

Food fortification

Topic:

“Reviewing premix specifications to add folic acid: The case of Nigeria”.

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Modules

- **Background of fortification in Nigeria (malnutrition and micronutrient deficiencies)**
- **National response**
- **Recent developments (review of premix composition)**

Module 1

- **Background of fortification in Nigeria (malnutrition and micronutrient deficiencies)**

Food fortification

- ◉ Food fortification has been practiced worldwide for nearly 80 years and has proved to be one of the most cost-effective ways of improving the health of a nation. It is also a very efficient way of using public resources to promote health for all.
- ◉ Food fortification is simply the addition of specific micronutrients (vitamins and minerals) to specific foods. The type and amount of micronutrients are determined by the nutritional status, and therefore nutritional needs, of the population while the food/s to be fortified depend on the eating habits of the population. The food/s to be fortified are generally called the "food vehicle". Both the micronutrients added and food vehicles selected must have a sound scientific basis if the population is truly to benefit them.

Enjoying a fortified food



Fortification Background in Nigeria

- ◉ Decades of protracted military rule deepened poverty and created undernourishment among children
- ◉ National Demographic and Health Survey (NDHS) of 2003 revealed that 29% of Nigerian children under five years are underweight
- ◉ In 2006 Nigeria was among the ten countries in the world with the largest number of underweight children, with an estimated 6million children under five years who are underweight
- ◉ Undernourished children offer less resistance to infection and are more likely to die from common childhood ailments like malaria, diarrhea or respiratory infections

Fortification Background in Nigeria

- In Nigeria it is estimated that malnutrition contributes to over 50% of mortality among children under the age of five

Micronutrients

Deficiency diseases do not only occur in poverty stricken communities. Deficiency diseases also occur often as a result of poor choice of food or unhealthy eating habits, often coupled with one's lifestyle.

- ◉ Vitamins and minerals, called micronutrients, play a very important role in our health even though they only make up a very small part of the foods that we eat each day (that is why they are called vital micronutrients).
- ❖ Diets which do not contain adequate amounts of vital micronutrients, often result in deficiency diseases including blindness, mental retardation and reduced resistance to infectious disease, depending on the particular micronutrient.

Micronutrients

- ❖ **Vitamin A:** A crucial micronutrient for the development of children immune and visual system
- **Iron:** Essential for Childs physically and mental development, for physical activity and productivity of all ages.
Iron is also critical for the health of a pregnant mother and her unborn child.
- **Zinc :** Deficiency weakens the immune system
- **Folic acid:** Decreases the risk of neural tube birth defects such as Spina Bifida

Other nutrients sometimes added to flour include vitamin-D, vitamin B12, thiamine, riboflavin, niacin

Micronutrients

- According to the NDHS (2004), 40% of Nigerian pregnant mothers did not take iron tablets, a recommended supplementation during pregnancy.
- A lack of iron (causing anaemia), increases the risk of infant death

Module 2

- ◉ National response

National response

In response to the effects of undernourishment and micronutrient deficiencies, a food policy on food and nutrition was launched by Nigeria in 2002 with the aim of improving the nutritional status of all Nigerians

Food policy

Targets:

- Reduction of severe and moderate malnutrition among children under 5 years by 30%, by 2010
- Reduction of micronutrient deficiencies (principally vitamin-A, Iron and iodine) by 50%, by 2010

Food policy targets achievement strategy (How?):

- Improving health services to provide essential maternal and child health care
- Controlling micronutrient deficiency and anaemia through vitamin and mineral supplementation, food fortification and dietary diversification
- Improving food security through programmes and projects in the agricultural and non-agricultural sectors to increase household income, especially in the poorer segment

Food policy targets achievement strategy (How?):

- Enhancing care-givers capacity by promoting optimal infant feeding practices and reducing the workload of women to create more time for childcare, through the development of labour saving technologies
- Institutionalizing general consumer protection measures to safeguard food quality and consumer health
- Eliminating iodine deficiency disorder through salt iodization programme

Food fortification strategy

- In 2002 the government of Nigeria adopted the fortification of staple foods (wheat semolina, wheat flour, maize flour, sugar, vegetable oil) with vitamin-A
- Standards Organisation of Nigeria (SON) published mandatory standards for vitamin-A fortification in flour, sugar and vegetable oil in 2002
- First of September 2003, all flour mills across Nigeria have commenced the fortification process.
- By 2004, 70% of the sugar, 100% of wheat flour and 55% of vegetable oil sold in the market were fortified with vitamin A
- Nigeria is also fortifying wheat flour with iron

Fortification premix composition for wheat semolina, wheat flour & maize flour

| Fortificant | Minimum acceptable level g/kg |
|---|---|
| Vitamin A palmitate 250 SN/CWS/CWD | 528,000 (132 000 000 IU Vitamin A/kg) |
| Iron Electrolytic | 116.12 |
| Thiamine Mononitrate | 031.55 |
| Riboflavin | 014.80 |
| Nicotinamide | 198.00 |
| Carrier / diluents | 061.53 |
| Addition rate: 250g/Metric Tonne Flour | Note: the premix for fortification of wheat semolina, wheat flour and maize flour shall contain not less than 10% overage of vitamin A. |
| Source: Nigerian Industrial Standard-NIS 475: 2004 | |

Cost of the current premix

● Cost per ton = \$ 6.0

● Cost per bag = \$ 0.3

The eye logo for all fortified foods



Enforcement

Enforcement of quality standards by National Agency for Food Drug Administration and Control (NAFDAC) and Standards Organisation of Nigeria (SON), ensures

- the demand for fortified foods and
- the compliance of producers and importers.

Module 3

- Recent developments (review of premix composition)

Revision of premix composition (recent developments)

- The incorporation of folic acid and Zinc has been an issue over the years in Nigeria due to their importance to health

Revision of premix composition

- NIS 475: 2004 standard was recently revised to improve the nutritional value of wheat semolina and wheat flour
- The revision will provide stakeholders with the necessary information to ensure fortified foods are manufactured to specified Nigerian Industrial Standards in order to control vitamin-A, folic acid and zinc deficiencies in Nigeria

Revision of premix composition

- In reviewing the NIS 475: 2004 standard, references were made to inputs from manufacturers, suppliers, International Vitamin A Consultative Group (IVACG), Micronutrients forum, International Life Sciences Institute (ILSI), Nutrition Society of Nigeria, Vitamin Information Centre, Food Safety Unit programme of Food and Nutrition of World Health Organization (WHO), DSM Nutritional products (ROCHE), Codex Alimentarius Commission, Fortification Basics and South African Bureau of Standards.
- Below is the revised standard awaiting approval by the SON governing council.

Revised standard for fortificant premix

| Fortificant | Minimum acceptable level g/kg |
|--|---|
| Vitamin A palmitate 250 SN/CWS/CWD | 528,000 (132 000 000 IU Vitamin A/kg) |
| Iron Electrolytic | 116.12 |
| Thiamine Mononitrate | 031.55 |
| Riboflavin | 014.80 |
| Nicotinamide | 198.00 |
| Carrier / diluents | 061.53 |
| | |
| Folic acid | 006.0 mg/kg |
| Zinc (zinc oxide) | 080 mg/kg |
| Addition rate: 250g/Metric Tonne Flour | Note: the premix for fortification of wheat semolina, wheat flour and maize flour shall contain not less than 10% overage of vitamin A. |
| Source: Nigerian Industrial Standard- NIS 475: 2010 | |

Cost of the revised premix

⦿ Cost per ton = \$ 6.0 +

⦿ Cost per bag = \$ 0.3 +

Revised standard for fortificant premix

- EDTA (ethylenediaminetetraacetic acid) was considered as a replacement for electrolytic iron in the premix due to its bioavailability however, its effect on the cost of premix (as it is costlier than electrolytic iron), counted against its acceptance.
- In order to encourage compliance, electrolytic iron was maintained in the premix, since it is still the case in so many other countries.

Revised standard

- The revised standard [inclusion of folic acid and zinc] only applies to wheat semolina, wheat flour and maize flour.

Enforcement

- ⦿ **The revised standard has to be approved by the technical committee.**
- ⦿ **It will then be endorsed to the standard council for the final approval and adoption.**
- ⦿ **Implementation by Flour Millers will follow.**

Conclusion

- Rare is the opportunity to implement a sustainable, inexpensive, and effective intervention to prevent major human diseases. Folic Acid Fortification of flour is one of those rare opportunities. The available evidence argues that Governments that do not ensure that flour is fortified with sufficient folic acid are committing public health malpractice.

