

Final Report: A Study of Wheat Flour Fortification in the Dominican Republic



Photograph taken by M. Rao at Grupo Bocol in Santiago, D.R., June 19, 2013

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EXECUTIVE SUMMARY

Deficiencies of vitamins and minerals, commonly called micronutrients, affect populations globally through the health consequences of iron deficiency, iron deficiency-anemia, and folic acid deficiency among other conditions. Food fortification is a cost-effective method of improving the general state of micronutrient deficiencies at the population level. The National Strategic Plan for Nutrition for 2013-2016 for the Dominican Republic includes food fortification and supplementation as the two primary strategies for preventing and controlling micronutrient deficiencies.

Monitoring and evaluation activities are important for ensuring that fortification programs are achieving their objectives of preventing and controlling micronutrient deficiencies in target populations. This report focuses on the monitoring aspects of the wheat flour fortification program in the Dominican Republic by presenting both the theoretical and actual situation. Information is from observations at flour mills, observations at the national laboratory, government documents about the fortification program, conversations with stakeholders and quantitative analysis of iron in samples of fortified wheat flour, breads and pastas. This report is meant to serve as a reference for the National Micronutrient Committee in its process of drafting and implementing a modified plan for regulatory monitoring of wheat flour fortification in the Dominican Republic.

Since the 1990s, the six wheat flour companies in the Dominican Republic were fortifying their flour voluntarily. In 2007 a norm was approved that included specifications for fortified wheat flour but did not make fortification mandatory. Mandatory legislation for fortification of wheat flour with iron, folic acid and complex B vitamins was passed in 2009.

Although 100% of wheat destined for flour production is imported from the U.S. and Canada, all of the wheat flour used for baking purposes is produced domestically. The majority of wheat flour is consumed by the Dominican population while a marginal portion is exported. Most of the wheat flour is used for bread and pasta, with a small percentage for crackers and all-purpose uses. The six wheat flour companies in the Dominican Republic vary in size, with several making additional products, such as pasta, crackers and rice. Several of the companies fortify flour used in their pasta and crackers, although fortification of semolina and durum flour used in these products is not mandatory. During mill visits, we observed that all of the companies are fortifying their wheat flour for bread with premixes that comply with the specifications set by the country's technical regulations for wheat flour fortification.

Theoretically, the entities responsible for internal monitoring of wheat flour fortification are the Departments of Quality Assurance and Quality Control (QA/QC) and the companies' internal laboratories. In the Dominican Republic, the entity designated as responsible for external monitoring is the Vice-ministry of Environmental Health. Additionally, the national laboratory should fill the role of external analysis of wheat flour samples in order to verify fortification.

Consumer protection agencies may play a role in commercial monitoring of wheat flour fortification.

During mill visits, we noted that every company has a Department of QA/QC that carries out internal inspections and sampling. Additionally, every company has its own laboratory that analyzes wheat flour samples. However, the majority of the companies do not use the iron spot test specified by the technical regulations for wheat flour as a qualitative test. None of the companies request external laboratories to conduct quantitative or qualitative analyses of iron in wheat flour samples to verify fortification.

During a visit to the national laboratory, we observed that the hygiene and safety conditions were insufficient and the area designated to nutrition programs had neither all the necessary reagents nor all the necessary equipment for analyzing fortified food samples. However, we were able to find other laboratories in Santo Domingo which have the capacity to carry out quantitative analysis of iron in wheat flour using the atomic absorption method.

From conversations with representatives from the Vice-ministry of Environmental Health and consumer protection organizations, we found that the Director of Food control in the Vice-ministry is the only person involved in external monitoring. The Director himself completes short, auditory visits to the mills approximately three to four times a year. He collects samples during these visits and conducts qualitative iron spot tests in the office of the Vice-ministry. We found that, apart from the activities carried out by the Director, no other organization carries out external monitoring or commercial monitoring of wheat flour fortification at this time.

Apart from observations and conversations with stakeholders, we carried out sampling and quantitative analysis of iron content in samples of fortified wheat flour, pasta and bread. Flour was sampled during the visits to the six flour mills and fortified pastas and bread were sampled at stores and bakeries in Santo Domingo, San Pedro and Santiago. The purpose of these studies was to verify compliance with the level of iron in wheat flour specified by the national regulation and to investigate the actual quantities of iron that reach the consumer through products such as bread and pasta made with fortified wheat flour.

In the samples of wheat flour that were analyzed, we found an average iron concentration of 49.9 mg/kg. Two samples reached the minimum level of iron specified by the national regulation (55.0 mg/kg) while seven brands did not have sufficient levels of iron. In bread samples, the average iron concentration in French-style bread (*pan de agua*) was 41.2 mg/kg and in soft bread (*pan sobao*) was 34.4 mg/kg. In samples of pastas, we found an average iron concentration of 25.0 mg/kg. Iron levels varied greatly among samples of bread (standard deviation = 24.6 in French-style bread, standard deviation = 10.5 in soft bread) and among pasta samples as well (standard deviation = 14.9).

The results from analyses of wheat flour samples show that the mills are fortifying their flour, but that some are fortifying with insufficient levels of micronutrients. These findings of inconsistent and sometimes inadequate levels of fortification highlight the importance of

carrying out quantitative analyses of iron in wheat flour as part of external monitoring. The results also show that wheat and pasta made from fortified wheat flour maintain at least some of the micronutrients from the flour, which benefits populations regularly consuming these foods.

Considering the findings of this study, we recommend that the national laboratory rehabilitate the area for nutrition programs so that it has the capacity to analyze samples of fortified wheat flour. It is also recommended that the Vice-ministry of Environmental Health revitalize its team of inspectors so it is able to complete all necessary external monitoring activities and report findings to the Office of Nutrition at the Ministry of Health and to the wheat flour companies. Additionally, we recommend that the companies use the iron spot test specified by the national regulation and periodically send samples to external laboratories for quantitative analysis of iron. As the organization responsible for the coordination and execution of the national fortification programs, the Office of Nutrition should take a leading role in strengthening the regulatory monitoring and plan, communicating with stakeholders and periodically requesting reports from the organizations carrying out regulatory monitoring activities. Finally, it is recommended that the Office of Nutrition distribute annual reports to the public summarizing the findings obtained from external and commercial monitoring of the wheat flour fortification program.

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