



The grain of truth:

industry compliance on flour
fortification in Mexico





This report has been written and researched by the Changing Markets Foundation in collaboration with independent researchers.

The purpose of the report is to shed light on industry-specific issues related to fortification of flour products in Mexico. The information in this document has been obtained from sources believed reliable and in good faith. The authors accept no liability whatsoever for any direct or consequential loss arising from the use of this document or its contents.

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Executive summary



Poor-quality diets are linked to the rise of not only overweightness and obesity but also micronutrient deficiencies – a lack of vitamins and minerals essential for health. In Mexico, micronutrient deficiencies are an important public health concern. Many adults and teenagers do not get enough iron, zinc, calcium or magnesium in their diet. A shocking nine out of ten women are not getting enough iron.¹ One in four children suffer from anaemia, and at least half of these cases are attributable to iron deficiency. The severity of this problem cannot be overstated – evidence shows that if nutritional anaemia is not detected and resolved before a child reaches two years old, the damage to healthy physical and mental development becomes irreversible.

Mexican law obliges flour companies to fortify wheat and maize flours with iron, zinc, folic acid and other B vitamins. The current standards for this fortification have been in place for nearly a decade. Food fortification is an important and effective tool in the fight against micronutrient deficiencies – but only when it is implemented properly. Building on previous reports, which highlighted significant gaps in the monitoring and enforcement of flour fortification in Mexico, this report reveals the results of the first independent testing of 61 different wheat and maize-flour products, the majority of which were purchased in the states of Mexico City and Chiapas at the end of 2018.

Our investigation revealed that only 7% (4 out of 61) of packaged maize and wheat-flour products are fortified adequately. This represents a huge failure on the part of the majority of companies to fortify correctly. The four adequately fortified products are all wheat flours; three are from the brands Selecta, Sol de Oro and Rio Lerma, and one is from supermarket La Comer's own brand, Golden Hills. The situation regarding maize flours is particularly bad; here, no companies are fortifying adequately. Companies either use the wrong type of iron or do not do enough to ensure levels of iron and zinc consistently meet the requirements. As maize represents 72% of the market share for grain consumed in Mexico, maize-flour companies' irresponsibility is unacceptable, and should be addressed as a priority. This report reveals that even essential maize-flour products from Diconsa and from Sistema Nacional para el Desarrollo Integral de la Familia (DIF) Chiapas, government programmes intended to provide nutritious foods to the most vulnerable families, are not adequately fortified. These products are not only breaking the law but also completely failing to ensure vulnerable families increase their consumption of nutritious foods.

The food industry has an obligation to follow the law and a moral responsibility for tackling nutritional challenges. However, the flour industry in Mexico is failing on both counts. This is not just a theoretical problem; the personal stories presented in this report show the realities of living with hidden hunger, the consequences of which are significantly exacerbated by the industry's dereliction of its duties.

This report presents a clear opportunity for the new government in Mexico to take a fresh look at the actions of the food industry and establish programmes that guarantee adequate and nutritious foods for all. The new administration should immediately take corrective measures to address the failings of the flour industry and uphold the laws that were established to guarantee that Mexican people get essential nutrients and vitamins through their staple foods.

1. Introduction

The Food and Agricultural Organisation recently reported that one in five deaths globally are associated with poor diets, meaning our diets are now deadlier than diseases like malaria, tuberculosis and measles.² The report also warned the ratio is likely to get rapidly worse in the near future. Poor-quality diets are linked to the rise of not only overweightness and obesity but also micronutrient deficiencies – a lack of vitamins and minerals essential for health. This so-called ‘hidden hunger’ can have serious consequences for people's health, growth, learning and productivity.³

Micronutrient deficiencies are a significant problem in Mexico. A 2012 national health survey, which gathered data on the nutritional status of the Mexican population, found low intakes of minerals including iron, zinc, calcium and magnesium, especially in adults and teenagers, while children aged five to 12 are highly deficient in iron and calcium and moderately deficient in vitamin A and folic acid. ⁴ A shocking 9 out of 10 women of reproductive age are not getting enough iron in their diet,⁵ and 1 in 4 children and 1 in 5 pregnant women suffer from anaemia, with at least half of these cases attributable to iron deficiency.⁶ Preliminary results from the 2018 National Health and Nutrition Survey (ENSANUT) show that anaemia rates in women of reproductive age are now nearly 30%⁷ – a worrying increase from the 2012 and 2016 surveys. Although the 2018 results are preliminary, the trends observed position anaemia as a hidden problem in the Mexican population.⁸

Anaemia has consequences for all stages of life. In children, it can cause delayed physical and mental growth. For adults, it can cause depression, fatigue, loss of productivity and disability.⁹ It also doubles the chance of death for pregnant women.¹⁰ The severity of this problem cannot be overstated; evidence shows that, if anaemia caused by micronutrient deficiency is not detected and resolved before a child reaches two years old, the damage to healthy physical and mental development becomes irreversible.¹¹

The best solution to this is to guarantee the right to food and nutrition, ensuring that all people have access to healthy and sustainable diets based on natural, traditional and nutritious foods. At the same time, food fortification is a complementary and effective tool in the fight against micronutrient deficiencies. For this reason, the legislation in Mexico obliges flour companies to fortify wheat and maize flours with iron, zinc, folic acid and other B vitamins.

However, our previous research highlighted significant gaps in the monitoring and enforcement of this legislation and raised questions about how the law is being implemented.¹² A lack of comprehensive data

from the Federal Commission for the Protection against Sanitary Risk (COFEPRIS) during the previous administration suggests the government has been insufficiently monitoring industry’s fortification of flours. Further investigation of the labels of popular brands of flour in Mexico revealed that two-thirds of maize-flour companies are using a less bioavailable type of iron to fortify their products, which the legislation does not recommend and which jeopardises the effectiveness of the fortification programme.

The food industry has an obligation to follow the law and a moral responsibility for tackling nutritional challenges across population groups. This report reveals that the industry is failing on both counts: it is failing to comply with the legislation and therefore failing the most vulnerable people in the Mexican population. In this report, we reveal the results of the first independent testing of 343 samples from 61 different packaged products and 11 bulk-flour products, the majority of which were purchased in two different states: Mexico City and Chiapas. The results are summarised in rankings of different flour products, flour companies and retailers based on their compliance with the legislation and World Health Organization (WHO) guidelines. Our research also reveals the human side of hidden hunger: Mexican people are struggling with anaemia and micronutrient deficiencies, exacerbated by the industry’s dereliction of its duties.

What does the law say?

In 2010, the Mexican government published regulation NOM-247-SSA1-2008, which provides mandatory nutritional standards for fortifying both wheat and maize flours with iron, zinc, folic acid, niacin, thiamine and riboflavin.¹³ The measure intended to restore up to 60% of the micronutrients lost in the industrial processing of refined flour, as well as to supplement the micronutrients that are most lacking in the Mexican diet.¹⁴

The standard also sets out the labelling requirements for packaged wheat and nixtamalized maize flour. These products must carry a standard fortification statement,^a indicate their content of iron, zinc, folic acid and B vitamins in mg/100g of product, and include the source of iron and zinc used in their list of ingredients.

The Mexican legislation does not obligate the use of specific iron compounds in the fortification process, but it does make recommendations, based on scientific evidence, of the best iron sources to use. The law recommends ferrous sulphate or ferrous fumarate for the fortification of wheat and maize flours.¹⁵ Additionally, recent WHO guidelines clearly state that electrolytic iron is not effective in the fortification of nixtamalized maize flours, and lists NaFeEDTA as the recommended iron compound for the fortification of wholegrain wheat flour.^{16,17}

a In Spanish: "Harina de trigo adicionada con ácido fólico o folacina o folato (vitamina Bc o vitamina B9)*, zinc y hierro, restituida con Vitamina B1 (mononitrato de tiamina)*, Vitamina B2 (riboflavina)* y Vitamina B3 (niacina)*" or "(i) Harina de maíz nixtamalizado adicionada con ácido fólico o folacina o folato (vitamina Bc o vitamina B9)*, hierro y zinc y restituida con Vitamina B1 (mononitrato de tiamina), Vitamina B2 (riboflavina)*, Vitamina B3 (niacina)*."

KEY FACTS - FLOUR FORTIFICATION IN MEXICO

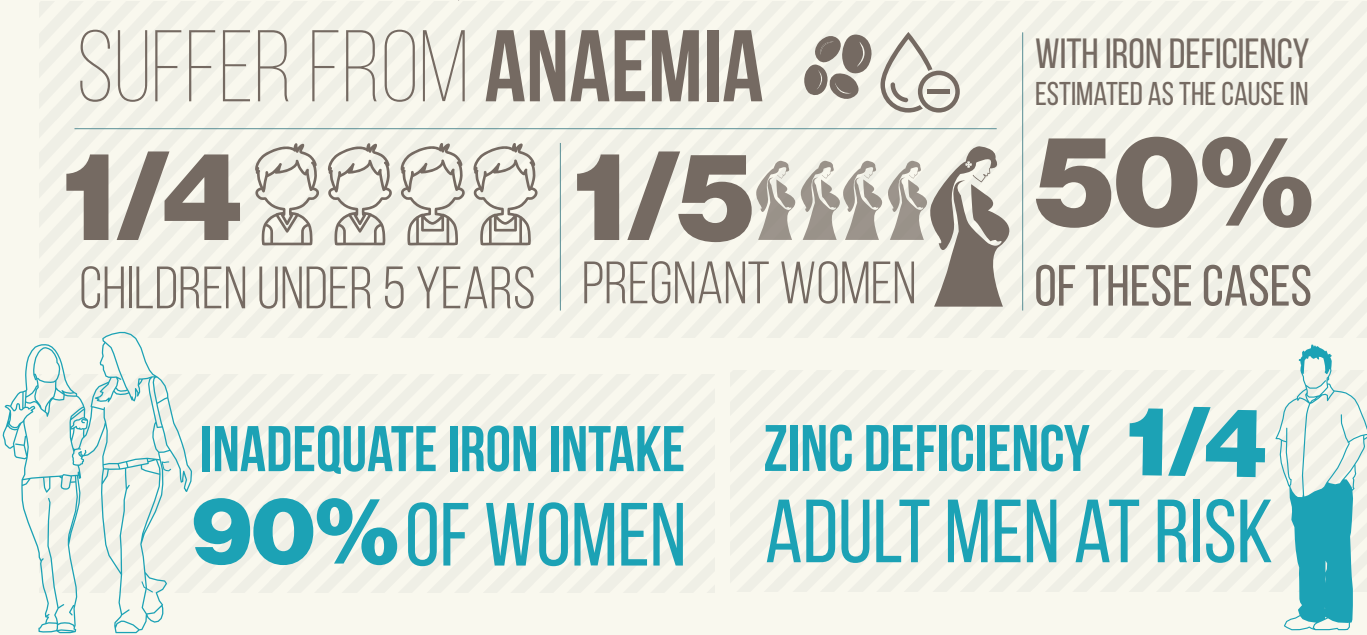
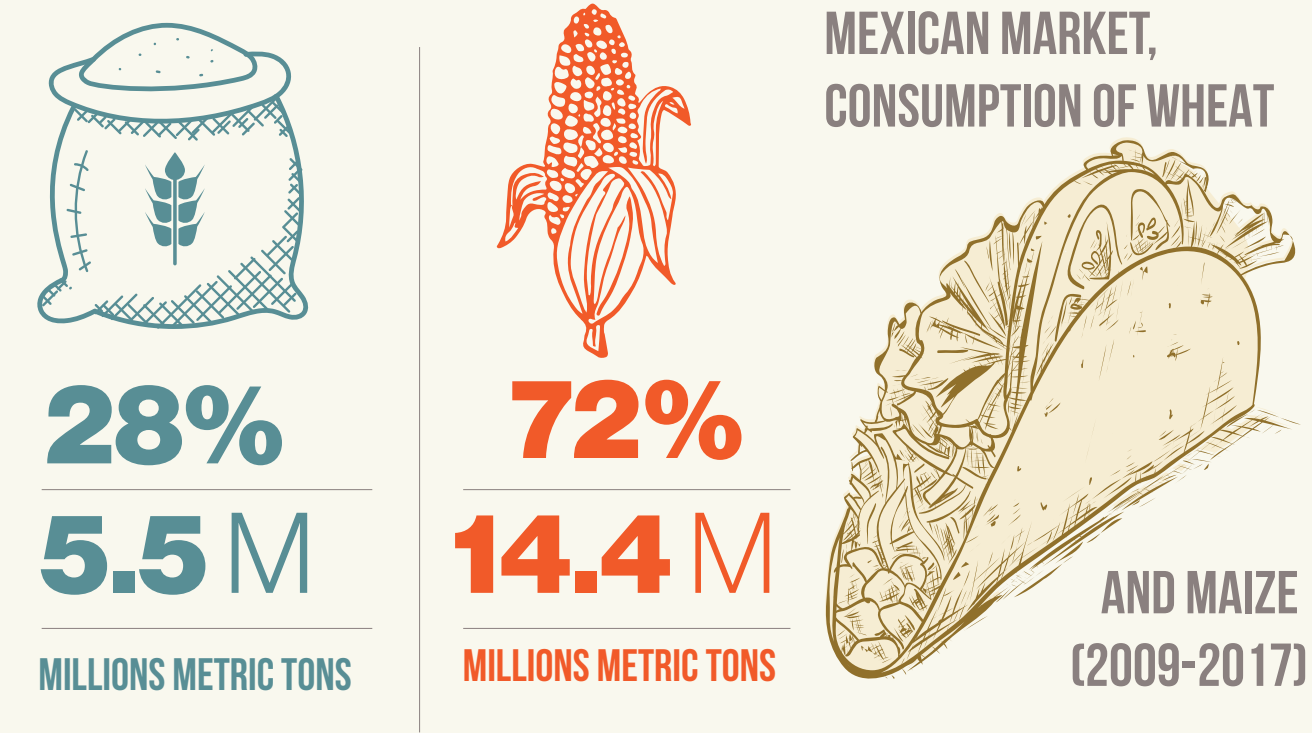


TABLE 1 - MINIMUM AMOUNTS OF NUTRIENTS TO BE ADDED TO FLOUR (MG / KG OF FLOUR)

RECOMMENDED SOURCES	MINERALS		B VITAMINS			
	Iron	Zinc	Folic Acid	Niacin	Riboflavin	Thiamine
	Ferrous sulphate Ferrous fumarate	Zinc oxide	Folic acid	Nicotinamide	Riboflavin	Thiamine mononitrate
 WHEAT	40	40	2	35	3	5
 MAIZE	40	40	2	35	3	5

Source: International Grain Council, ENSANUT and COFEPRIS



Interview 1:
“I thought that because my children were full, they were healthy”
Evelia, housewife, Chiapas

Evelia Estela Morales and her four-year-old son, Luis Fernando, live in Teopisca, Chiapas. She affectionately calls him ‘Luisito’, meaning ‘Little Luis’. Evelia thought eating three times a day was enough to keep Luis healthy. But one day she noticed that Luis looked “yellowish”, had lost his appetite and had begun to lose weight. Evelia was told that Luis had anaemia, which was even affecting his behaviour – every day, he seemed more and more distant.

Evelia cared for her son and thought she was giving him the nutrition he needed to be healthy. Every morning she made coffee and gave him a quesadilla or some bread. He would then have a traditional Mexican noodle soup with egg for lunch, and either rice or soup for dinner. Throughout the day, she gave him several glasses of milk from Nido or the government’s own brand, Liconsa. She thought Liconsa would be especially good for Luis because it was provided by the government and the packet stated it was enriched with vitamins and minerals.

“My son ate everything, but I did not know he needed iron, nor did I know what that was. I thought everything was ok because I thought that what I gave him to eat was enough. I gave him eggs and rice, but not vegetables or meat. It was really worrying.”

Evelia was surprised when she was told she should not give Luis coffee. In this coffee-growing town, it is common for everyone in the family, even babies, to drink it. Nobody had told Evelia or her family that coffee inhibits the body’s absorption of calcium.

Evelia’s diet was practically the same as her son’s. It was discovered that she, too, had anaemia. She suddenly understood why she had been suffering from headaches, felt “off” and lacked the energy to do very much.

But meat and vegetables are expensive. The family had to make some sacrifices and work even harder to be able to afford a wider range of food. This has not been easy.

“My husband is a bricklaying labourer. Sometimes he also works in the fields and earns 80 to 100 pesos a day. But he told me that, no matter what, I had to buy meat so we could make Luis better and get him out of his current state.”

Evelia was motivated to set up a small grocery store in her living room, where she mainly sells crisps, cornmeal, noodles for soup, and sweets. Through much sacrifice and hard work, Luis’s father’s wages and Evelia’s grocery store now earn 120 pesos a day. The family has begun to buy beef, a rich source of iron; but a kilo of beef costs 120 pesos – the same as their daily income – so they can only consume it two or three days a week. The family also now eats more vegetables and has improved both the quantity and the quality of the food they eat.

“I used to buy rice, noodles, eggs, bread. I thought that because my children ate enough and they were full, that they were healthy. Now they might eat beans with eggs and swiss chard. Luis was very distant with the other children but now he has a lot of friends. He is the only one in his class who knows how to count from one to ten and who can read his name.”

Credit: Margarita Vega Mendoza

2. Testing flours for levels of micronutrients

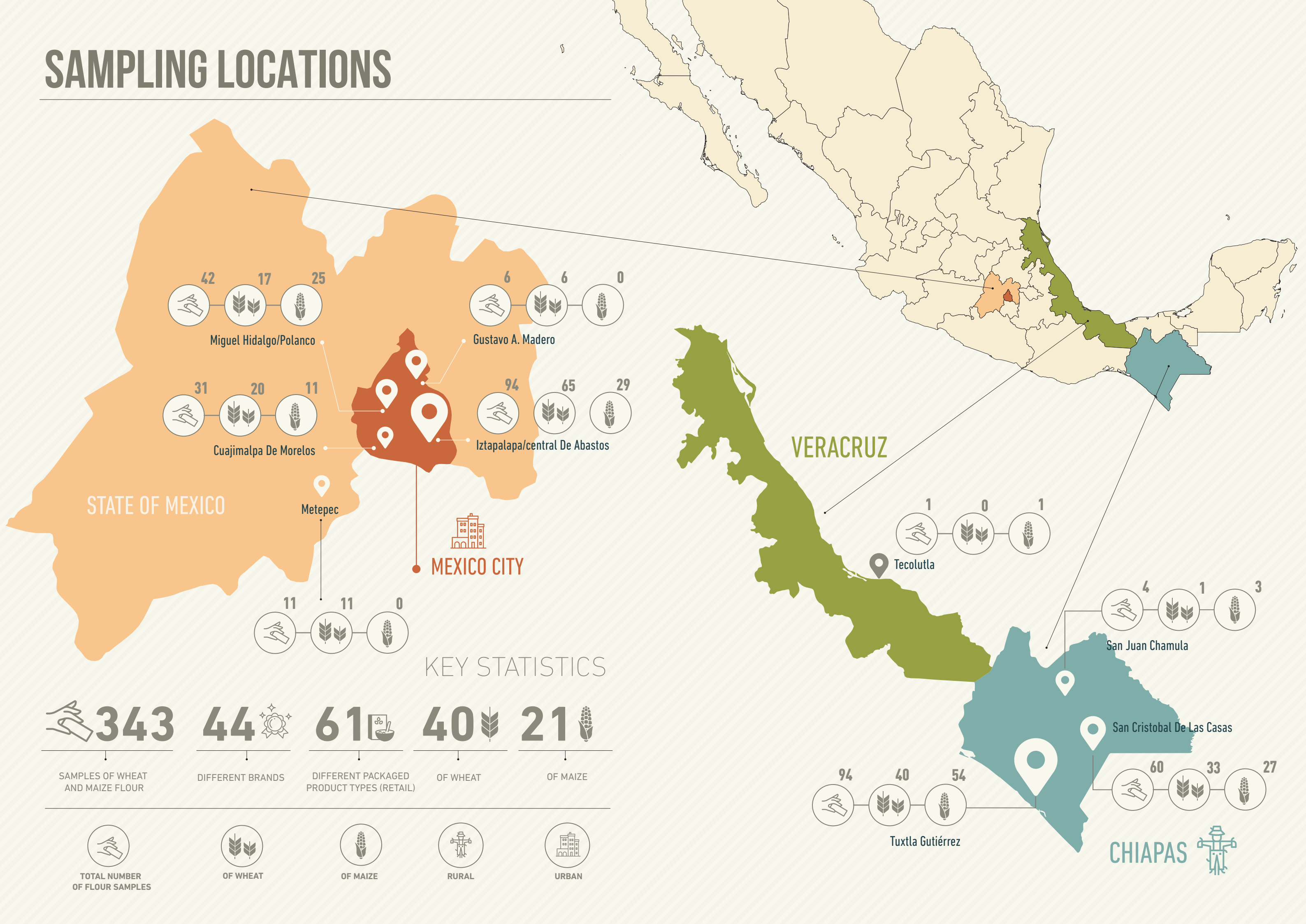
2.1. Methodology

The research undertaken for this report aimed to assess the effectiveness of Mexico’s current flour-fortification programme. This represents the first independent investigation and laboratory testing of retail-level flour products’ nutritional content in Mexico since current fortification legislation was introduced in 2008.¹⁸

We collected 343 samples from 61 different packaged products and 11 bulk-flour products, covering 44 brands. These samples, predominantly taken between October and December 2018, were collected in different locations in the state of Chiapas (158 samples from San Cristóbal de las Casas, Tuxtla Gutiérrez and San Juan Chamula) and Mexico City (173 samples from Miguel Hidalgo/Polanco, Iztapalapa/Central de Abastos, Gustavo A. Madero and Cuajimalpa). We focused on these two states because they have some of the highest anaemia rates in the country, but have very different socioeconomic conditions. A few addition samples were purchased from the nearby states of Estado de Mexico (11 samples from Metepec) and Veracruz (1 sample from Tecolutla) to improve the study’s coverage of major brands.

Within Mexico City and Chiapas, three different marketplace areas were selected, based on socioeconomic criteria. Project partner Proyecto AliMente carried out the market assessment. Within each area, a team of samplers visited a wide range of retail outlets, including large food-retail chains, convenience stores, specialised stores and market stalls. The team collected general information about the flour products on sale and took samples from as many brands and products as possible. The majority of samples were collected from flours available at retail level; however, the team also purchased a few samples from wholesale flours used in bakeries and tortillerías. These products were sent to the laboratory for testing of their nutritional levels, as described below.

SAMPLING LOCATIONS



2.2. Testing procedure

A total of 343 flour samples were submitted for analytical testing, which Laboratorios Fermi carried out in accredited facilities in Mexico City. The laboratory tested products in several stages to analyse the products’ degree of compliance.

First, individual samples underwent an ‘iron spot test’.^b This test turns any iron compounds, added in the fortification process, into visible red spots when treated with a chemical solution.¹⁹ Such testing for added iron is commonly considered a proxy to determine whether the full vitamin and mineral premix has been added to a product. Samples that clearly failed this test were not subjected to further testing.

Second, individual samples from each product that had been confirmed as fortified were combined. Where possible, these combined samples were made up of individual samples of the same brand but different production batches, so as to obtain a better estimate of the average across the brand. Composite samples of a number of products for which the iron spot test was not conclusive were also formed. All samples were then tested to determine the levels of iron and zinc present in the mixture, in line with analytical methods referred to in the legislation,²⁰ and compared with the minimum levels mandated.

3. Results

3.1. Main findings

Overall, the test results reveal a big failure of Mexico's flour-fortification programme. Most flours in Mexico are labelled as fortified; indeed, fortification takes place in the majority of products, to some extent. But our results show that only 7% of products - 4 out of 61 (21 maize flours and 40 wheat flours) - are actually fortified adequately.²¹

‘Fortified adequately’ is defined in this report according to two criteria: whether the product unequivocally meets the required minimum level for iron and zinc content, and whether the recommended iron compound has been used to fortify the product. Using these two criteria, only four out of 61 products were fortified adequately. All of these were wheat flours. Overall, good examples were few and far between, leading us to conclude that flour fortification in Mexico is not implemented in a way that maximises benefits for the population.

The majority of wheat and maize flours in Mexico are fortified to some extent, but they do not adequately meet the national standards. Using the criteria outlined above, there were two main reasons why these flours were classified as inadequately fortified.

First, they did not meet the required minimum level for iron and zinc content; 1 in 8 wheat-flour products and 1 in 7 maize-flour products did not meet the required levels of iron, zinc or both. For some products, the levels of these minerals were far below those required; for example, Diconsa maize-flour had only half the required level of iron - the lowest iron content of all the products tested. A larger number of products (two-thirds of wheat-flour products and half of maize-flour products) included iron and zinc in the region of the mandatory requirements levels, but given the range of uncertainty associated with the analytical test, they could not be confidently said to meet the minimum levels.

Second, we found that companies are not using the recommended iron compounds to fortify their flour; a third of wheat-flour products and three-quarters of maize-flour products did not use the recommended iron compounds according to the latest WHO guidelines. Companies that use less bioavailable iron compounds to fortify their products reduce the potential impact of the national fortification programme and miss the opportunity to improve people's health.



b Method 40-40.01: Iron Qualitative Method, as approved by the American Association of Cereal Chemists.

Of the 343 samples, 23 (7%) were not fortified at all. The biggest offender in this category is the flour distributed by Sistema Nacional para el Desarrollo Integral de la Familia (DIF) Chiapas, a public institution that provides governmental assistance, including a basic ‘food basket’ to cover the essential nutritional needs of indigenous and rural families. The DIF Chiapas maize-flour we tested clearly stated that the company Minsa produced it. This was by far the worst performing product: none of the eight samples were fortified. Questions should be raised about why this flour, which is provided as part of a public initiative to ensure vulnerable families increase their intake of nutritious foods, is not being fortified. Several imported flours, from the brands Bob’s Red Mill and Le 5 Stagioni, were also found to be unfortified.

Finally, in four domestic brands – Minsa, La Perla, Hoja de Plata and Tres Estrellas – some flour samples were not fortified at all. This raises important questions about the consistency of the fortification process in these factories.

As part of our ongoing investigation of this topic, we have reached out to both the past administration and the recently elected government, as well as to the biggest flour companies and retailers. We have asked them about the policies and measures they are putting in place to comply with fortification regulations. We have also specifically asked them about the source of iron they are using to fortify their products.²² At the time of writing, we have not received a response.

Interview 2:
“You don't realise that what you're eating is so bad”
Beatriz, professional, Mexico City

Beatriz always saw herself as a woman who took care of her health and her diet. She chose products that claimed to be nutritious and that she thought would help her stay healthy and slim.

Having recently given birth, Beatriz wanted to lose the extra pounds she had gained during pregnancy, so she started to eat more foods made with wholemeal flour that she could easily buy at any supermarket. Most of these products – including energy bars, bread and crackers – promised to be fortified and low in calories.

However, after a few months of following this diet, Beatriz began to feel that something was not right. She developed tooth decay, her hair began to fall out, she suffered from dizziness and she felt very tired. One day, she tripped over a table in the office and a bruise developed. Over several days, this bruise turned into a clot, leading to a visit to the hospital emergency room.

“I had a haemoglobin level of six when I was told the normal level is 14. If I had not hit my leg, I would not have noticed that I had terrible anaemia.”

Beatriz was in hospital for 42 days. The doctors struggled to stabilise her haemoglobin levels despite giving her five blood transfusions. Her health and finances took a severe hit.

Beatriz and her family could not believe her diagnosis. In Mexico, it is often thought that anaemia is concentrated in rural areas and mostly affects people with low incomes and poor access to quality food. This was not the case for Beatriz, who is from Mexico City and, as an executive of a department store, had a successful career. Her doctors and nutritionist said she had made the wrong food choices partly due to products being advertised as nutritious when, in reality, they are not.

“I did not think I would be admitted for anaemia, because to me I thought that I felt good. When I felt very tired and dizzy, and when my hair fell out, I just thought it was stress.”

“At the time I was breastfeeding my son. If you combine breastfeeding with poor nutrition, you end up with a serious problem. It's difficult to imagine. You don't realise that what you're eating is so bad. The products I was eating to lose weight were not as good as I thought. These eating habits are pretty typical for people who work all day.”

A couple of years after her hospital experience, Beatriz has improved her nutrition by incorporating high-quality foods, such as fruit, vegetables, meat and varied carbohydrates, into her diet. She finally feels well and knows that her health is no longer at risk because of a poor diet.

Credit: Margarita Vega Mendoza

3.2. Product ranking

To provide a clear picture of how each product performed in our tests, we have used a traffic-light rating system. For levels of iron and zinc, *green* indicates the levels are clearly meeting the mandatory requirements; *amber* shows the levels are in the region of the mandatory requirements but, given the range of uncertainty associated with the analytical test, could not be confidently said to meet the minimum levels; and *red* means the levels are clearly below the mandatory requirements. Therefore, if a sample is categorised as *green* for levels of iron and zinc, *and* uses the recommended source of iron, it is considered ‘adequately fortified’.

We also used a scoring system to rank products in order of best- to worst-performing for their fortification practices, with 0 being worst and 10 being best. We awarded more points for good implementation than for good labelling practices, because although good labelling practices are both important and required, companies must also ensure their flour is fortified accordingly. This ranking exercise was only carried out for flours available at retail level; wholesale samples were excluded because we could not verify the information on all the labels.

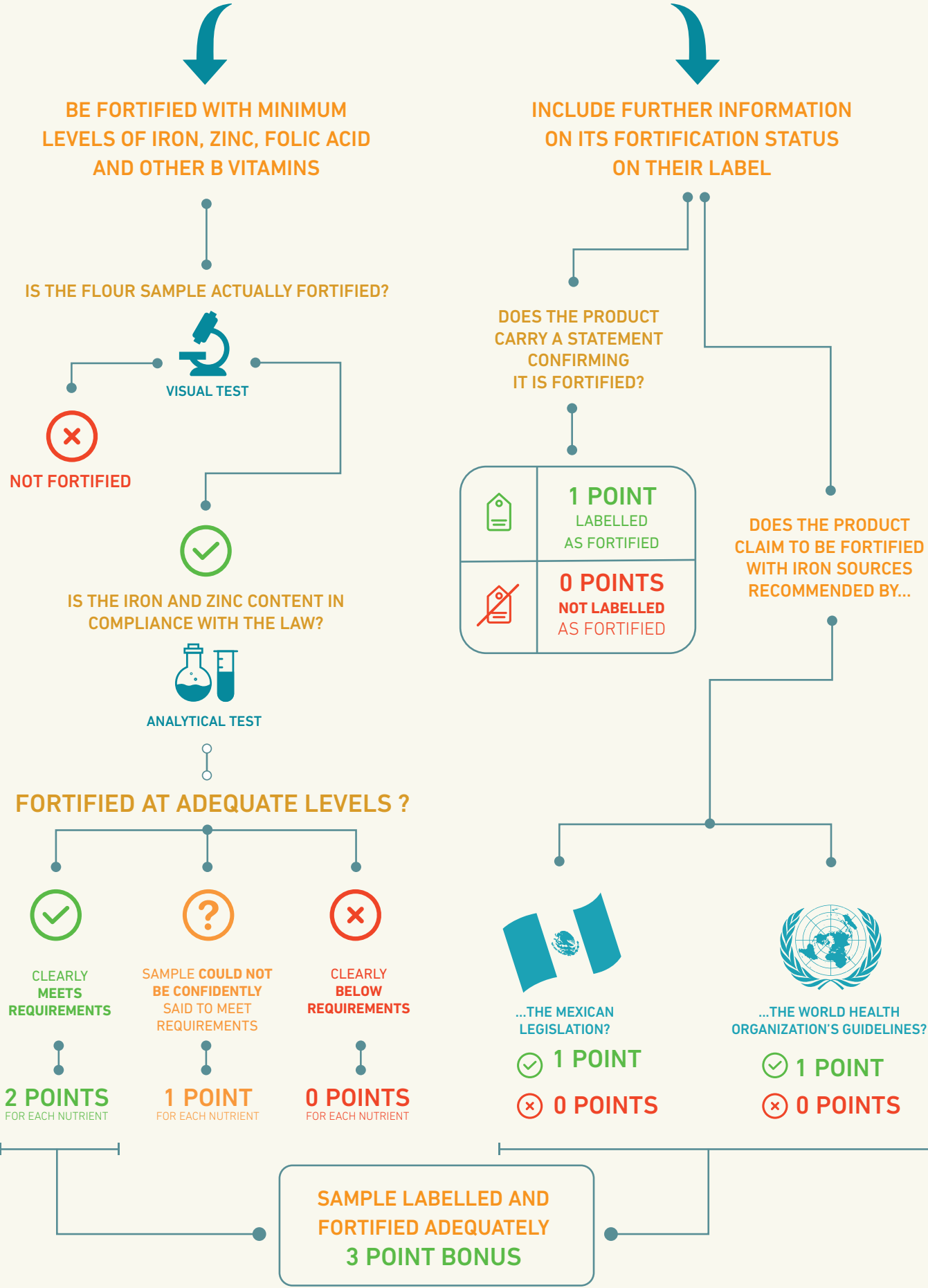
We awarded one point for flours labelled as fortified. If the label stated that the product was fortified with the type of iron recommended by the Mexican standard, we awarded one point. If this type of iron was also recommended by the latest WHO guidelines, we awarded another point. As such, a maximum of two points were awarded for the iron type.

We awarded two points if the laboratory test showed iron and zinc levels that were clearly compliant with the mandatory requirements, one point if the levels were close to the mandatory requirements but within the range of uncertainty, and no points if the levels were clearly below the requirements. We scored separately for iron and zinc, giving a maximum of four points for their levels.

Finally, we awarded a bonus of three points to products that gained a *green* rating across all elements of the study; that is, for products that were adequately fortified.

The rankings are presented separately for maize flours, wheat flours, supermarket own-brand flours and imported flours.

ACCORDING TO THE LAW, ALL WHEAT AND NIXTAMILIZED MAIZE FLOUR PRODUCTS SOLD IN MEXICO HAVE TO:



3.2.1. Maize-flour fortification

As Table 2 shows, no maize-flour product tested can be considered adequately fortified because none clearly meets the required levels of iron and zinc *and* used the recommended type of iron compound. Minsa's Extra Blanca comes close to meeting all criteria, but given the range of uncertainty associated with the analytical test, the iron level cannot confidently be said to meet the minimum requirement. As maize represents 72% of the market share for grain consumed in Mexico, improving maize-flour fortification with the right type of iron, and in correct quantities, should be a priority for addressing iron deficiency and nutritional anaemia in the country.

Table 2: Testing results and product ranking for domestically produced maize flour

BRAND	TRADER/OWNER/PRODUCER	PRODUCT	FORTIFICATION STATEMENT ON LABEL	IRON TYPE (MEXICAN LEGISLATION)	IRON TYPE (WHO)	IRON LEVELS	ZINC LEVELS	SCORE
		HARINA DE MAIZ BLANCO EXTRA BLANCA	●	●	●	●	●	6
		HARINA DE MAIZ BLANCO NIXTAMALIZADO PARA PREPARAR MASA	●	●	●	●	●	5
		HARINA DE MAIZ AZUL NIXTAMALIZADO SIN GLUTEN	●	?	?	●	●	5
		HARINA DE MAIZ PARA PREPARAR MASA ANTOJITOS SIN GLUTEN	●	?	?	●	●	5
		HARINA DE MAIZ NIXTAMALIZADO AMARILLO SIN GLUTEN	●	●	●	●	●	5
		HARINA DE MAIZ NIXTAMALIZADO TAMAL SIN GLUTEN	●	●	●	●	●	5
		HARINA DE MAIZ NIXTAMALIZADO PARA PREPARAR MASA LIBRE DE GLUTEN	●	●	●	●	●	5
		HARINA DE MAIZ NIXTAMALIZADO SIN GLUTEN	●	●	●	●	●	4
		HARINA DE MAIZ NIXTAMALIZADO BLANCO	●	●	●	●	●	4
		HARINA DE MAIZ NIXTAMALIZADO	●	●	●	●	●	3
		HARINA DE MAIZ NIXTAMALIZADO LIBRE DE GLUTEN	●	●	●	●	●	3
		HARINA DE MAIZ NIXTAMALIZADO AMARILLO	●	●	●	●	●	3
		TAMAL HARINA DE MAIZ NIXTAMALIZADO	●	●	●	●	●	3

The worst offenders are two products from Hari Masa and one from San Blas. Neither brand uses the recommended type of iron for nixtamalized maize flour, and both show levels of iron and zinc that are in the region of the requirements but, given the margin of uncertainty, could fall below this level. The brand Guerrero also performs poorly because, despite using the recommended type of iron, the levels detected in the flour fall significantly below legal requirements.

The brands Maseca and Maizza generally perform better on meeting the required levels of iron and zinc, but they lose points for fortifying with a less bioavailable type of iron, which the Mexican legislation does not recommend and which the WHO guidelines state is ineffective for use in nixtamalized maize flour.

Table 3: Testing results and product ranking for domestically produced wheat flour

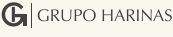
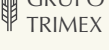
BRAND	TRADER/OWNER/PRODUCER	PRODUCT	FORTIFICATION STATEMENT ON LABEL	IRON TYPE (MEXICAN LEGISLATION)	IRON TYPE (WHO)	IRON LEVELS	ZINC LEVELS	SCORE
	 GRUPO TRIMEX	HARINA DE TRIGO DE ALTA PROTEINA						10
	 CMG	HARINA DE TRIGO EXTRAFINA						10
	 MUNSA	HARINA DE TRIGO SELECCIONADO ESPECIAL PARA TORTILLAS						10
SAN CRISTOBAL	 harinera de chiapas	HARINA DE TRIGO EXTRA FUERTE						6
	BUNGE	HARINA DE TRIGO						6
	 LA MODERNA	HARINA EXTRA FINA DE TRIGO						6
	 LA ITALIANA	HARINA DE TRIGO INTEGRAL						6
	 LA MODERNA	HARINA DE TRIGO EXTRAFINA						6
AGUA AZUL	 harinera de chiapas	HARINA DE TRIGO SUAVE						5
	 GRUPO TRIMEX	HARINA DE TRIGO						5
	BUNGE	HARINA DE TRIGO FINA						5
	 GRUPO TRIMEX	HARINA FINA DE TRIGO						5
	 LA ITALIANA	HARINA DE TRIGO ESPECIAL PARA USO EN EL HOGAR						5
	 GRUPO TRIMEX	HARINA DE TRIGO						5
	 GRUPO TRIMEX	HARINA DE TRIGO PARA PAN ARTESANAL						5

3.2.2. Wheat-flour fortification

The results for wheat flours are slightly better than the results for maize. As shown in Table 3, out of 31 products, three are well-fortified. These were from the brands Selecta, Sol de Oro and Rio Lerma. However, a large proportion (90%) of domestically produced wheat-flour products are not adequately fortified.

Three brands have iron and zinc levels far below the level required by the Mexican standard. Two of these brands - Castilla and Superior - are produced by Munsa. The third brand is Aires de Campo organic wholemeal wheat flour. This does not include a fortification statement on its package label, and the test results show that its levels of added iron and zinc are extremely low.

Table 3 (part 2): Testing results and product ranking for domestically produced wheat flour

BRAND	TRADER/OWNER/PRODUCER	PRODUCT	FORTIFICATION STATEMENT ON LABEL	IRON TYPE (MEXICAN LEGISLATION)	IRON TYPE (WHO)	IRON LEVELS	ZINC LEVELS	SCORE
	 HARINERA ANAHUAC	HARINA DE TRIGO MULTIUSOS PARA PANIFICACION						5
	 LA MODERNA	HARINA DE TRIGO INTEGRAL CON FIBRA NATURAL						5
	 LA MODERNA	HARINA DE TRIGO SAN ANTONIO EXTRAFINA						5
	 GRUPO HARINAS	HARINA DE TRIGO EXTRA FINA						5
	 GRUPO INDUSTRIAL LA ITALIANA	HARINA DE TRIGO						5
	 LA MODERNA	HARINA DE TRIGO INTEGRAL						5
	 Cuétara	HARINA DE TRIGO EXTRAFINA						5
	 CMG	HARINA DE TRIGO						5
	 GRUPO INDUSTRIAL LA ITALIANA	HARINA DE TRIGO						5
	 MUNSA	HARINA DE TRIGO						5
	 GRUPO TRIMEX	HARINA DE TRIGO INTEGRAL						4
	 HARINAS ELIZONDO	HARINA DE TRIGO						3
	 GRUPO TRIMEX	HARINA DE TRIGO PARA TORTILLAS						3
	 MUNSA	HARINA DE TRIGO						3
	 MUNSA	HARINA DE TRIGO						3
	 AIRES DE CAMPO	HARINA ORGANICA INTEGRAL DE TRIGO						0

A particular issue arose relating to wholemeal wheat flours from the brands Selecta, La Perla, Tres Estrellas and San Blas. All of these brands state that they use either ferrous fumarate or ferrous sulphate - types of iron that, according to the latest WHO guidelines, are ineffective when used to fortify wholemeal flour.

Many brands that produce white, refined wheat flour - Bola Roja, Cúspide, El Diluvio, Escudo Anaya, La Espiga, Maribel, Medalla de Oro, Omega, San Blas, Selecta, San Cristóbal, Villa Rica, La Moderna, Super Independencia and Tres Estrellas - use the recommended type of iron. However, the test results were ambiguous regarding whether these brands meet the required levels of both iron and zinc; the levels could fall below the legal requirements due to the range of uncertainty associated with the analytical test.

We looked at five different products from Selecta, the well-known flour brand produced by Grupo Trimex. Rather than being uniform in their scoring, this brand's products are located near the top, middle and the bottom of the ranking table. Selecta's wheat flour for tortillas does not declare the type of iron used, and the brand's wholemeal flour uses a type of iron that the WHO guidelines deem ineffective. However, Selecta's *'harina de trigo alta proteína'* was one of the few brands assessed as well-fortified.

Other wheat-flour brands assessed as adequately fortified were Sol de Oro and Rio Lerma. The Rio Lerma brand is made by Munsa, which also has products at the very bottom of the ranking due to low levels of iron and zinc. This calls into question the consistency of the company's fortification processes.

Imported flours

Our tests on imported flours show that companies are completely ignoring the Mexican law on fortification. Bob's Red Mill and Le 5 Stagioni wheat flours are not labelled as fortified, and our testing for iron and zinc confirmed they are not fortified at all.

Pillsbury (General Mills) is labelled as fortified, but the label does not mention zinc, and our tests found that the product's zinc levels are far below the requirements set out in the Mexican standard.

The two imported maize flours from the brand PAN also state they are fortified, but our test results show that PAN's *'amarillo precocida'* has very low levels of iron and zinc, while its *'blanco precocida'* has very low levels of zinc.

The main message here is that imported flour brands are totally failing to fortify in line with the Mexican legal standard.

3.2.3. Supermarket own-brand flour fortification

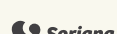
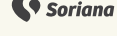
We placed supermarket own brands in a separate table (Table 5) to see how they compared with each other. Overall, out of nine products from eight different brands of flour, only one wheat-flour product was found to be adequately fortified.

For wheat flours, at the top of the table is La Comer's Golden Hills, which contains the appropriate levels of iron and zinc and fortifies with the optimal type of iron. At the bottom of the table is Soriana's Menu Solutions wheat flour, which neither state which type of iron it is fortified with nor clearly meets required iron and zinc levels.

Table 4: Testing results for imported wheat flours

BRAND	TRADER/OWNER/ PRODUCER	PRODUCT	FORTIFICATION STATEMENT ON LABEL	IRON TYPE (MEXICAN LEGISLATION)	IRON TYPE (WHO)	IRON LEVELS	ZINC LEVELS	SCORE
		MEZCLA DE HARINAS ALL PURPOSE FLOUR BLEACHED-ENRICHED						3
		HARINA DE MAIZ BLANCO PRECOCIDA						2
		HARINA DE MAIZ AMARILLO PRECOCIDA						1
		HARINA 100% INTEGRAL MOLIDO A LA PIEDRA TRIGO ORGANICO				NOT FORTIFIED	NOT FORTIFIED	0
		HARINA DE TRIGO SIN BLANQUEAR ORGANICA				NOT FORTIFIED	NOT FORTIFIED	0
		FARINA LE GRANO TENERO TIPO "00"				NOT FORTIFIED	NOT FORTIFIED	0

Table 5: Testing results and product ranking for supermarket brands of wheat and maize flour

BRAND	TRADER/OWNER/ PRODUCER	PRODUCT	FORTIFICATION STATEMENT ON LABEL	IRON TYPE (MEXICAN LEGISLATION)	IRON TYPE (WHO)	IRON LEVELS	ZINC LEVELS	SCORE
		HARINA DE TRIGO						10
		HARINA DE MAIZ NIXTAMALIZADO						5
		HARINA DE MAIZ						5
		HARINA DE TRIGO EXTRAFINA						5
		HARINA DE TRIGO						5
		HARINA TRIGO						5
		HARINA DE MAIZ NIXTAMALIZADO						4
		HARINA DE MAIZ NIXTAMALIZADO PARA PREPARAR MASA						3
		HARINA DE TRIGO						3

As with other maize flours on the Mexican market, supermarket-own-brand maize flours are inadequately fortified. At the bottom of the table is Chedraui's nixtamalized maize flour, which neither uses the recommended type of iron nor clearly meets required iron and zinc levels.

Nixtamalized maize flours from Aurrera (Walmart) and Members Choice (Soriana) are failing to use the type of iron recommended by the Mexican standard and WHO guidelines. Soriana's other brand, simply called Soriana, does not state which type of iron is used. While all three brands meet the mandated levels for iron, Walmart's Aurrera maize flour does not clearly meet the necessary zinc levels.

Selling like hot cakes – but are they fortified?

Hot-cake mix – wheat flour formulated for people to make pancakes – is a popular product in Mexico; indeed, hot cakes are one of the most consumed breakfast foods in the country.²³ In addition to the flour samples, our investigation tested seven of these products from five different brands to find out whether they are fortified.

Cué tara fortifies its wheat-flour products but does not fortify its hot-cake mix at all. PepsiCo-owned Gamesa and Aunt Jemima sell only hot-cake mixes and not wheat flour. Gamesa and Aunt Jemima hot-cake mix products are fortified, but not in line with Mexican flour fortification regulations. Tres Estrellas hot-cake mixes are fortified with the recommended type of iron but do not clearly meet the required levels of iron and zinc. On the other hand, Con Alimentos-owned Pronto, meet the required level of iron when fortifying their hot-cake mix but do not say what type of iron is used.

The different approaches and wide variety of practices regarding fortifying hot-cake mixes in Mexico highlight how these products currently fall into a grey area. The new government has an opportunity to close the loophole and to ensure these products clearly fall under the remit of the fortification legislation.

Government programmes: fortified flour for vulnerable families?

Our study included maize flour from two government programmes: Diconsa and DIF Chiapas. Both of these programmes aim to provide nutritious foods to the poorest and most vulnerable people. We took five samples from Diconsa products and eight samples from DIF Chiapas products.

Flour from the Diconsa programme is only available in Diconsa shops. These shops constitute a publicly supported distribution network, which aims to provide affordable, highly nutritious foods to the poorest, most remote areas of the country at low cost.

DIF Chiapas, part of the National System for Integral Family Development, is a government social-assistance programme focused on strengthening the welfare of Mexican families. Each state in Mexico has its own DIF programme. Within this remit, DIF runs a variety of health, food and nutrition programmes targeting children, families in poverty and indigenous families. For DIF Chiapas, this includes providing a basic ‘food basket’ to cover the essential nutritional needs of indigenous and rural families in Chiapas, with the main objective of increasing these vulnerable families’ consumption of nutritious foods.²⁴ The basic food basket includes items such as flour, oil, milk and beans. DIF-branded items should not be on sale in marketplaces, as clearly stated on their packaging; nevertheless, this is where we found the DIF Chiapas flour included in our study.

The DIF Chiapas flour packaging states that its producer is the company Minsa. For Diconsa maize flour, it appears that contracts have been granted to three companies: Gimsa, Minsa and Macsa.²⁵ However we were unable to verify which of these companies produced the samples in our analysis.

As mentioned in our previous report, the labels on both the Diconsa and DIF Chiapas flours clearly state that they are fortified according to the national standard and that the recommended iron source is used.²⁶ Our test results, however, reveal a very different – and shocking – picture. As Table 6 shows, Diconsa maize flour’s iron levels are significantly below legal requirements; the lowest level of all the products tested. DIF Chiapas flour is not fortified at all. These products are not only breaking the law but also completely failing to achieve their programmes’ aim: increasing vulnerable families’ consumption of nutritious foods. Evidently, when it comes to fortifying maize flour, there has been a reprehensible lack of accountability in these programmes.

There is a clear opportunity for the new government in Mexico to take a fresh look at fortified flours, especially those produced for social welfare programmes, and inspect and penalise any flour companies that are not following the law. The new government could make a profound change to the health and nutrition of the poorest people – if food fortification is done properly.

Table 6: Test results for Diconsa and DIF Chiapas brands of maize flours

BRAND	TRADER/OWNER/ PRODUCER	PRODUCT	FORTIFICATION STATEMENT ON LABEL	IRON TYPE (MEXICAN LEGISLATION)	IRON TYPE (WHO)	IRON LEVELS	ZINC LEVELS	SCORE
DICONSA	  	HARINA DE MAIZ NIXTAMALIZADO						4
	 	HARINA DE MAIZ NIXTAMALIZADO PARA PREPARAR MASA				NOT FORTIFIED	NOT FORTIFIED	0

3.3. Company scores

In addition to the individual product-scoring exercise, we gave each company an overall average product score and summarised the main areas in which they need to improve regarding fortification. Maize-flour companies are performing abysmally on fortification (see Table 7); wheat-flour companies are doing slightly better, but still have a lot of scope for improvement (see Table 8); and most supermarkets also need to improve their fortification efforts (see Table 9).

Most maize-flour companies are not using the most appropriate type of iron to fortify nixtamalized flour products; instead, they use types of iron that the body does not easily absorb. This means the fortification taking place is not reaching its full potential in benefiting people’s health. Minsa was an exception here in that the company uses the recommended type of iron. However, our testing reveals that one sample from Minsa was not fortified at all, while other samples from the company were at the lower end of required levels. Minsa therefore needs to review its fortification process across all its brands, as our findings highlight a worrying lack of consistency. Furthermore, Minsa has neglected to fortify the DIF Chiapas maize flour for the most vulnerable families. The Mexican government should thoroughly check and sanction these major discrepancies, particularly Minsa’s failure to fortify flour for a social welfare and nutrition programme.

Another company, Munsa, has 12% of the market share of all wheat-flour companies (based on production capacity). Our test results and analysis of package labels show that brands produced by Munsa are very inconsistent in their fortification; therefore, the company does not rank highly in the overall company score table. For example, Rio Lerma white wheat flour seems to be fortified well; it uses the recommended type of iron and contains high levels of iron and zinc. However, two other Munsa brands – Castilla and Superior – have iron and zinc levels far below the mandated requirements. As such, rather than being a shining example of a company that fortifies correctly, our results show that Munsa is extremely inconsistent in its practices and needs to take immediate steps to address unbalanced fortification processes across its different brands.

Grupo Trimex has the largest share (27%) of the wheat-flour market and produces a significant number of brands and product varieties, yet the company is also inconsistent in its fortification practices. Trimex’s Selecta brand, ‘harina de trigo para tortillas’, is close to the bottom of the product ranking, while another of its Selecta brands, ‘harina de trigo de alta proteína’, is at the top. Trimex needs to check iron and zinc levels across all its brands and varieties to ensure they clearly reach mandated levels, and must also ensure all labels declare the type of iron used.

Supermarket own brands follow the same trends; no supermarkets use the recommended type of iron to fortify their brands of nixtamalized maize flour, while Soriana and La Comer add very different levels of iron across their different wheat-flour brands.

Interview 3:
“We have to take care of ourselves in order to take care of others”

Mariana, nutritionist, Mexico City

Mariana, a nutritionist, is accustomed supporting patients who are obese or overweight. However, in recent years she has increasingly seen patients with anaemia, usually women.

Mariana attributes this to the fact that mothers in Mexico often prioritise their children’s nutrition over their own, ensuring their children have the best-quality food they can afford. Mariana observes that, in Mexico, many women tend to neglect their health because of their focus on the wellbeing of their wider family, and may only see a nutritionist when they want to lose weight – or when, after a series of medical tests, they discover they have anaemia.

“In Mexico, because of societal and cultural reasons, as women we overlook feeding ourselves well, prioritising the needs of other family members. We prefer to make sure our partners and our children eat well, we leave ourselves behind. We don’t have the same culture of care for ourselves – that ‘I have to take care of myself in order to take care of others’.”

Mariana is based in Naucalpan, a middle-income municipality adjacent to Mexico City. She laments inflation rates of 5% and 6%, which have increased the cost of food for many households in Mexico and therefore affected nutrition levels.

“People are eating less protein because it is too expensive. Eggs also contain iron but have gone up in price too. Middle-income patients didn’t used to complain about the cost of food and now it’s the first thing they tell me during the consultation. There are families who used to spend 500 or 600 pesos on their food shop and now they spend 1,000, they have to reduce what they buy to what they can afford.”

Mariana says rising anaemia rates in Mexico are due to not only the tough economic situation but also lifestyle, and a lack of knowledge about what constitutes adequate, nutritionally balanced food.

Many Mexicans in urban areas struggle to find time to have a proper breakfast because of time spent travelling to work in heavy traffic. They therefore tend to take easy-to-prepare products to work – but these may not be of the best nutritional quality.

“Because of tight schedules, many people choose to go to a fast-food shop or coffee chain to buy a sandwich. Some people go to restaurants, but these are also becoming more expensive. Food in restaurants is becoming less nutritious, because they offer smaller portions of protein due to the increase in the cost of food.”

Mariana emphasises that people often have little knowledge about what foods best maintain good health. A rise in the number of foods promoted as ‘nutritious’ means people do not know what the best choices are for their diet and their health.

“What we eat most in Mexico are products such as tortillas, flour, rice, pasta, because they are very easy to prepare and are cheap. We also eat sweet breads where the flour should also be fortified.”

Credit: Margarita Vega Mendoza

Maseca in the spotlight: Does more of the wrong iron make it right?

Mexican legislation is clear: ferrous fumarate or ferrous sulphate are the recommended types of iron to use in flour fortification. Despite this, the majority of Maseca nixtamalized maize-flour labels state that the company uses electrolytic iron to fortify its flours. Our laboratory tests reveal that Maseca is adding electrolytic iron to its flours at levels two to three times higher, on average, than the levels recommended for ferrous salts (the law recommends 40mg/kg) – presumably to try to compensate for the human body’s inability to absorb this type of iron well. But is adding more of the wrong type of iron a good strategy?

The latest WHO guidelines clearly state that electrolytic iron is not suitable for use in nixtamalized maize flour – again because it is not well absorbed by the human body.²⁷ Evidence shows that using low-bioavailability iron sources can decrease the effectiveness of a fortification programme.²⁸ Furthermore, if Maseca is using this as a cost-cutting strategy, evidence suggests this may not be an effective approach; although more bioavailable compounds, such as ferrous fumarate, are twice as expensive as electrolytic iron, a much lower amount of the latter is needed.²⁹ For example, we estimate that making this switch in Maseca’s maize flour for tamales (i.e. from the current range of 95–153mg/kg of electrolytic iron to the legal recommendation of 40mg/kg of ferrous fumarate) could lower costs by up to 28%.

As the company with the biggest market share, the effective fortification of Maseca maize flour could have a significant impact on iron deficiency in the Mexican population. Maseca could lead the way for others and highlight its efforts in helping to tackle micronutrient deficiencies in Mexico.

Table 7: Maize-flour company scores

TRADER/OWNER	% SHARE (CAPACITY)	BRANDS	PRODUCT VARIETIES (N)	SAMPLES TESTED (N)	AVERAGE SCORE	REMARKS
	20		2	20	6	Check mandated levels of iron and zinc are being reached. One sample nixtamilised maize flour not fortified
	74		5	52	5	Check mandated levels of zinc are being reached. Declare iron type on label of all products. Use right type of iron sources to fortify (currently adding high levels of cheaper and less bioavailable iron)
	N/A		1	8	5	Need to use recommended type of iron to fortify.
	3		3	20	3	Check mandated levels of iron and zinc are being reached. Need to use recommended type of iron to fortify.
	N/A		1	10	3	Check mandated levels of iron and zinc are being reached. Need to use recommended type of iron to fortify.
	N/A		1	2	3	Need to meet mandated levels of iron and zinc.

Table 8: Wheat-flour company scores

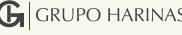
TRADER/OWNER	% SHARE (CAPACITY)	BRANDS	PRODUCT VARIETIES (N)	SAMPLES TESTED (N)	AVERAGE SCORE	REMARKS
	N/A	 	2	7	8	Check mandated levels of iron and zinc are reached in all products.
	16	 	2	8	6	Check mandated levels of iron and zinc are reached in all products.
	N/A	 	2	11	6	Need to meet mandated levels of zinc.
	6	  	5	50	5	3 out of 13 samples of wholemeal TRES ESTRELLAS were not fortified. 4 out of 7 samples of LA PERLA wholemeal were not fortified. Need to use recommended type of iron in wholemeal varieties. Check mandated levels of iron and zinc are reached in all products.
	27	  	7	34	5	Check mandated levels of iron and zinc are reached in all products. Need to use recommended type of iron in wholemeal varieties. Ensure iron types are declared on label.
	12	  	4	6	5	Revise fortification processes across all brands. Rio Lerma brand has very high levels of iron and zinc, while Castilla and Superior are below the mandated levels
	N/A	  	4	22	5	Check mandated levels of iron and zinc are reached. Need to use recommended type of iron in wholemeal varieties.
	N/A		1	1	5	Ensure iron type is declared on the label.
	N/A		1	3	5	Check mandated levels of iron and zinc are being reached.
	N/A		1	3	5	Check mandated levels of iron and zinc are being reached.
	11		1	6	3	One sample (bulk) of wheat flour was not fortified. Check mandated levels of iron and zinc are being reached. Ensure iron type is declared on label.
	N/A		1	1	0	Meet mandated levels of iron and zinc. Include fortification statement and ensure iron type is declared on the label.

Table 9: Supermarket scores

TRADER/OWNER	BRANDS	PRODUCT VARIETIES (N)	SAMPLES TESTED (N)	AVERAGE SCORE	REMARKS
laComer	GOLDEN HILLS Ke! Precio	2	2	8	Check mandated levels of iron and zinc are being reached.
Walmart	Great Value Aurrera	2	19	5	Check mandated levels of iron and zinc are being reached. Use right type of iron in nixtamilised maize flour products.
CEDRAUI cuesta menos	CEDRAUI cuesta menos	2	15	4	Check mandated levels of iron and zinc are being reached. Use right type of iron in nixtamilised maize flour products.
Soriana	Soriana Member's Choice menú solutions	3	7	4	Check iron and zinc levels are being reached. Declare iron sources used to fortify. Ensure right type of iron is used to fortify nixtamilised maize flour products.



Interview 4 :
“You can see they are malnourished because they have a swollen tummy”
Ernesto, doctor, Chiapas

Every month, about six children are admitted to the hospital in San Cristóbal de las Casas showing signs of malnutrition and anaemia. It is not malnutrition per se, but its consequences, behind their hospitalisation; staff regularly see severe respiratory or gastrointestinal diseases, which result from weakened immunity, which results from malnutrition.

As a doctor, Ernesto has learnt to identify these patients with ease.

“Their reasons for coming may not immediately appear to be malnutrition. They come here because of pneumonia, because of diarrhoea, but these are all caused by poor nutrition. You can see they are malnourished because they have a swollen tummy.”

The hospital is located in Los Altos, in Chiapas, a region with a large indigenous population, many of whom are poor. Parents say they struggle to feed their children for financial reasons, as Ernesto explains:

“They do not have access to varied and quality food. They might eat beans and nothing else, which is not enough because this doesn’t provide the basic nutrition.”

During their hospital stay, many children eat common types of food – such as milk, meat and a variety of fruit and vegetables – for the first time, but the doctors and nurses know that when they return home they will resume their old eating habits.

The treatment of these children depends on their degree of malnutrition. While some of them are discharged after a week, some stay in hospital for a month, “not so much because of the illness, but so they can put on weight,” Ernesto explains.

“If children are admitted after five years old, they can recover in terms of reincorporating themselves in their social circle, but they will be left behind in terms of neurological development. It’s not so much about the obvious physical consequences; yes, they may be of small height, but mainly the limitation they show in relation to children of their age within the normal range of development is that they cannot do things that children their age shouldn’t have a problem with. The longer they experience malnutrition for before adequate nutrition is provided, the more serious the consequences are.”

Credit: Margarita Vega Mendoza

Micronutrient deficiencies: a problem that won’t go away?

Climate change might not be the first thing that springs to mind when discussing micronutrient deficiencies, but the two issues are more closely linked than might first appear.

Tackling the problem of micronutrient malnutrition is becoming more urgent in the context of climate change. Several studies show that increasing levels of carbon dioxide in our atmosphere could make our food less nutritious.³⁰ Staple foods such as wheat, rice and pulses have shown declines in essential nutrients, like iron and zinc, when grown in conditions simulating the higher carbon dioxide levels expected by 2050.³¹ This means people would receive fewer nutrients from the food they eat.

Currently, more than 2 billion people are deficient in one or more micronutrients, and lower levels of nutrients in food could mean millions more becoming deficient without realising. As we face a continuing climate crisis and increasing carbon dioxide levels, the nutrient deficit in staple crops may move from being a little-known symptom of our planet’s struggle to a major health crisis.

Micronutrient deficiencies can be effectively addressed through food fortification. In the context of climate change, ensuring food fortification is being done well becomes even more critical. Nevertheless, the huge potential of food fortification requires governments to have robust laws and policies – and to enforce them. It also requires the food industry to adopt a proactive attitude. The industry’s role in not only investing in better nutrition for all but also tackling climate change is undeniable; the question is, will they step up to the challenge?



4. Conclusion

Fortification is an important tool for tackling micronutrient deficiencies, but only when it is implemented properly. Our investigation revealed that only 7% of flour products tested were adequately fortified. None of the companies whose products we analysed in this report achieved the highest company score for adequate fortification. It is especially worrying that the companies with the biggest market shares (Gruma, Minsa and Grupo Trimex) either do not use the recommended sources of iron or fail to show they are consistently adding the required amounts of iron and zinc to their products. This represents a total failure by the majority of companies to fortify correctly.

The situation is especially bad regarding the fortification of maize flours; the majority of companies are either using the wrong type of iron or not doing enough to ensure levels of iron and zinc meet the minimum requirements. As maize represents 72% of the market share for grain consumed in Mexico, such an unacceptable lack of responsibility on the part of maize-flour companies is serious and should be addressed as a priority, both to ensure the success of the fortification programme and to tackle iron deficiency and nutritional anaemia in the country.³² Our testing revealed that even essential maize-flour products that government programmes distribute to provide nutritious foods to the most vulnerable families are not appropriately fortified.

The food industry has an obligation to follow the law and a moral responsibility to tackle nutritional challenges. However, the flour industry selling its products in Mexico is failing on both counts - it is failing to comply with the legislation, and therefore failing the most vulnerable people in the Mexican population. This is not just a theoretical problem; many people across Mexico are living with the consequences of poor nutrition. The personal stories in this report, of Mexicans struggling with anaemia and micronutrient deficiencies, show the realities of living with hidden hunger - the consequences of which are significantly exacerbated by the industry's dereliction of its duties. The government should immediately take corrective measures to address this industry failure and to uphold the laws that were established to guarantee Mexican people obtain essential nutrients and vitamins through their staple foods.

Our case studies also show that, while people might need more education and better advice about what constitutes a healthy diet, they also require better availability of healthy and nutritious foods. Industry plays a key role in shaping the food environment and contributing to the national scourge of all forms of malnutrition. Industry is largely responsible for the high availability and aggressive marketing of ultra-processed foods in Mexico, which are not only inadequately fortified but also high in added sugar, salt and

additives, therefore presenting risks for obesity and diet-related chronic disease. Evidence has shown that the food industry has powerful lobbies that work to oppose and weaken nutrition policies in Mexico.³³

This study adds to this evidence by demonstrating that, in addition to opposing regulation, once a regulation is in place the industry overwhelmingly fails to properly comply with it. The food industry has repeatedly argued that it must be part of the solution to combat malnutrition, and it often touts its fortification efforts as evidence of its actions towards this end. But this report suggests this is pure lip-service and demonstrates that, once again, food-industry practices lack transparency and continue to be driven by private interests rather than public health.

This is a clear opportunity for the new government in Mexico to take a fresh look at the actions of the food industry, and to establish programmes that guarantee adequate and nutritious foods for all. Of the existing fortification legislation, the government should immediately implement its own monitoring programme and engage with flour companies to ensure they improve their fortification practices. The regulations should be strengthened to include details of regular inspections and penalties for any flour companies that are not complying with the law. As a priority, the new government should review flours produced for social welfare programmes, such as DIF and Diconsa. If the new government takes control of the situation left by the previous administration, and ensures food fortification is carried out properly, a positive and profound change could be made for the health and nutrition of Mexican people.

Recommendations

Government

- Update the Mexican regulation, NOM-247-SSA1-2008, to include details of external monitoring and enforcement at mills, retail level and points of import. These regulations should specify the frequency of monitoring, methods used and indicators of success. It should also provide details of inspections and penalties.
- Provide the relevant government agency, COFEPRIS, with the budget and human resources to implement effective monitoring and enforcement.
- Make sure that only companies fortifying in line with the law are allowed to supply flour to Diconsa, DIF or any other programmes for the poorest people.
- Update the Mexican regulation, NOM-247-SSA1-2008, in line with the latest WHO guidelines to make sure the standard is clear and unambiguous about the sources of micronutrients that should – and should not – be used to fortify flours.
- Make external monitoring and compliance data publicly available and accessible to civil society, consumers and industry.

Flour industry

- Each company should investigate the fortification failings and publish a plan to address shortcomings in the fortification practices, highlighted in this report.
- Fortify flours in line with the Mexican General Health Law and regulation NOM-247-SSA1-2008, and clearly demonstrate to the government and the public that this is consistently taking place at production level, especially for any contracts relating to the production of flours for government social welfare or nutrition programmes.
- Fortify flours using the vitamins and minerals recommended in the latest WHO guidelines and the Mexican regulation *NOM-247-SSA1-2008*.
- Maintain internal quality-control reports on fortification and make these available for government officials to inspect.
- Proactively report, to government and the public, details of premix type, premix suppliers and standard operating procedures for fortification.

Endnotes

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