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
Republic Act 8976 Components

1. Mandatory Fortification by Nov. 7, 2004

- Rice with iron
- Edible Oil with Vitamin A
- Flour with Vitamin A and Iron
- Sugar with Vitamin A
2. Voluntary Fortification - Processed Food thru Sangkap Pinoy Seal

- Baby foods
- Fruit Juices
- Canned Goods
- Snack foods
- Margarine
- Noodles
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-carototene
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 forticant 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

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

- DSM/Buhler
- Superlative Snacks, Inc., Phils.
- Nutrition and Beyond Corp., Phils.
Four Types of rice fortification technology

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<tr>
<th>2. Cold Extrusion- (below 70º) process resulting in grains that are uncooked, opaque, and easier to differentiate from regular rice kernels</th>
<th>low temperature</th>
<th>-Simple pasta press</th>
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<td>-does not utilize any additional thermal energy input other than the heat generated during the process</td>
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<td>Ex: PATH, Vingui in Costa Rica</td>
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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
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 therefore 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
IRON RICE PREMIX (IRP)
Continuous Rice Processing Line at FNRI Facility

Mixer

Hot Extruder

Blower

Conveyor Dryer

Polisher

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<th>Equipment</th>
<th>Cost (M)</th>
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<td>Continuous Rice Processing</td>
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<td>Quality control equipment</td>
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Parts of a Hot Extruder

1. Control panel
2. Hopper
3. Barrel
4. Screw
5. Water inlet
6. Die
Example die or molder
IRON FORTIFIED RICE (IFR)
Iron Fortified Rice (IFR) Production

1 G PREMIX → 200 G ORDINARY RICE

Gravity Feed Method of Premix Delivery

Mixing process

IF RICE

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
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 ¼ cup to 1 cup rice) 
   *1 ¼ 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 ¼ 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.

**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
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
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
THANK YOU!