

TERMS OF REFERENCE FOR THE FORTIFIED RICE KERNELS SUPPLIER

RICE FORTIFICATION PROJECT IN GAJAPATI District , ODISHA
for the year 2017-18.

*Supported by the Department of School & Mass Education
Government of Odisha*

Details of the rice fortification project:

Background: India suffers from a huge burden of under-nutrition and micronutrient malnutrition across the spectrum of age, sex and socio-economic background. Micronutrient malnutrition is another major problem in India, which severely impairs the quality of life of Indian population. Of all the micronutrient deficiencies in India, iron, vitamin A and iodine deficiency disorders have the most overwhelming impact.

The state of Odisha, being one of the most nutritionally vulnerable states, has substantially high levels of both under-nutrition and anemia. As per the National Nutrition Monitoring Bureau (NNMB) rural surveys 2003-06, 82.1% of 12-14 year old children in rural Odisha suffer from Iron Deficiency Anemia.

Well recognized strategies to address micronutrient malnutrition include dietary diversification, micronutrient supplementation and food fortification. Of these, 'food fortification' is the most effective strategy by which the micronutrients are added to the most common foods leading to rapid improvements in the micronutrient status of various population groups, at a very reasonable cost.

Rice fortification is one such strategy that can improve the micronutrient status of a targeted population.

Rationale for the project: To boost enrolment in schools, and simultaneously address the problem of malnutrition among school children, the Government of India launched the National Programme of Nutritional Support to Primary Education, popularly known as Mid-Day Meal Programme (MDM) in August 1995. Currently, the program provides for a cooked meal with a minimum of 450 calories, to be given to all primary stage and a minimum of calories for upper primary children in government, local body and government-aided schools, and alternative education centers.

Odisha's poor nutritional status and low productivity have captured the attention of policy makers. The Department of School and Mass Education (SME) of the Government of Odisha (GoO) is therefore strengthening implementation of its Mid-day Meal (MDM) programme, to address the nutrition and health problems of school children aged 6-14 years. In conformity with the Government of India (GoI) and the judgment of the Honorable Supreme Court of India, the

GoO is already providing a *rice-based* hot cooked meal to 6 to 14 year old children attending the schools.

Fortification of school meals is the most efficient and effective route to alleviating micronutrient deficiencies in school children. MDM's potential in this regard remains largely untapped. The school meal is meant to supplement children's diet and make up the deficiency in calories and proteins.

Recent advances in food technology have led to the production of "fortified rice kernels" (FRK) which can be successfully blended with rice in special blending machines to fortify the rice. In order to take the advantage of this new technology for rice fortification, and efficient, functional MDM systems, United Nations World Food Programme (WFP) has supported the DS&ME/GoO by implementing a unique project of fortifying the rice and distributing it to all the MDM beneficiaries receiving hot-cooked meals through the MDM programmes in the District Gajapati, Odisha. The end line evaluation of the project has been concluded and shows significant reduction of 20 percentage points in the anemia prevalence among the school children in the project District; of which 6 percentage points is attributable to the consumption of fortified rice in the mid-day meals .

The Government of India (GoI) and the Government of Odisha (GoO) are committed to improving the nutritional status of their population and are exploring options to improve the nutritional quality of rations provided through their various food-based programmes. Based on the evidence generated by the end line evaluation of the Gajapati pilot project, the Government of Odisha has decided to continue the fortification of MDM rice in Gajapati District.

Goal: Improve the micronutrient status of school children between 6-14 years of age through sustainable rice fortification.

Project location: Gajapati District, Odisha. (Distance from Bhubaneswar to project location point is approximately 360 KMs.)

Beneficiary coverage: The DS&ME/GoO implements the MDM programme. It is expected that about 88700 school children would be covered under the project through the MDM programme. The total requirement of fortified rice to cover this group during the academic year 2017-18 would be 2483.42 MTs and to fortify this

tonnage of rice, 25 MTs of FRK would be required. This includes the processing, handling and transportation losses of FRK.

Selection of the fortified rice kernel (FRK) supplier:

The following is the scope of work for the supplier of Fortified Rice Kernels –

1. Supply 25 MT Fortified rice kernels at the rice mill as shortlisted by Department of School & Mass Education (DSME). The responsibility of transportation of the agreed tonnage of the FRK rests with the FRK supplier. The FRK to be fortified with iron, Folic acid, Vitamin B12 and the iron salt to include ferric pyrophosphate (further details provided under product specifications). **(Letter No.781/SPMU dated 27.05.2017, Letter No.824/SPMU dated 06.06.2017 of State Nodal Officer, SPMU MDM enclosed).**
2. Follow the technical specifications, analytical test protocols and delivery schedule as mentioned in the technical specifications sheet below or as communicated by DSME from time to time. Sample rice which will be consumed in MDM will be shared with the FRK supplier in advance of the production to enable appropriate matching with the base rice.
3. Regularly follow up with DSME office at state & District level regarding quality issues, delivery schedules, storage and shelf life.
4. Ensure that the required consignment of fortified rice kernels is tested for iron, Folic Acid & Vitamin B 12 content by an independent laboratory and that the certificate of analysis of the FRK is shared with both the District administration as well as DSME, GoO before dispatch. Other documents such as certificate of shelf life analysis of FRK, details of the pre-mix supplier for the production of the FRK and others product documents deemed appropriate to also be shared in advance of the dispatch. The dispatch of the FRK to Gajapati to be done only when either the District administration or DSME/GoO convey their satisfaction with the results of the laboratory test.
5. Suggested list of documents to be shared by the FRK supplier include: (i) Details of the pre-mix supplier (ii) Certificate of analysis of the pre-mix used for manufacture of the FRK (iii) Certificate of analysis of the FRK (iv) Details of iron, Folic Acid & Vitamin B-12 coverage's added (v) Certificate of shelf life of the FRK (vi) Various certifications of the FRK manufacturing facility.

Annex I

Technical Specifications for manufacture of fortified rice kernels

1. Introduction

Product Purpose – Fortified Rice Kernel (FRK) is a product for young children of 6-14 years of age enrolled under the Mid Day Meal programme in Gajapati District, Odisha. The FRK would be blended with the local rice in a ratio of 1:100 to provide intended amount of iron, Folic Acid & Vitamin B-12 to the beneficiaries.

Product Type – Fortified Rice Kernel micronutrient delivery system incorporates Iron, Folic Acid & Vitamin B-12 within an extruded rice grain made from rice flour. Such fortified extruded grains should resemble to natural milled rice in size, shape and color as closely as possible.

Standards & Recommendations –

Fortified rice shall comply, in terms of raw materials, composition or manufacture, except when specified otherwise in this contract with the following guidelines or standards:

1. (5) Rice, (1) Food Grains meant for human consumption, Regulation 5.4.6 Food Grains, Part 5.4 Cereal & Cereal Products Food Safety and Standard Regulations (2010)
2. Codex Standard for Rice (CODEX STAN 198-1995)
3. 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”
4. General Principles for addition of essential nutrients to foods: CAC/GL 09-1987 (amended 1989, 1991) of the Codex Alimentarius

2. Raw Materials

Key Ingredients –

2.1 Milled Rice (Broken)

2.2 **Mineral Premix** – The premix must be purchased from an approved supplier and used at the following rate of addition per MT of the finished product –

- 1MT of Fortified Rice Kernels would be blended with 100MT of milled rice to provide **10mg/100g iron (as ferric pyrophosphate) to fulfill 62.5% of iron RDA and Folic Acid & Vitamin B-12 (please refer Letter No 824/SPMU dated 06.06.2017 enclosed)** requirements for children between 7-9 years of age. As mentioned every 100gm of cooked rice should provide 10mg of iron through the addition of the fortified rice kernels. Cognizance needs to be taken of expected losses in iron, Folic Acid & Vitamin B-12 during transportation, storage and cooking, based on which appropriate overages need to be built in to the FRK.

Suppliers of the micronutrient premixes to the FRK supplier should include any from the following: BASF (Stern Vitamin), DSM, Fortieth, Nicholas Piramal Healthcare, Global Calcium, PD Navkar, Shanpar and Hexagon Nutrition or their authorized dealer.

Micronutrient premix must be delivered to the processor of Fortified rice kernels with a complete certificate of analysis as well as proof of purchase of premix. The two documents must be presented with other documents for payment to the District administration.

Micronutrient premix must be stored in a dry, cool & clean place. Storage temperature should not exceed 25 °C.

2.3 Potable/Drinking Water

2.4 Processing Aids

Sodium tri polyphosphate FCC grade
Citric acid anhydrous FCC grade

3. Product Safety & Specifications

3.1 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
- Quality Management System

In this context an appointed DSME Inspector / Quality Surveyor is entitled to visit the factory without prior notice during any period when DSME 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.

3.2 Product Specification

3.2.1 Raw material Specifications

Ingredient	Parameter	Specification	Reference	Frequency
Potable or Drinking Water	As listed in the standard	As listed in the standard	IS 10500:1991	Quarterly
Ferric Pyrophosphate Premix	% Iron (Fe ³⁺)	24% (Min)	Obtain COA from supplier	Each Lot
	Particle Size	3 microns (Max)	Obtain COA from supplier	Each Lot

Product	Parameter	Specification	Reference	Frequency	
Rice Broken	Moisture	12% (Maximum)	ISO 712-2009	Batch-wise	
	Organoleptic (Smell, Color)	Pleasant smell, Typical color (White to Off-White)		Batch-wise	
	Extraneous Matter	Free from inorganic and organic components other than kernels of rice		Batch-wise	
	Pesticide Residues (Max)	Diflubenzuron	0.01mg/kg	Codex Pesticide Residues in Food & Feed, GC 0649 – Rice	Annually
		Fipronil	0.01mg/kg		
		Thiacloprid	0.02mg/kg		
		Paraquat	0.05mg/kg		
		Chlorpyrifos-Methyl	0.1mg/kg		
		Bentazone	0.1mg/kg		
Chlorpyrifos		0.5mg/kg			
Cyhalothrin (Includes lambda-cyhalothrin)		1mg/kg			
Cypermethrins (Including alpha- and	2mg/kg				

		zeta-cypermethrin)			
		Azoxystrobin	5mg/kg		
		Trifloxystrobin	5mg/kg		
		Diquat	10mg/kg		
	Heavy Metals(Max)	Lead	2.5ppm	Food Safety and Standards (Contaminants, Toxins & Residues) Regulations, 2011	Annually
		Copper	30ppm		
		Arsenic	1.1ppm		
		Tin	250ppm		
		Cadmium	1.5ppm		
		Mercury	1ppm		
		Methyl Mercury	0.25ppm		
	Aflatoxin	30mcg (microgram)/kg (Max)		AACC 45-16	Quarterly
	Mesophyllic aerobic bacteria	100,000 cfu per gram (Max)		Microbiological Standard for WFP Rice Soya Blend (Approx 60% Rice Flour) ICC no. 125, AACC 42-11	Quarterly
	Yeasts and Moulds	1000 cfu per gram (Max)		Microbiological Standard for WFP Rice Soya Blend (Approx 60% Rice Flour) ICC no. 146, AACC 42-50	Quarterly

3.2.2 Product specifications

Ingredient	Parameter	Specification	Reference	Frequency
Fortified Rice Kernels	Shape	Manufactured grain should resemble the normal milled rice as closely as possible	Rice supplied by OSCSC Ltd to the District of Gajapati	Each consignment
	Average Grain Length	5mm (Min)	Rice supplied by OSCSC Ltd to the District of Gajapati	Each consignment
	Average Grain Breadth	2.2mm (Min)	Rice supplied by OSCSC Ltd to the District of Gajapati	Each consignment

	Moisture	12% w/w (Max)		Each consignment
	Extraneous Matter	Free from organic and inorganic extraneous matter		Each consignment
	Color	White to Off-white		Each consignment
	Total Iron	14.925mg/gm (Min)	AOAC 944.02 or AACC 40-70.01 (total iron present in ferric form) using Atomic Absorption Spectrophotometry or AOAC 984.27 using ICP Emission.	Each consignment
	Total Folic Acid & Vitamin B-12	please refer Letter No 824/SPMU dated 06.06.2017 enclosed		
	Mesophyllic aerobic bacteria	10,000 cfu per gram (Max)	ICC no. 125, AACC 42-11	Each consignment
	Yeasts and Moulds	100 cfu per gram (Max)	ICC no. 146, AACC 42-50	Each consignment
	Cooking test	Fortified rice kernels should be cooked to check if they are able to withstand the process of washing (1-2 times) & cooking. Further, blended rice should be tested for similar washing & cooking characteristics.		Each consignment

4. Packaging

Outer Packaging Material: Woven HPDE or PP

Outer bag: 80gms

Inner Liner Packaging Material: LDPE

Liner Thickness: 250 gauge

Packaging Size: 20-25kg

5. Marking

Name of the Product
Intended Consumption
Ingredients
Net weight
Detailed address of Manufacturer
Instructions for Use
Storage Conditions
Batch Number/ Lot Number/ Date & Time of Manufacturing/Shelf Life

6. Additional Requirements

1. The **shelf life** and quality of fortified rice kernels should be retained for a min of 12 months from the date of manufacture when stored dry at ambient conditions prevalent in the destination. The shelf life evaluation report to be shared in this context.
2. On a periodic basis, the FRK manufacturer is expected to coordinate with the rice processor for a sample of regular milled rice (1 kg) obtained from district OSCSC Ltd. godown. This would ensure that the fortified rice kernels are manufactured to closely resemble the regular milled rice supplied by OSCSC Ltd.
3. **Delivery Schedule**

Total 25 MTs of FRK – (1st phase July 2017 – 10 MTs and 2nd Phase October 2017 – 15 MTs)

7. List of reference documents to be adhered to, by the FRK manufacturer:

- Annexure II - (5) Rice, (1) Food Grains meant for human consumption, Regulation 5.4.6 Food Grains, Part 5.4 Cereal & Cereal Products Food Safety and Standard Regulations (2010)
- Annexure III – Post Harvest Profile of Paddy/Rice (http://agmarknet.nic.in/rice-paddy-profile_copy.pdf)
- Annexure IV - 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”
- Annexure V - General Principles for addition of essential nutrients to foods: CAC/GL 09-1987 (amended 1989, 1991) of the Codex Alimentarius.
- Annexure VI – Food Safety and Standards (Contaminants, Toxins and Residues) Regulations, 2011

Total 25 MTs of FRK – (1st phase July 2017 – 10 MTs and 2nd Phase October 2017 – 15 MTs)

Annex I

Computation of Cost of Fortified Rice Kernels for fortification of rice under MDM in Gajapati District for the year 2017-18.

Amount in Rupees

<i>Quantity of Fortified Rice Kernels to be supplied: 25 MT</i>			
Summary of Price	Unit	Unit Cost	Total Cost
1. Manufacturing Cost			
Raw Materials			
Utilities			
Labor			
<i>Conversion/Processing</i>			
Packaging			
Analytical Tests			
Miscellaneous			
Total (1)			
2. Transportation Cost			
Total (2)			
Grand Total (1+2)			

NB: The payment will be released from the District Administration / District Education Officer, Gajapati to the firms designated account after receives of the FRK at project point (Sri Sairam Rice Mill, Kashinagar, Gajapati District) within 15 working days.

Signature