

Folic Acid:

A pinch a day keeps the birth defects away

by Becky Tsang and Michelle Duong, members of the Global Fortification Data Exchange (GFDx) Secretariat

The GFDx Secretariat is comprised of representatives from the Food Fortification Initiative (FFI), Global Alliance for Improved Nutrition (GAIN), and Iodine Global Network (IGN).

Faith Musyimi lives in Kenya. In 2011, Faith Musyimi was pregnant with a little girl who she named Kyla. But after birth Kyla was diagnosed with spina bifida, a type of neural tube defect, due to the incomplete closure of the spinal cord during early fetal development.

As a result of the spina bifida, Kyla was also born with hydrocephalus, or excessive fluid in the brain.

Kyla is now eight years old. Although spina bifida cannot be cured and Kyla has required many procedures for the hydrocephalus and other health issues related due to the spina bifida, Kyla is lucky – more severe types of neural tube defects result in death shortly after birth.

Prevention

Unknown to Faith at the time, consuming supplements with folic acid, the synthetic form of folate, can prevent up to 70 percent of neural tube defects¹. Folate is an essential B-vitamin that plays a key role in cell reproduction.

But because neural tube defects form in the first four weeks of pregnancy, before many women even know they are pregnant, even if Faith had started taking supplements after she had found out she was pregnant, it would have been too late.

The sensitive timing of folic acid delivery in the fetal

development stage, combined with the common occurrence of unplanned pregnancies, is why in 1996, countries around the world began amending fortification requirements for wheat flour to include folic acid.

Oman was the first, followed closely behind by the United States and Canada.

Kenya introduced legislation mandating the fortification of both wheat flour and maize flour in 2012.

As of January 2021, 76 countries have either revised regulations to include folic acid or passed new fortification legislation that requires folic acid². Eighty-nine percent of countries with mandatory fortification of wheat flour, maize flour, and/or rice include folic acid in their standards.

Public Health achievement

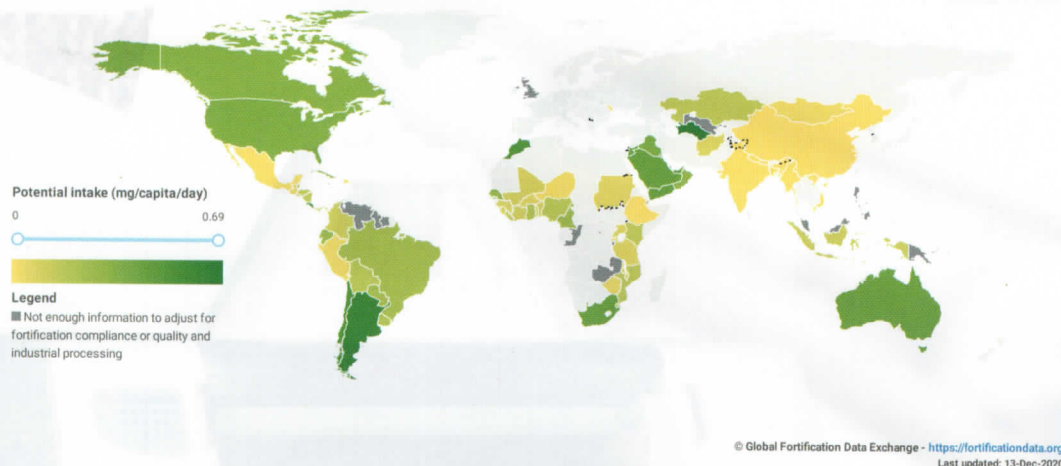
Fortifying flour with folic acid is considered one of the greatest public health achievements of the 20th century³. In Australia, which passed mandatory fortification of bread flour with folic acid in 2009, and where there are 36 fewer cases of neural tube defects per year⁴ (of an estimated 150 per year)⁵, with the greatest impact in Aboriginal and teenage pregnancies⁶. Countries that have evaluated the impact of folic acid fortification on the prevalence of neural tube defect rates before and after fortification have similarly found significant, consistent declines in neural tube defects after fortification, proving that folic acid fortification works⁸.

Availability of Folic Acid in a Country's Fortification Standard

76 countries include folic acid in their maize flour, wheat flour, and/or rice fortification standard



GFDx Analysis: Potential folate (B9) intake from fortification (in mg/day, Recommended Intake, and UL) after taking into account the percent of the maize flour, rice and wheat flour that is industrially processed and that meets fortification standards



Globally, fortification of flours with folic acid is estimated to have prevented 65,380 cases of neural tube defects in 2019 alone⁷.

In 1996, Dr Godfrey Oakley was part of the team leading the Centres for Disease Control and Prevention (CDC) in the United States to make the recommendation to add folic acid to the national wheat flour standards. Dr Godfrey, now the director of the Center for Spina Bifida Prevention at Emory University, credits fortification with the prevention of “almost all cases of folic acid preventable spina bifida and anencephaly in the United States and savings of US\$10 billion in health care costs alone since 1998.

“In addition, fortification with folic acid in the US has eliminated folate deficiency⁸ and folate deficiency anemia⁹, and it may well have prevented some first ischemic strokes.¹⁰”

The basics of fortifying with folic acid

Unlike other nutrients (such as iron), only one compound for folate is used in fortification: folic acid, which is a synthetic form of folate.

Folic acid is a naturally yellow compound. Despite its colour, there are no noticeable effects on the appearance or taste of fortified flour itself or in food prepared with the flour because it is added in low amounts.

According to the Global Fortification Data Exchange, an open-source database of national fortification programs, fortification requirements for the addition of folic acid ranges in national standards from 0.4 to 5.12ppm.

In comparison, iron, another nutrient commonly specified in fortification requirements, is a nutrient that is needed by the body in higher amounts. As a result, addition levels are also higher, ranging from 10 to 120ppm.

No country requires the fortification of folic acid alone; all countries with folic acid in food standards also require the fortification of other nutrients, such as iron, zinc, and other B vitamins (B12, thiamin, niacin, riboflavin).

Because of this, as well as the low addition levels, folic acid is typically added to flours through a premix.

In practice, folic acid is primarily added through fortification to cereal grains such as maize flour, rice, and wheat flour. The addition rate of the premix is usually driven by the dosing requirements of the other nutrients, rather than folic acid.

Opportunities for the addition of folic acid to food standards for cereal grains: the role of millers and food industry

At this time, 24 countries do not make folic acid mandatory through existing food standards for maize flour, rice, or wheat flour.

The Global Fortification Data Exchange considers these countries an important, immediate opportunity for the prevention of neural tube defects. Globally, 111 countries do not have mandatory fortification of any cereal grain or do not folic acid in any food standards. Only an estimated 23 percent of preventable neural tube defects are prevented through existing mandatory fortification with folic acid food standards.¹¹

Millers' key role

Millers and the food industry have a key role in championing fortification, understanding that fortification is an opportunity for their foods to provide essential vitamins and minerals.

In Nigeria, the Nigerian Food Processing and Nutrition Leadership Forum gathered CEOs from leading food processing companies to join government and development leaders in announcing a commitment to ensure that foods are adequately fortified.¹²

In the Philippines, the food industry associations such as the Philippine Association of Flour Millers and Philcongrains are active and participating members of the national Technical Working Group on Food Fortification.

In Indonesia, the co-chair of the Scaling Up Nutrition Business Network Advisory group is Axton Salim, Director of Indofood. Mr Salim has called fortification one of the five key areas in which the private sector can contribute to improved nutrition.¹³ As of January 2021, 62 countries have joined the Scaling Up Nutrition movement.¹⁴

Though 62 countries require the addition of folic acid in food standards, fortification may not be equally implemented in countries where there is small-scale production of foods is practiced (for example, at-home or village milling) or food producers do not follow food standards, even when mandatory.

According to the Global Fortification Data Exchange, after considering the proportion of food that is industrially milled in a country, as well as available regulatory monitoring data, only 0-100% of the expected folic acid intake is likely to actually reaching consumers.¹⁵

Robust regulatory monitoring of food producers is essential to ensure fair competition – so that some food producers are not paying for fortification premix while others are not – and so that

fortified foods actually contain the right amounts of vitamins and minerals to prevent birth defects and nutritional deficiencies.

Understanding the key role

For Scott Montgomery, a former Vice President at Cargill who began his career at a flour mill and is now the Executive Director of the Food Fortification Initiative, it's important for millers to understand what a key role they play in preventing birth defects like neural tube defects.

"[Millers] are the ones who actually implement fortification programs, by ordering premix and implementing quality control and assurance practices to ensure that fortified foods meeting standards are being produced.

"But millers and the food industry are also one of the most valuable advocates we have in food fortification. They don't just feed consumers – they can also save lives."

Fortification programs are always looking to engage with food industry partners. For ideas on how you can become involved in your country's food fortification program, please contact info@fortificationdata.org.

The Data Exchange

Folic acid is only one nutrient added in fortification programs; diets are rarely deficient in only one nutrient. The presence of folic acid (and other nutrients) in food standards can be found in the Global Fortification Data Exchange, an open-source database of fortification program data.

The Global Fortification Data Exchange is made possible through a partnership between Food Fortification Initiative, Global Alliance for Improved Nutrition, the Iodine Global Network, and the Micronutrient Forum, with support from the Bill and Melinda Gates Foundation.

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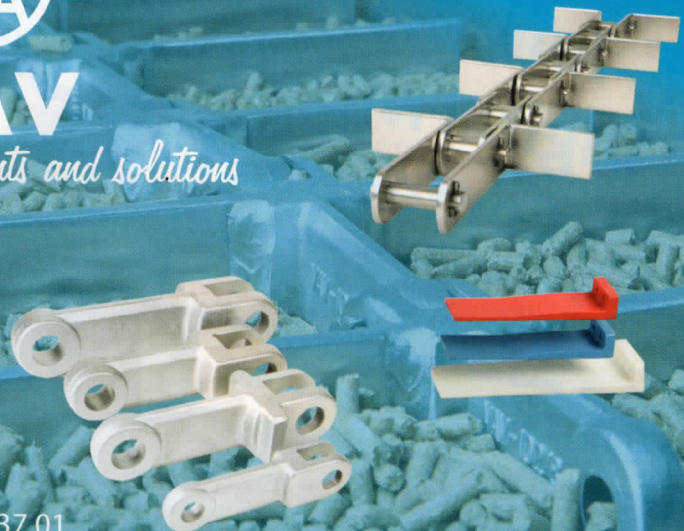
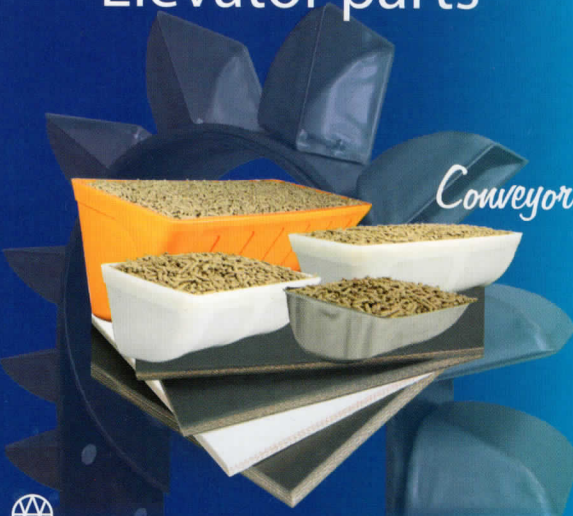
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