

# PREMIX for FORTIFICATION

Quentin Johnson

Smarter Futures – Food Fortification  
Initiative



**Food Fortification Initiative**  
Enhancing Grains for Healthier Lives



**AkzoNobel**



**Helen Keller**  
INTERNATIONAL



Ministerie van Buitenlandse Zaken

# Premix: General Requirements

- Bio-availability of micronutrients
- No change of organoleptic features
- Affordable cost
- Acceptable colour, solubility and particle size
- Commercially available ingredients
- No interaction of active ingredients
- Safety

# Premix considerations

- Definition
- Choice of Fortificant
- Formulation

## Fortificant choice depends upon:

- Identification and Prevalence of Deficiencies
- Consumption pattern of target food
- Single or multiple fortificant
- Bio-availability of micronutrients
- Distribution and storage conditions
- Affordability

# Micronutrients for flour - Minerals

- Minerals – (WHO Recommendations)
  - Iron; Ferrous Sulphate, Ferrous Fumarate, NaFeEDTA, Electrolytic
  - Zinc; Zinc Oxide
- Minerals - Others
  - Calcium; Calcium Carbonate or Calcium Sulphate
  - Magnesium; Magnesium Sulphate
  - Phosphorus; Calcium Phosphate
  - Selenium; Sodium Selenite

# Micronutrients for Flours – Vitamins

- **Vitamins**

- Vitamin A (WHO guideline)
- Folic Acid (WHO guideline)
- Vitamin B1, B2, B3, B5, B6, B12
- Vitamin D
- **NOTE:** Vitamin C should not be used as a fortificant it reacts with cereal proteins and is destroyed

# Wheat Premix: To meet US/Canada regulations

- **Used in North American mills**

<b>Ingredient</b>	<b>Amount per kg Flour</b>
• Thiamine B1	5.2 mg
• Riboflavin B2	3.6 mg
• Niacin B3	42 mg
• Folic Acid	1.5 mg
• Iron, electrolytic	35 mg
• Dosage 160 g per MT flour	

# Premixes and Standards

## North American Example

- Standards in US and Canada set based on Addition and natural levels

• <b>Vitamin</b>	<b>Added</b>	<b>Natural</b>	<b>Total</b>	<b>Standard</b>
• B1	5.2	1.3	6.5	6.3
• B2	4.0	0.4	4.4	4.0
• B3	46	12	58	52
• FA	1.5	0.2	1.7	1.5
• Iron	38	11	49	44



# Process Losses - Cooking

- Standards for processed foods made from fortified maize must reflect processing losses
- Main source of losses for maize are during cooking at the household level
- Premixes should contain overages of minerals and vitamins to compensate for processing variations.

# Frequency of procurement

- Depends upon shelf life of premix, usage rate by millers and flour demand
- Premix delivery lead times are about 3-4 months depending upon origin
- Premix shelf life is usually 9 to 18 months depending upon composition – Kosovo premix is simple and will have 12-15 months shelf life
- Sufficient stocks must be in country at mill level to ensure continuation of fortification

# Procurement of Premix – Who is responsible?

- If there is mandatory fortification and flour prices can be adjusted, then millers are responsible for procurement just as they are for buying wheat.
- Key is long term sustainability – cannot rely on outside sources of funding for premix
- Options in practice today in other countries: Millers, Millers association, MoH.

# Sources of Premix:

- International Suppliers Europe: CSM, DSM, Eurogerm, Fortitech, Muhlenchemie,
- International Suppliers Americas: Corbion, Granotec, Research Products
- International Suppliers Asia: Hexagon, Nicolas Piramal
- GAIN premix facility suppliers [www.gpf.gainhealth.org](http://www.gpf.gainhealth.org)

NOTE: Smarter Futures and FFI provide a list of suppliers only. Millers and stakeholders must follow internationally accepted procurement procedures