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NUTRITION
RESEARCH
INSTITUTE

DEPARTMENT
OF
SCIENCE AND
TECHNOLOGY



Technology on Iron Rice Premix and Iron Fortified Rice



Outline of Presentation:

1. Background
2. Raw Materials: Fortificants and Food vehicle
3. Premix and IFR Technology
4. Equipment
5. Industry Partners



The Philippine Food Fortification Law of 2000

Republic Act 8976

“An Act Establishing the Philippine Food Fortification Program and for other Purposes”

Signed into law on November 7, 2000

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Republic Act 8976 Components

1. Mandatory Fortification by Nov. 7, 2004

**Rice with
iron**

**Flour with
Vitamin A
and Iron**

**Edible Oil with
Vitamin A**

**Sugar with
Vitamin A**





Republic Act 8976 Component

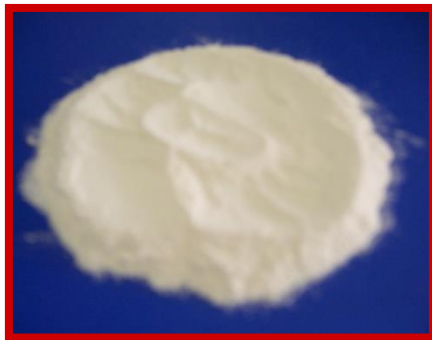
2. Voluntary Fortification - Processed Food thru Sangkap Pinoy Seal





Fortificant & Food Vehicle

Fortificant - a substance, in chemical or natural form, added to specific food vehicle to increase its nutrient value



Ferric pyrophosphate, powder
(8% Fe) FCC

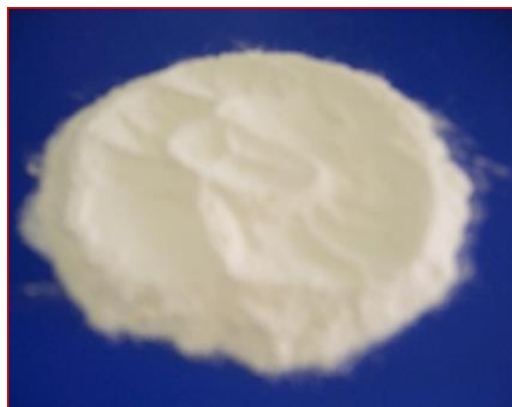


Squash as a source of B-carotene



**Ferric pyrophosphate, powder
(8% Fe) FCC**

- uses super-dispersion technology
- Is readily dispersible in liquid formulations and no precipitation.
- The technology masks any disagreeable iron flavors without affecting the flavor of the final products



**Ferric pyrophosphate, powder
(8% Fe) FCC**

- Is generally recognized as safe (GRAS)
- It is stable against PH, heat, salt and oxidation
- and is mild on the gastrointestinal system,
- provides a non-irritating iron fortification
- Has superior absorption properties



Fortificant & Food Vehicle

Food Vehicle - it is a means to supply the nutrient



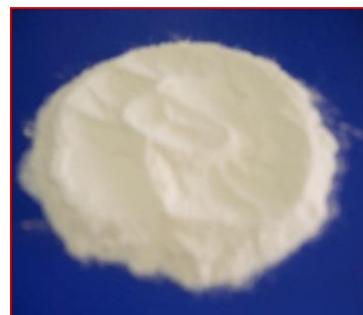


Premix and Fortified Product

Premix - a product formed by combining the food vehicle with a high concentration of fortificant



Ordinary Rice



Ferric pyrophosphate,
powder (8% Fe) FCC



Iron Rice premix



Premix and Fortified Product

Fortified Products - is a product to which a fortificant or nutrient in the form of premix has been added at a certain ratio



1 g iron extruded premix



200g ordinary rice

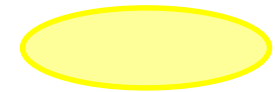


Extruded Iron Fortified Rice



EXTRUSION TECHNOLOGY

-is simply the operation of shaping a dough-like material by forcing it through a die.



- it can be used to cook, form, texturize and shape food products under conditions that favors quality retention, high productivity and low cost
- it's a high temperature short time (HTST) device that can transform a variety of raw ingredients into finish product.



Four Types of rice fortification technology

1. Hot Extrusion -mixture of rice flour, fortificant, binder, water, etc. passes through a screw extruder at high temp. (70-110°) to produce fully and partially pre-cooked simulated rice kernel with similar sheen and transparency as regular rice kernels.



Users:

DSM/Buhler

Superlative Snacks, Inc., Phils.

Nutrition and Beyond Corp., Phils.



Four Types of rice fortification technology

2. Cold Extrusion- low temperature (below 70°) process resulting in grains that are uncooked, opaque, and easier to differentiate from regular rice kernels

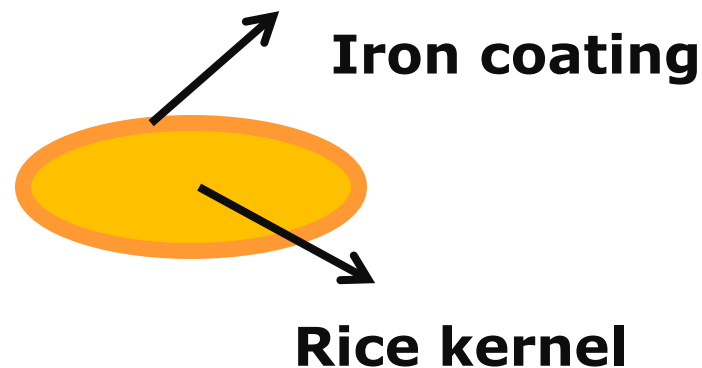


- Simple pasta press
- does not utilize any additional thermal energy input other than the heat generated during the process

Ex: PATH, Vingui in Costa Rica



3. Coating combines the fortificant mix with the ingredients such as gums then sprayed to the rice on the surface of grains kernels in several layers to form the rice-premix.



Users: CLG-Health in Mindanao-
Wright Enrichment rice-NFA

**Used
Ferrous sulfate
fortificant**



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4. Dusting- involves dusting the polished rice grains with powder form of the micronutrient premix. The fortificants stick to the grains surface because of electrostatic forces



Advantages of Extrusion over other Technologies:

- 1. Premix produced from extrusion is more acceptable in appearance, color and sensory acceptability;**
- 2. The premix is stable and nutrient is retain after rinsing and washing;**
- 3. Does not use solvent there fore safe**



Packaging for Iron Rice Premix:

1. Made of opaque PE or PP plastic
2. Store at cold temperature
3. Keep away from UV light





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IRON RICE PREMIX (IRP)



Continuous Rice Processing Line at FNRI Facility



Mixer

Hot Extruder

Blower

Conveyor Dryer



Continuous Rice Processing	2.6M
Quality control equipment	0.2M



Polisher



Parts of a Hot Extruder

1. Control panel
4. Screw



2. Hopper



5. Water inlet



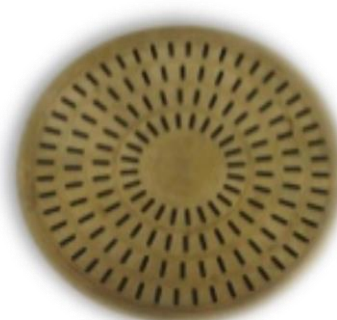
3. Barrel



6. Die







Example die or molder





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IRON FORTIFIED RICE (IFR)



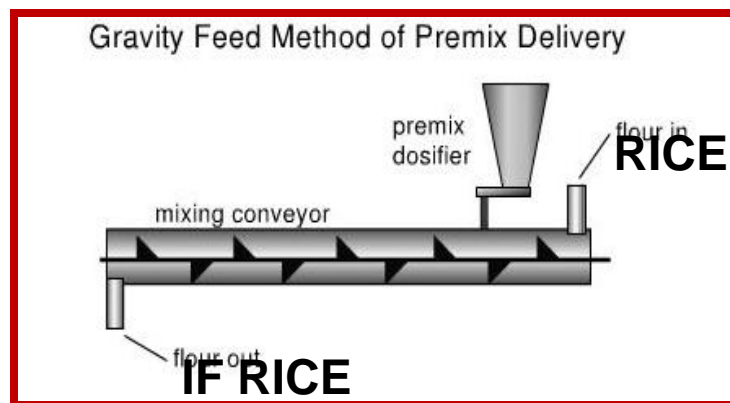
Iron Fortified Rice (IFR) Production



1 G PREMIX



200 G ORDINARY RICE



mixing process



IFR in 50kg bag



Feeder/Dosifier for Continuous Premix Production



Nutrition & Beyond Corporation San Leonardo, Nueva Ecija



Feeder/Dosifier for Continuous Premix Production



**Pilot Plant Facility
FNRI-DOST
Bicutan , Taguig
City**

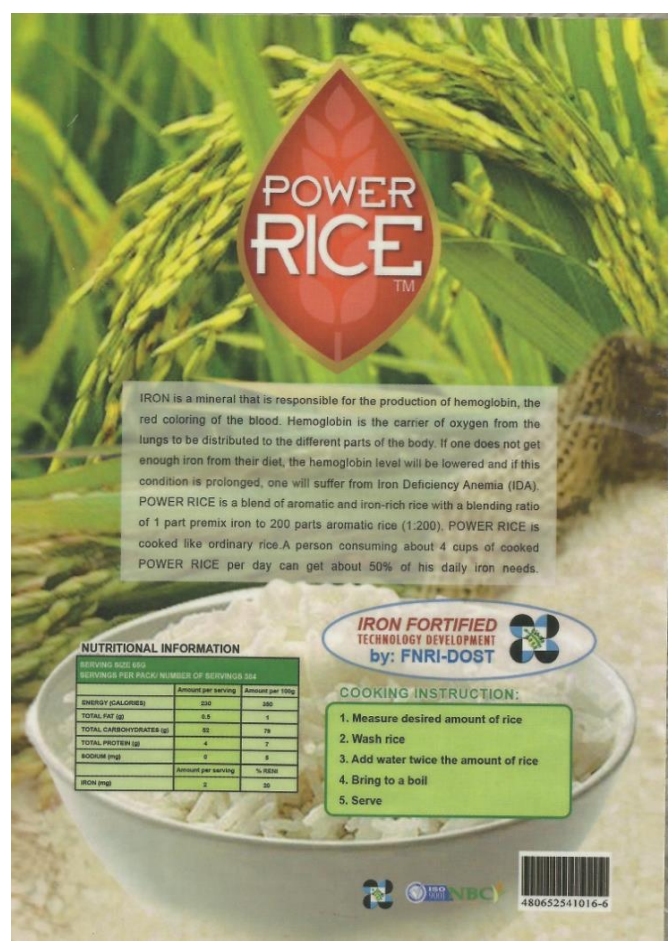
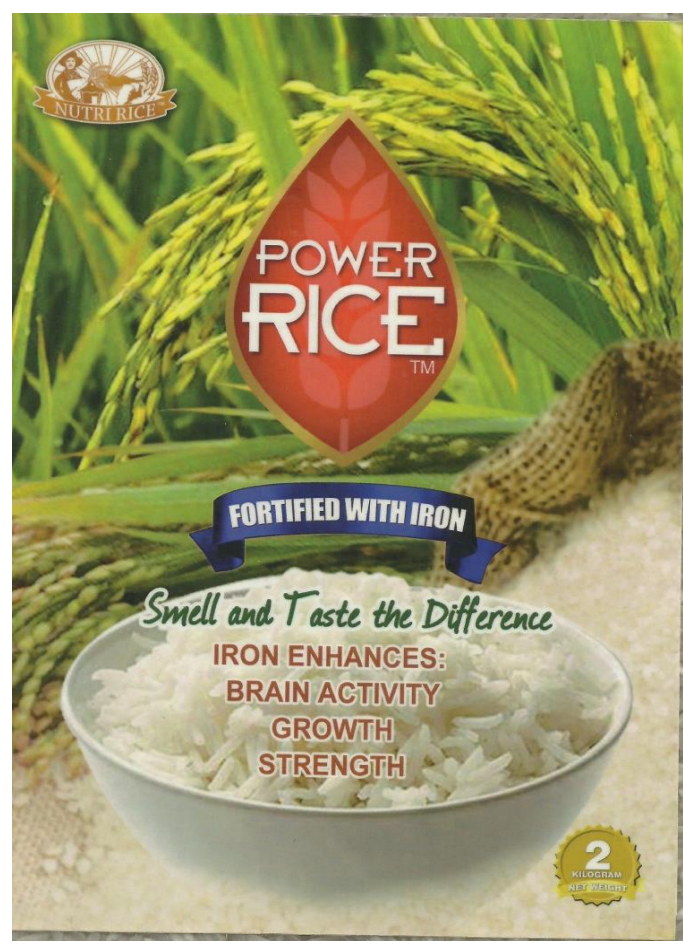


**National Food
Authority FTI
Processing Plant
FTI Complex ,
Taguig City**



Batch-type Premix Production Equipment





Iron Fortified Rice (IFR) – 2 kg

J .D. Aguilar Commercial Center, San Leonardo, Nueva Ecija



Iron Fortified Rice (IFR) – 50kg
J .D. Aguilar Commercial Center, Nueva Ecija



Iron Fortified Rice (IFR) – 500g
J .D. Aguilar Commercial Center
Nueva Ecija



SUPERICE



SUPERICE

SUPERICE

IRON ENRICHED RICE

500g Net Wt.

**San Leonardo
Nueva Ecija**



ISO 9001:2008
CIP/4217/09/02/629



Iron is an essential micronutrient. Consumption of iron rich food is expected to build healthy red blood cells, improve physical and mental performance, prevents anemia and strengthen the body against infection. Low iron absorption decreases ability of a person to fight infection and increase vulnerability to transmissible diseases

HOW TO COOK RICE:

1. Measure rice in cooking pot.
Maglagay ng bigas sa kaldero.
2. Wash the rice 1-2 times.
hugasan ang bigas isa hanggang dalawang beses.
3. Add water (1 $\frac{1}{4}$ cup to 1 cup rice)
1 $\frac{1}{4}$ tasang tubig sa 1 tasang bigas.
4. Cover and bring to boil, then reduce heat and allow to simmer for approximately 15 minutes .
isalang, takpan at hayang kumulo, painitin ang kanin ng 15 minuto sa mahinang apoy
5. Remove from heat and serve.
Alisin sa kalan at maaari ng ihain.

NOTE: The suggested ratio in cooking rice is 1 $\frac{1}{4}$ cup water for every cup of Rice. But moisture in rice may vary Slightly due to time of the year , Requiring adjustment in water-rice ratio

NUTRITION INFORMATION

Serving Size 1 cup (180 g)	Amount per serving
Energy (Calories)	160
Total Fat (g)	0.5
Total Carbohydrate (g)	36
Total Protein (g)	3
Sodium (mg)	0
	% RNI
Iron	15

Based on RNI for male 19 years old and above

Ingredients:

Ordinary rice, iron rice premix [flour, binders, micronized ferric pyrophosphate (as fortificant)] , and water.

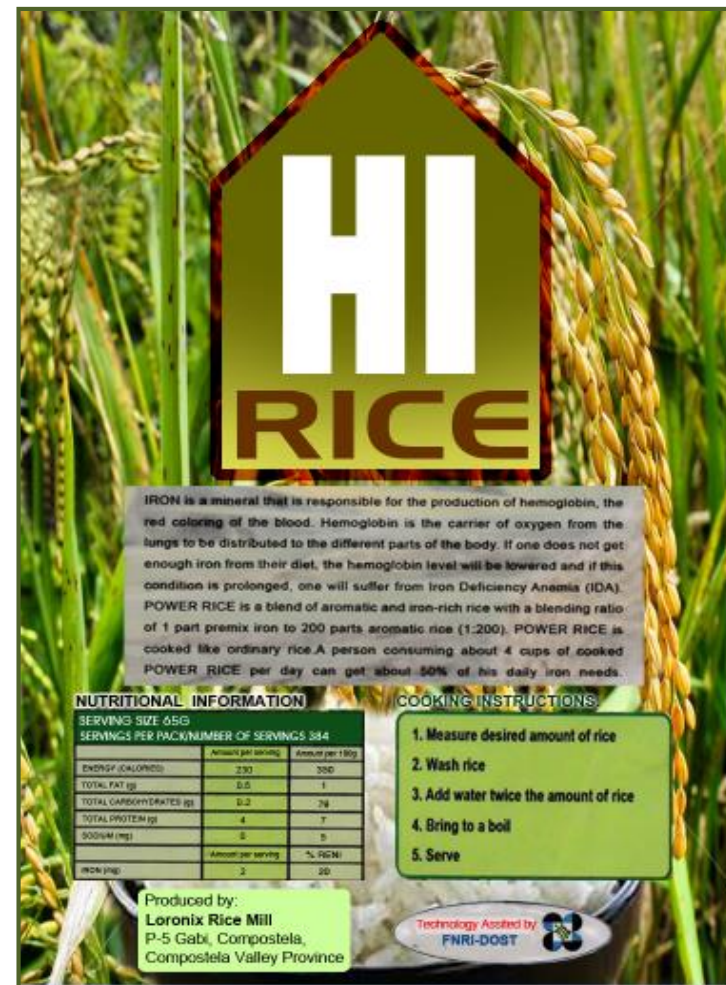
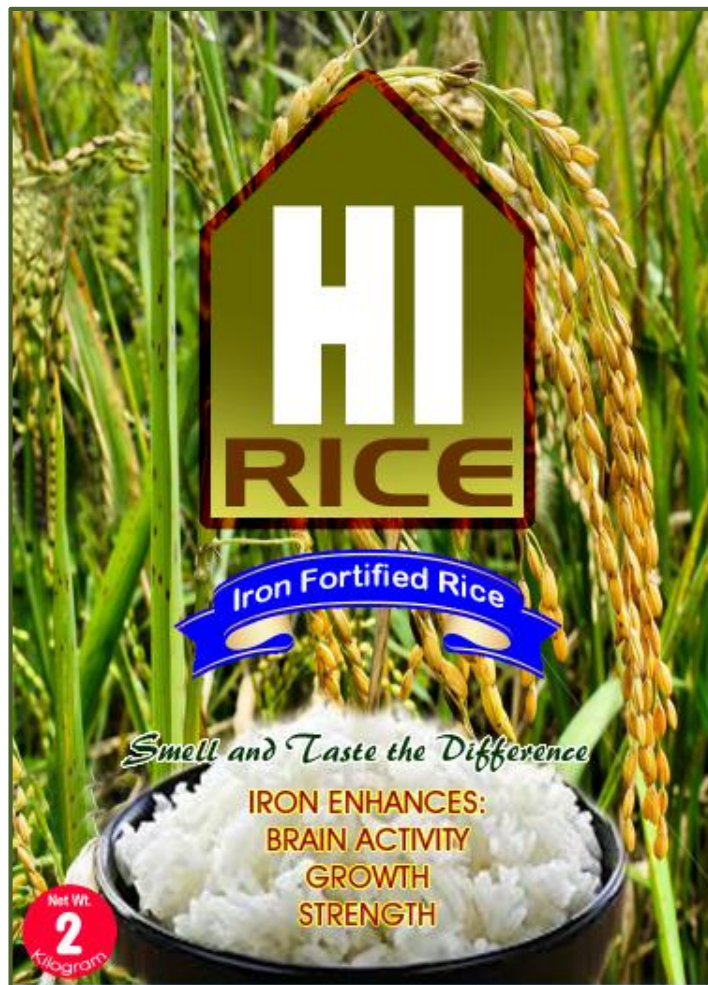
Manufactured by:

Jorge D. Aguilar Commercial Center, San Leonardo, Nueva Ecija

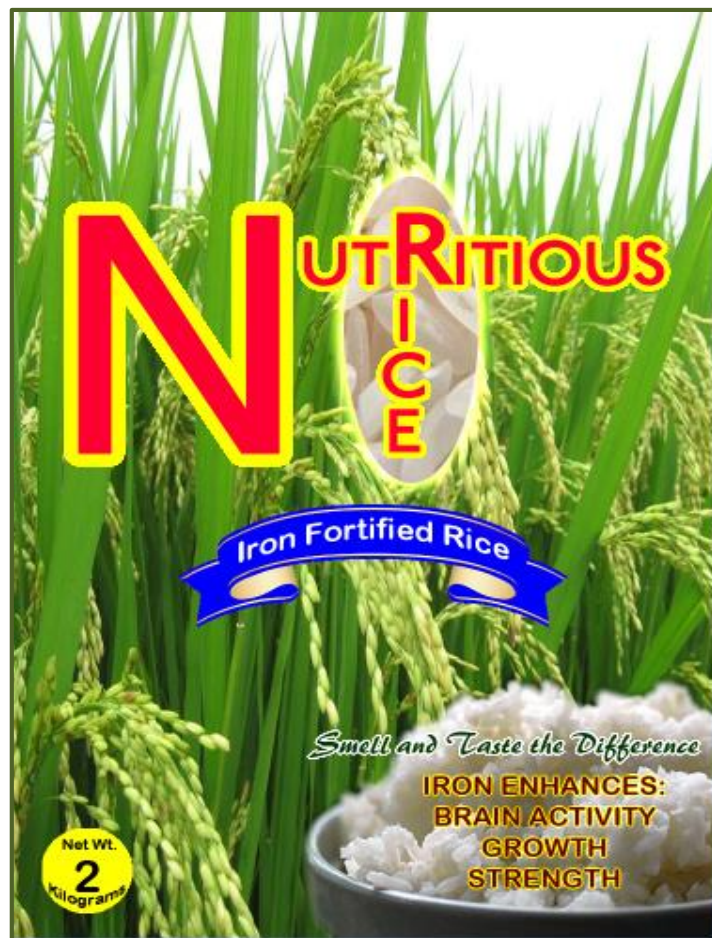
Technology Developed by:

Food and Nutrition Research Institute
Department of Science and Technology

PRODUCT OF THE PHILIPPINES



Iron Fortified Rice (IFR) – 2 kg Loronix Rice Mill, Compostela Valley

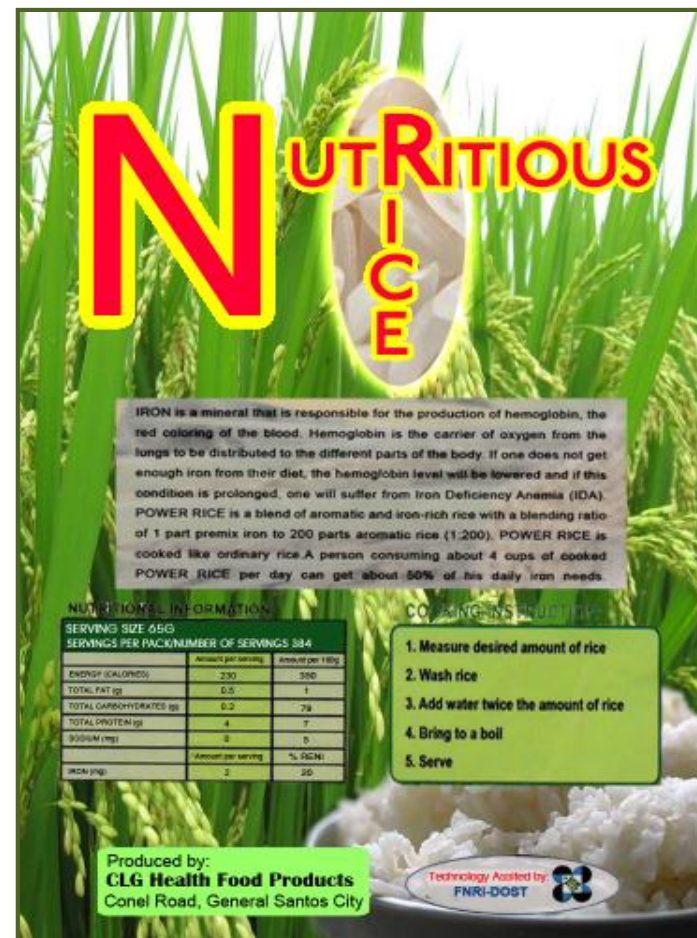
**NUTRITIOUS
ICE**

Iron Fortified Rice

Smell and Taste the Difference

**IRON ENHANCES:
BRAIN ACTIVITY
GROWTH
STRENGTH**

Net Wt.
2
Kilograms



**NUTRITIOUS
ICE**

IRON is a mineral that is responsible for the production of hemoglobin, the red coloring of the blood. Hemoglobin is the carrier of oxygen from the lungs to be distributed to the different parts of the body. If one does not get enough iron from their diet, the hemoglobin level will be lowered and if this condition is prolonged, one will suffer from Iron Deficiency Anemia (IDA). POWER RICE is a blend of aromatic and iron-rich rice with a blending ratio of 1 part premix iron to 200 parts aromatic rice (1:200). POWER RICE is cooked like ordinary rice. A person consuming about 4 cups of cooked POWER RICE per day can get about 50% of his daily iron needs.

NUTRITIONAL INFORMATION

SERVING SIZE 65G
SERVINGS PER PACK/NUMBER OF SERVINGS 314

	Amount per serving	Amount per 100g
ENERGY (CALORIES)	230	350
TOTAL FAT (g)	0.5	1
TOTAL CARBOHYDRATES (g)	0.2	78
TOTAL PROTEIN (g)	4	7
SODIUM (mg)	0	0
	Amount per serving	% DRCNI
IRON (mg)	2	20

COOKING INSTRUCTIONS

1. Measure desired amount of rice
2. Wash rice
3. Add water twice the amount of rice
4. Bring to a boil
5. Serve

Produced by:
CLG Health Food Products
Connel Road, General Santos City

Technology Assisted by:
FNRI-DOST

Iron Fortified Rice (IFR) – 2 kg
CLG Health Food Products, Inc., Connel Road, Gensan City



Industry Partners:

Premix :

1. **Nutrition and Beyond Corporation**
San Leonardo, Nueva Ecija
2. **Superlative Snacks, Inc.**
Paco, Manila
3. **CLG Health Food Products**
Connel Road, General Santos City



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Industry Partners:

Iron Fortified Rice :

- 1. J.D. Aguilar Commercial Center
San Leonardo, Nueva Ecija**
- 2. Lononix Rice Mill
Nabunturan, Compostela Valley**
- 3. CLG Health Food Products, Inc
Connel Road, Gensan City**



Future Industry Partners:

Iron Fortified Rice :

1. **Damasco Rice Mill**
Compostela Valley
2. **BALURIMCO Rice Mill**
Banaybanay, Davao Oriental



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THANK YOU!