non-GMO crop if required by the recipient Country or regulations.

- GMO: Negative (< 0.9% of GMO material) - ISO 21570

5.1.3 Hygiene

- It is recommended that the commodity covered by the provisions of this specification 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 commodities.
- When tested by appropriate methods of sampling and examination, the commodity shall:
  - Be free from objectionable matter the extent possible using good manufacturing practices (GMPs)
  - Be free from micro-organisms in amounts which may represent a hazard to health
  - Be free from parasites which may represent a hazard to health
  - Not contain any substance originating from pathogenic micro-organisms, including fungi, in amounts which may represent a hazard to health
  - Not be irradiated in amounts which may represent a hazard to human health
  - Be free from heavy metals in amounts which may represent a hazard to human health

5.2 Specific requirements

The commodity shall be fresh, free from abnormal flavours, odours, live insects and otherwise fit for human consumption and intended purpose.

Fortified Rice with 25% broken kernels shall be composed of rice mixed homogenously with vitamin and mineral premix kernels to mimic the physical characteristics of the rice.

5.3 Raw materials

Raw materials for **Fortified Rice with 25% broken kernels include**: 25% broken, reasonably well milled white rice and vitamin and mineral premix kernels as described in relevant WFP specifications. All raw materials must be fresh, of good quality, free from foreign materials and substances hazardous to health, must comply with all relevant food laws and standards. Raw materials must be stored under dry, ventilated and hygienic conditions. For agricultural products, only safe insecticides (*i.e.* phosphine) may be used for fumigation control. Where needed, fumigation must be performed by certified operators.

Milled rice

- Must conform to Codex Standard 198-1995 and the pertinent WFP specification for **Milled Rice.**

Vitamin and mineral premix kernels

- Must conform to WFP specification for **Vitamin and Mineral Premix Kernels.**

5.4 Processing

The **Fortified Rice with 25% broken kernels** Supplier must implement a HACCP plan specific to the type of product and specific to the environment of production and the process (including Critical Control Points – CCP's, critical limits, and corrective actions). Other principles such as Strict zoning plan, Environmental Monitoring plan and other ISO 22000 related principles shall be implemented where possible.

Fortified Rice with 25% broken kernels is prepared by blending rice kernels with vitamin and mineral premix kernels. The vitamin and mineral premix kernels should be homogenously blended into the rice at a ratio that ensures the nutritional requirements are met as outlined below. The recommended mixing ratio is 1:100 (e.g. 1kg of vitamin and mineral premix kernels mixed with 99kg milled rice) or equivalent; with a CV of no more than 15%.

5.5 Nutritional Value

Freshly produced **Fortified Rice with 25% broken kernels** shall comply with the nutritional requirements in Table 1.

Table 1: *Micronutrient content of finished Fortified Rice with 25% broken kernels*

Nutrient	Minimum mg/kg finished Fortified Rice	Maximum per mg/kg finished Fortified Rice	Per 100g for Labelling
Vitamin A	1.95 mg	3.12 mg	150 mcg
Vitamin B1	6.50 mg	9.75 mg	0.5 mg
Vitamin B3	91.0 mg	109.2 mg	7.0 mg
Vitamin B6	7.80 mg	11.7 mg	0.60 mg
Folic acid	1.69 mg	2.54 mg	0.13 mg
Vitamin B12	0.013 mg	0.020 mg	1 mcg
Iron	40.0 mg	48.0 mg	4.0 mg
Zinc	60.0 mg	72.0 mg	6.0 mg

5.6. Shelf life

Expected shelf life (best before date) is 24 months from the date of packaging. The product can withhold the entire shelf life without issues related to food safety or sensory. Retention of micronutrient levels is yet to be confirmed. This recommendation is on an interim basis until more scientific evidence is generated and with the objective to continuing the facilitation of the operations when introducing this product.

5.7. Additional Instructions

The Vitamin and mineral premix kernel supplier should receive a Certificate of Analysis of the micronutrient premix, from the micronutrient premix supplier at the time of procurement. They should also regularly collect samples at the time of production to analyse for required amounts and uniformity of micronutrient content in the kernels.

The Vitamin and mineral premix kernel supplier should use food-grade packaging that ensures product quality and should include producer name, date of production, lot number, best-before date and ingredients utilized for the production process of this ingredient.

A Certificate of Analysis for the finished **Vitamin and mineral premix kernels** from an accredited lab should be given to the buyers at time of sale to fortified rice supplier.

6. PACKAGING AND MARKING

6.1 Packaging

Bags for **Fortified Rice with 25% broken kernels** must comply with below requirements:

Net weight / volume	Packaging requirements
< 1kg bags	- Laminate 60PE/LDPE+12PET or equivalent. - Bags must be clean, sound and free from insect infestation, fungal growth. - Bags must be new, uniform, strong, fit for export and multiple handling. - Bags must be well sealed in order to prevent leakage during transport.
1 to 5 kg bags	- Laminate 80PE/LDPE+12PET or equivalent. - Bags must be clean, sound and free from insect infestation, fungal growth. - Bags must be new, uniform, strong, fit for export and multiple handling. - Bags must be well sealed in order to prevent leakage during transport
>5 to 50 kg bags	- Bags must be made of woven polypropylene (PP) with food grade “ultraviolet” treatment. - Bags must have a heat cut mouth to prevent fibrillation and have sewn, single-fold bottom. - Bags must be closed by double stitching with suitable thread. - Bags must be clean, sound and free from insect infestation, fungal growth. - Bags must be new, uniform, strong, fit for export and multiple handling. - Construction of fabric must be solid to sustain harsh handling.

- Bags with finished product must pass the drop test (after each drop, there shall be no rupture or loss of contents) following the principles of the drop test standard (EN 277, ISO 7965-2 or equivalent) with following sequence:
    - Butt dropping: Bag is dropped from a height of 1.20m on the bottom and the top of the bag.
    - Flat dropping: Bag is dropped from a height of 1.60m twice on one flat face and twice on the opposite flat face.

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

6.2 Marking

Below information must be printed on the bags:

- Name of the food: **Fortified Rice with 25% broken kernels**
- Net weight
- Name of supplier
- Production date (mm/yyyy)
- Best before date (mm/yyyy)
- List of Ingredients: Rice, Vitamins & Minerals
- Country of origin
- Lot identification
- Storage instructions

Additional marking may be required per contract.

7. STORAGE

Fortified Rice must be stored under dry, ventilated and hygienic conditions.

8. SAMPLING AND ANALYTICAL REQUIREMENTS

8.1 Sampling Plan

Fortified Rice will be sampled for analysis by a qualified third party utilizing the following rice sampling standards:

- GAFTA Sampling Rules 124 (latest version)

8.2 List of analyses

The principal tests in table 2 must be performed by a qualified third party, appointed by WFP, in order to ensure that **Fortified Rice with 25% broken kernels** meets the necessary quality and safety parameters. The quality requirements (1-15) outlined below correspond to the generic specification, which might change as per contractual obligation. Supplier shall also submit a Certificate of Analysis from the manufacturer of the vitamin and mineral premix kernels used in the production of the **Fortified Rice with 25% broken kernels** certifying that the above micronutrient fortification levels are met.

Table 2: *Compulsory tests and recommended reference methods for white Fortified Rice 25% broken*

No	**Tests**	**Requirements**	**Reference method** *(or specified equivalent)*
1	Moisture	Max. **14 %** (m/m)	ISO 7301
2	Yellow kernels	Max. **1.5 %** (m/m)	ISO 7301
3	Red kernels	Max. **7.0 %** (m/m)	ISO 7301
4	Chalky kernels	Max. **8.0 %** (m/m)	ISO 7301
5	Immature kernels	Max. **1.5 %** (m/m)	ISO 7301
6	Paddy kernels	Max. **30** kernels/kg	ISO 7301
7	Damaged kernels	Max. **2.0** % (m/m)	ISO 7301
8	Foreign material	Max. **0.50 %** (m/m)	ISO 7301
9	Milling degree	Min. **Reasonably well milled**	ISO 7301
10	Broken kernels (%)	Min. **25%** (m/m)	ISO 7301
11	Organoleptic quality	**Natural odour, colour appearance**	ISO 7301
12	Average kernel length	**As per contractual agreement**	ISO 7301
13	GMO (*if required*)	**Negative** (<0.9 % of GMO material)	PCR
14	Radiation (*if required*)	**As per contractual agreement**	EN 1788
15	Live insect	**Nil**	ISO 7301
16	Arsenic (inorganic)	Max.**0.2** ppm	AOAC 986.15
17	Cadmium	Max.**0.4** ppm	AOAC 945.58
18	Pesticide residues	http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/commodities-detail/en/?c_id=158	EN 15662
19	Ochratoxin A	Max. **5 ppb**	AOAC 2000.3
20	Vitamin and mineral premix kernels	**0.85-1.15%** (m/m)	UV-A Lamp