Food Fortification Initiative
Enhancing Grains for Healthier Lives

Large-Scale Food Fortification (LSFF) Partner Convening - April 16, 2024
Working session 17: What is the LSFF evidence base?
Global Evidence Base for LSFF: Nutrition Outcomes

Micronutrient deficiencies and strategies to address them

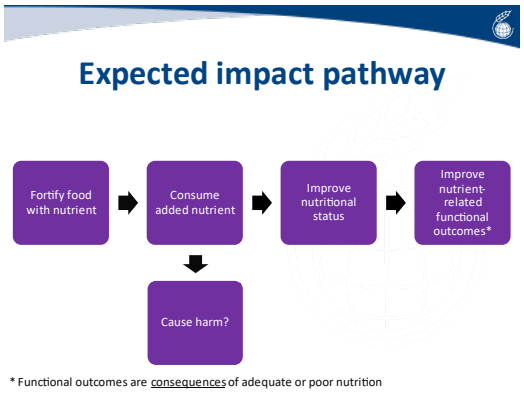
Micronutrients are those vitamins and minerals that our body needs in small quantities to function optimally.[1] At the global level, at least 50% of preschool children and women of reproductive age suffer from one or more micronutrient deficiency.[2] This suggests that micronutrient deficiencies are a public health problem.


Image

Food fortification, also known as enrichment, is the addition of vitamins and minerals to foods during their processing.[3] It is one of the many and complementary strategies that can be used to prevent and control micronutrient deficiencies.

Currently, 143 countries mandate the fortification of maize flour, oil, rice, salt or wheat flour.[4]

Expected impact pathway for LSFF



Why have policy makers mandated fortification in so many countries? Because of the evidence that it improves nutrition according to this expected impact pathway.

If food is fortified with a nutrient, the consumer gets added nutrients in their diet. This leads to improvements in the person and population's nutritional status and nutrient-related functional outcomes, where functional outcomes are the consequences of adequate or poor nutrition. Further, there is no evidence of harm from adding nutrients to the diet.

Evidence from fortifying grains (wheat flour, maize flour, rice) with folic acid (a form of vitamin B9)

- Fortify food with nutrient: Seventy (70) countries include folic acid in their wheat flour, maize flour or rice fortification standards.[5] *Adding folic acid to grains through fortification is a standard practice globally.*
- Consume added nutrient: After introduction of mandatory fortification of wheat flour, maize flour and rice with several nutrients, including folic acid, mean folate intakes increased for women and men.[6] *Fortifying grains with folic acid leads to an increase in the intake of folate.*
- Improve nutritional status: After mandatory grain fortification with folic acid in the USA, Canada, Chile and Costa Rica, serum folate values increased.[7] *Fortifying grains with folic acid improves the folate status of the population.*

- Improve nutrient-related functional outcomes: After mandatory fortification of grains with folic acid, the odds decreased of a woman having a pregnancy affected by a birth defect of the brain and spine (called neural tube defects).[8] After mandating the fortification of several foods with folic acid in Costa Rica, spinal lesions deemed too large to close surgically decreased.[9] *Fortifying grains with folic acid reduces neural tube defects and their severity.*
- Cause no harm: Proceedings of a 2019 expert workshop held at the National Institutes of Health in the United States concluded that "Observations indicating adverse effects from excess folic acid intake, elevated folate status, and unmetabolized folic acid (UMFA) remain inconclusive; the data do not provide the evidence needed to affect public health recommendations."[10] *Fortifying grains with folic acid does not harm the population.*

Health impact of fortifying foods with other nutrients

A meta-analysis[11] summarizing the results of many studies combined concluded:

- Fortification of salt with iodine in low- and middle-income countries reduced the prevalence of iodine deficiency and the prevalence of goiter by approximately 75%.
- Fortification of fish sauce, maize flour, milk, rice, soy sauce and wheat flour with iron in low- and middle-income countries reduced the prevalence of iron deficiency by 58% and anemia prevalence by 34%.
- Fortification of maize flour, oil and sugar with vitamin A increased serum retinol levels by 0.31 mcg/dl, indicating an improvement in vitamin A status in low- and middle-income countries.

Fortification with iodine, iron and vitamin A improves nutritional status and functional outcomes.

Summary

Global evidence indicates that fortification with folic acid improves nutrient intake, nutritional status, and functional outcomes (where functional outcomes are the consequences of adequate or poor nutrition), without causing harm to the population.

Fortification with iodine, iron, and vitamin A improves nutritional status and functional outcomes.

How to cite this document

Food Fortification Initiative. Global evidence base for large-scale food fortification: nutrition outcomes. Food Fortification Initiative: Atlanta, USA. 2024.

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