



Food Fortification Initiative
Enhancing Grains for Healthier Lives

Flour Fortification Overview

Global and Regional Update

Presented by Quentin Johnson

Event: SF,FFI, WHO/EMRO Workshop, Casablanca

Date: 12-15 May 2014



What is Grain Fortification?

- Fortification adds vitamins and minerals during the milling process so that foods made with fortified grain products are more nutritious.

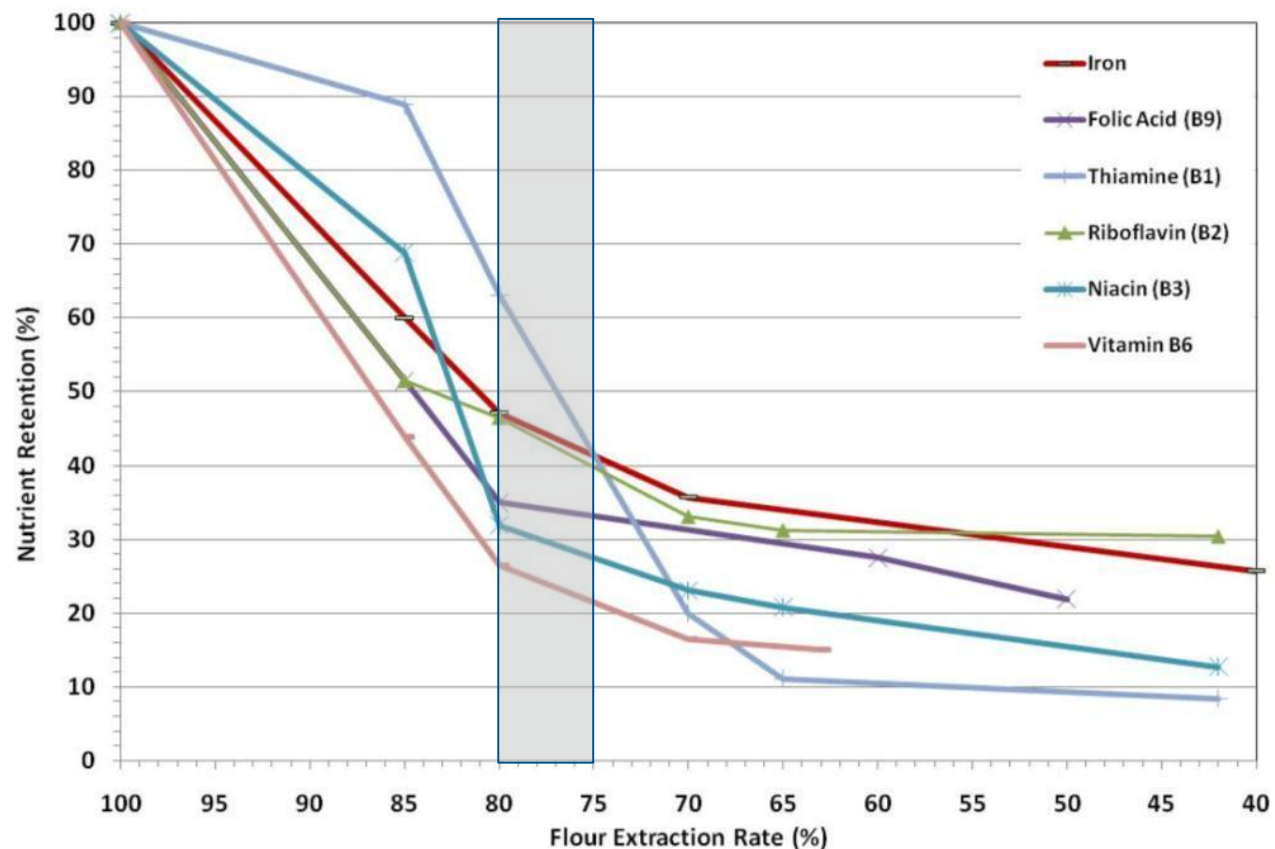


Vitamins and minerals are combined in a powdery premix to add to flour during fortification. Photo from Mühlenchemie.



Nutrients Lost in Flour Milling

Wheat and maize lose nutrients in the milling process, usually at levels indicated in the gray box.



Adapted from "Wheat in Human Nutrition" by W.R. Aykroyd and Joyce Doughty
Food and Agriculture Organization of the United Nations, Rome, 1970.



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Women and children are the people most likely to benefit from nutrients used in flour fortification. Istockphoto.



Vitamin and Mineral Deficiency Contributes to:

- More than one-third of all ***deaths in children*** under the age of 5
- Stunting of an estimated ***195 million children*** under age 5 in developing countries
- Undeveloped ***cognitive capacity***, productivity and earning potential



istockphoto



Iron Deficiency:



- Affects *more people* than any other health condition
- Reduces *work capacity*
- Impairs a child's physical and intellectual *development*
- Contributes to 20% of all *maternal deaths*
- Is a leading cause of anemia which affects *2 billion people* – over 30% of the world's population



Success of Fortifying with Iron

Country	Population studied	Improvement?
China	Women	Yes
Iran	Women and men	Yes
Venezuela	School-age children	Yes
Fiji	Women of child-bearing age	Yes
Azerbaijan	Preschool and school-age children	Yes
Kazakhstan	Preschool and school-age children	Yes
Mongolia	Preschool and school-age children	Yes
Tajikistan	Preschool and school-age children	Yes
South Africa	Women of child-bearing age	No
Uzbekistan	Preschool and school-age children	No



Insufficient Folic Acid

- An estimated **300,000 neural tube defects** (NTDs) occur every year globally.¹
- Most of these birth defects are **preventable** if the mother has enough folic acid at the right time.²



Spina bifida is malformation of the baby's spine. It causes permanent disability.



Anencephaly is malformation of the baby's brain. It is always fatal.

¹ Global Report on Birth Defects, March of [Dimes](#) Birth Defects Foundation, 2006

² U.S. Centers for Disease Control and Prevention: <http://www.cdc.gov/ncbddd/folicacid/faqs.html>

Photos from Google Images



Equivalent of 400 μg of Folic Acid

- 4 slices of beef liver or
- 44½ medium ripe tomatoes or
- 14½ cups of raw broccoli or
- 17½ cups of orange juice or
- 5½ cups of black beans or
- 200 medium red apples or
- 19½ cups of raw green beans





Overall 46% Reduction In Birth Defects

Eight studies from Argentina, Canada, Chile, South Africa, and the United States report:

- **31% to 78% reduced risk** of neural tube defects after fortifying flour with folic acid
- Overall **46% reduction** in neural tube defects after fortifying flour with folic acid





38,417 Birth Defects Prevented



Globally an estimated **38,417** birth defects were prevented in 2012 - an average of **105 a day** – where flour was fortified with folic acid.



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Photo by Karen Codling, FFI staff



Wheat Flour Fortification Progress

	2004 ¹	2007 ¹	2014 ²
Countries with mandates to fortify wheat flour with at least iron or folic acid	33	57	78
Percent of wheat flour fortified in industrialized mills worldwide	18	27	31

The combined population of countries requiring wheat flour fortification is 2.2 billion.

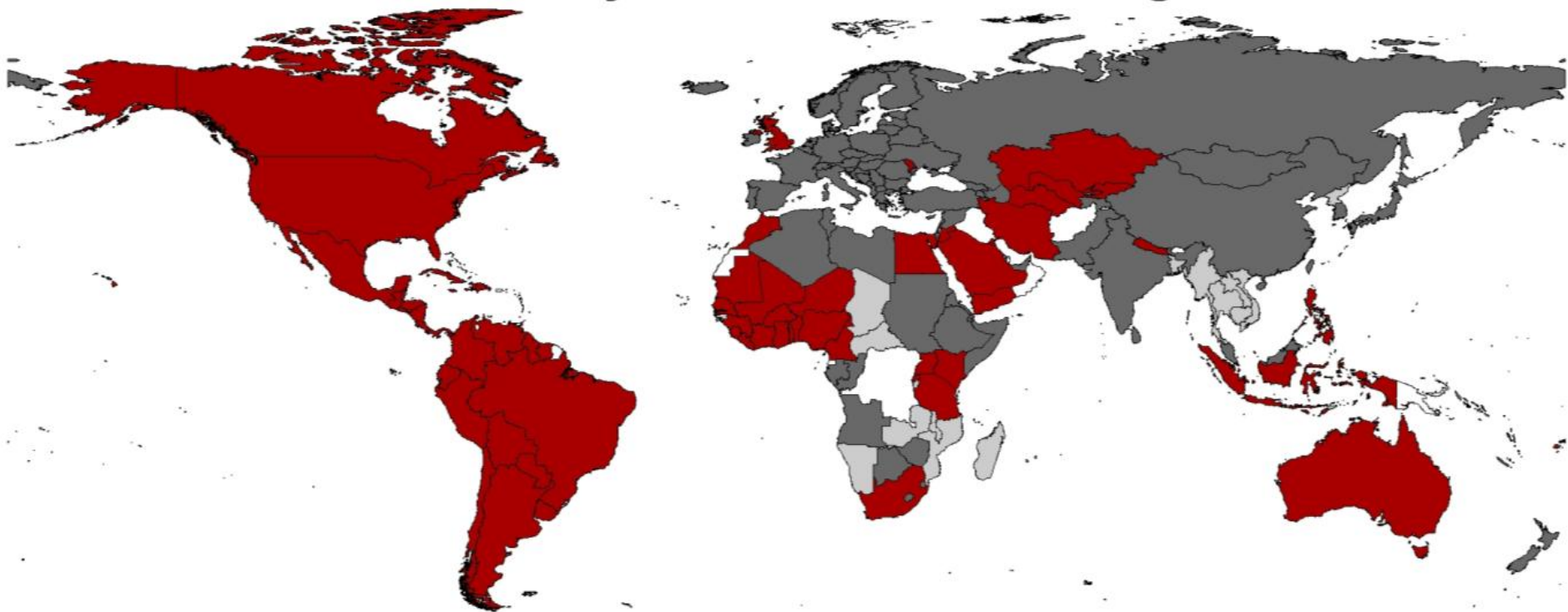






¹ Trends in Wheat Flour Fortification with Folic Acid and Iron – Worldwide, 2004 and 2007, Morbidity and Mortality Weekly Report, US Centers for Disease Control and Prevention, January 11, 2008.

² Flour Fortification Initiative database, April 2014



Wheat Availability and Fortification Legislation

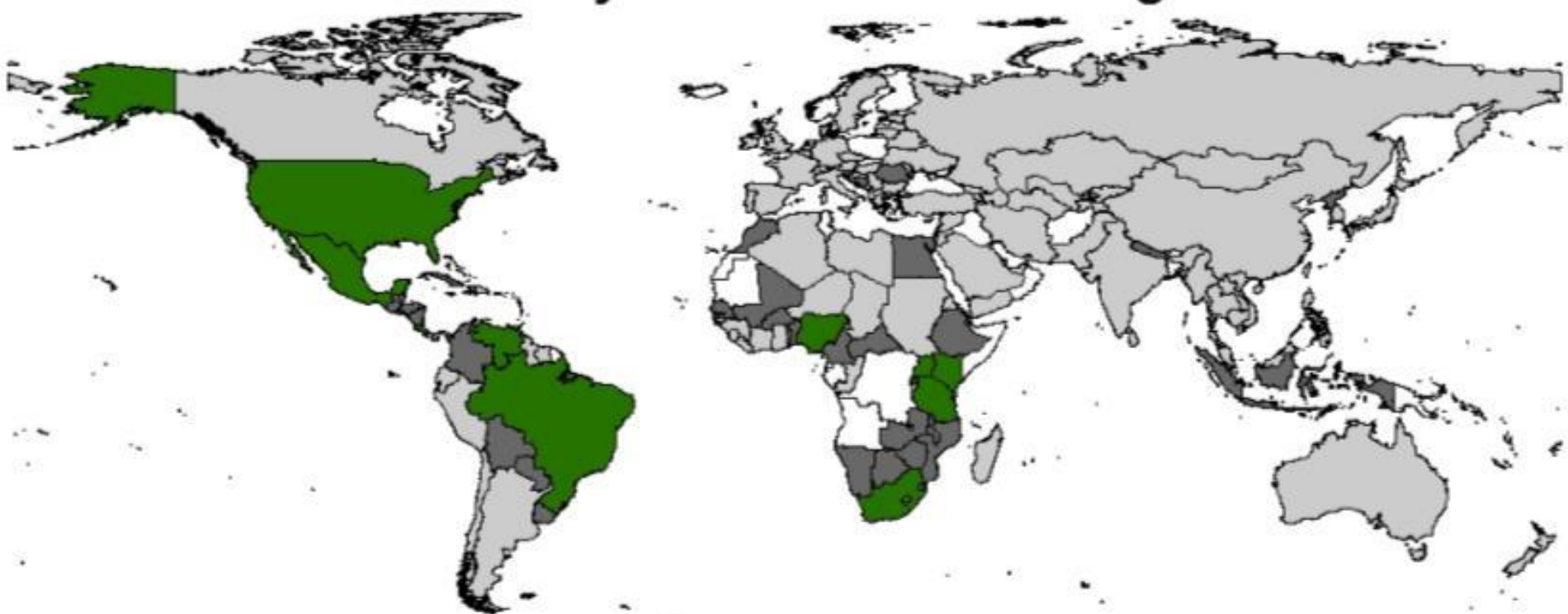






 75 or more grams available per person per day	 Mandatory fortification legislation * 78 countries
 Less than 75 grams available per person per day	 No availability or legislation data

* Legislation has effect of mandating grain fortification with at least iron or folic acid; does not reflect how much grain is available .
Grain availability data from the Food and Agriculture Organization (2009).
Legislation status from the Flour Fortification Initiative (www.FFInetwork.org) April 2014



Maize Availability and Fortification Legislation



 75 or more grams available per person per day	 Mandatory fortification legislation * 12 countries
 Less than 75 grams available per person per day	 No availability or legislation data

* Legislation has effect of mandating grain fortification with at least iron or folic acid; does not reflect how much grain is available .
Grain availability data from the Food and Agriculture Organization (2009).
Legislation status from the Flour Fortification Initiative (www.FFInetwork.org) April 2014



Reasons for Mandatory Legislation



Osmonbek Artykbaev, left, former Parliamentarian in the Kyrgyz Republic, helped the country pass legislation to require flour fortification.

- Equalizes costs for millers
- Sets appropriate standards including:
 - Best iron compound
 - Levels of other vitamins and minerals
- Can be more easily monitored
- Provides more equitable access to foods made with fortified flour



Grain Fortification Challenges

Grains produced globally for human consumption in 2009:¹

439

354

113

Million tons of wheat

Million tons of rice

Million tons of maize

Our Challenges:

- Fortifying more wheat flour
- Developing best practices for rice fortification
- Fortifying maize flour

¹ Food Balance Sheet World Total for 2009, the most recent year with data. Food and Agriculture Organization of the United Nations
<http://faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor>



FFI Team

Facilitating collaboration among partners to advance grain fortification worldwide

Canada

*Training and Technical
Support Coordinator*

Europe

*Senior Advisor in The Netherlands
Europe Associate in Brussels*

US

- *Director*
- *Nutrition Scientist*
- *Communications
Coordinator*
- *Senior Advisor*
- *Micronutrient Specialist*
- *Administrative
Coordinator*

Africa

*Africa
Network
Coordinator*

India

*India
Network
Coordinator
and Senior
Advisor*

Asia

*Coordinators in Bangkok
and Jakarta*





Global Best Practices

To plan a flour fortification program, consider:

- Local culture and cereal consumption
- Nutritional needs
- Industry analysis
- Creation of a multi-sector national fortification alliance
- Legislation
- Monitoring



Brazil photo by David Snyder / CDC Foundation



Middle East



http://www.ffinetwork.org/regional_activity/middle_east.php
Boy with balidi bread photo from the World Food Programme.



Africa



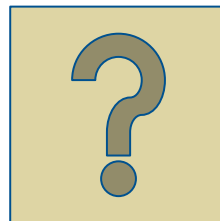
http://www.ffinetwork.org/regional_activity/africa.php
Photo from by Anna Verster, FFI staff.



In Summary

The Problem:

One-third of the world's population suffers from vitamin and mineral deficiencies. In many countries, both lower and higher income populations are affected



– World Bank 2006

Part of the Solution:

Within countries, FFI stimulates interaction among partners so that together we can achieve results that none of us could achieve independently.

www.FFInetwork.org



Global Consensus



INTERNATIONAL
FEDERATION
for
SPINA BIFIDA
and
HYDROCEPHALUS



gain
Global Alliance for
Improved Nutrition



Helen Keller
INTERNATIONAL



World Health
Organization



Micronutrient
Initiative

Recommendations on Wheat and Maize Flour Fortification Meeting Report: Interim Consensus Statement

PURPOSE

This statement is based on scientific reviews prepared for a Flour Fortification Initiative (FFI) technical workshop held in Stone Mountain, GA, USA in 2008 where various organizations actively engaged in the prevention and control of vitamin and mineral deficiencies and various other relevant stakeholders met and discussed specific practical recommendations to guide flour fortification efforts being implemented in various countries by the public, private and civic

THE FFI SECOND TECHNICAL WORKSHOP ON WHEAT FLOUR FORTIFICATION

Nearly 100 leading nutrition, pharmaceutical and cereal scientists and milling experts from the public and private sectors from around the world met on March 30 to April 3, 2008 in Stone Mountain, GA, USA to provide advice for countries considering national wheat and/or maize flour fortification. This Second Technical Workshop on Wheat Flour Fortification: Practical Recommendations for Milling and Distribution was followed up by a FFI-USA/UK Consensus for Progress



For More Information

www.FFInetwork.org

www.Facebook.com/FFInetwork

<https://twitter.com/FFINetwork>

Join the Food Fortification Initiative group on [Linked In](#)

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