

# REPORT

## BASICS

PN-ACA-333

**CENTRAL AMERICA  
MICRONUTRIENT INITIATIVE:  
ASSESSMENT OF  
HONDURAS AND NICARAGUA**

2-9 February 1997

Honduras and Nicaragua

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## ACRONYMS

BASICS	Basics Support for Institutionalizing Child Survival
FOB	Free on Board
INCAP	Institute of Nutrition for Central American and Panama
LAC	Latin America and the Caribbean
MT	Metric tons
OMNI	Opportunities for Micronutrients Initiative
ppm	Parts per million
SUSTAIN	Sharing United States Technology to Aid in the Improvement of Nutrition
USAID	United States Agency for International Development

## SCOPE OF WORK/OBJECTIVES

This visit is part of a joint effort supported by USAID/ LAC bureau between SUSTAIN, OMNI, BASICS, and INCAP to implement fortification of staple foods with iron in the Central American sub-region. A team composed of Hector Quinones and Peter Ranum (SUSTAIN), Camille Saadé (BASICS), Omar Dary (INCAP and OMNI's consultant in Honduras) and Josefina Bonilla (OMNI in Nicaragua) visited Honduras and Nicaragua from February 3 to 10, 1997 to assess the potential for iron fortification of flour. The three main components of this assessment are—

**Industry:** millers' capacities to fortify flour with iron.

**Public sector:** policy environment toward flour fortification.

**Consumer demand:** target population's dietary habits and marketing potential to create demand for fortified foods.

## BACKGROUND

To combat the alarming levels of micronutrient deficiency in general, and iron deficiency among children and women in particular, USAID asked SUSTAIN, OMNI, BASICS, and INCAP to collaborate in implementing food fortification as one of the major intervention strategies in Central America. Since the start of this collaborative effort it was agreed that this regional food fortification initiative would complement, and not preclude, other interventions such as supplementation and promotion of dietary diversification. The group planned to start the food fortification initiative by an assessment of the four Central American countries. In November 1996, SUSTAIN conducted an assessment of the industry in Guatemala and El Salvador. Benefitting from the availability of the same wheat flour expert, the group organized this second leg of the assessment in the remaining two countries: Honduras and Nicaragua.

### The Public Sector

The public sector in both countries is committed to eliminating and reducing micronutrient deficiency by the year 2000. Recently, the December 1996 meeting of the First Ladies of America in La Paz, Bolivia, reiterated its recommendation for the control and prevention of nutritional anemia. Food fortification has been recognized as the most efficient cost-benefit intervention. Honduras has an existing legislation for fortifying wheat flour, while Nicaragua still has to develop its policy. However, Nicaragua has introduced a legislation proposal to Parliament on the iodization of salt, and has a joint private-public sector National Commission of Micronutrient actively involved in vitamin A fortification of sugar.

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## **The Private Sector**

The mills in El Salvador and Guatemala were visited previously. The mills in both countries were using the new level of fortification developed by INCAP. There are three different flour fortification standards used in Central America (see appendix for actual levels). The first is the straight restoration levels used by Canada. The second is the current U.S. standards which are slightly higher than the Canadian levels. The third, and newest, are those recently developed by INCAP, which involve restoration levels for thiamine, riboflavin, niacin, and folic acid, but a higher fortification level for iron. The United States and Canada have recently adopted a higher fortification level for folic acid, which becomes mandatory January 1, 1998. INCAP is considering including the same folic acid level in their standard. Premixes for all of these different standards are readily available from commercial companies in the United States and Mexico.

## **The Problem**

In Nicaragua, the 1993 National Survey on Micronutrient Deficiency demonstrated the existence of 29 percent iron deficiency anemia among children, and 34 percent among of fertile women. This translated into 430,000 children and 850,000 women suffering from iron deficiency, of which 43,400 women suffered from severe anemia. The children most at risk are the ones between 1 and 2 years old. The immediate causes of micronutrient deficiency are the low consumption of foods rich in micronutrient biologically available, and the high frequency of morbidity, especially of infectious origin. The principal foods that contribute to total iron consumption are cereals and their derivatives: 26 percent; beans: 19 percent; and corn tortilla: 12 percent.

In Honduras, the level of anemia is estimated at 15 percent for women, and 40 to 60 percent among children.

## **INDUSTRY ASSESSMENT**

We visited four wheat flour mills in Honduras and three mills in Nicaragua. These mills represent most of the flour consumed in these two countries because there is very little import of flour and no small neighborhood mills that we know of. The information on each of the flour mills is summarized in Appendix A. All the mills in both countries were adding improvers and were set up with dosifiers to do that. The most common improver was potassium bromate, but some mills also added funal amilase (an enzyme), bleach, maturing agent, and ascorbic acid. The mills had banks of dosifiers for adding these microingredients. The mills also had experience in the quality control testing of these additives, particularly potassium bromate.

## Honduras

In our visits to the Honduran mills we were accompanied by the sub-coordinator of the Department of Food Control of the Ministry of Health, and a Food Control inspector for the San Pedro Sula Region. They hardly knew about any of the practices of the mills, including enrichment.

The largest flour mill in Honduras is MOLINO HARINERO SULA, with a little over 50 percent of the production in the country. This mill was built and run by General Mills, who instituted the practice of regular flour enrichment and which the mill has continued under other ownership. Currently the mill claims to be enriching all flour to the current Canadian standards (restoration levels that are slightly lower than the U.S. standards), along with adding 1100 ppm calcium in the form of calcium carbonate. The mill has three units, including a small unit to make semolina for pasta which is not enriched. We observed the enrichment feeder in operation in the mill, but noted that they used the oldest of their dosifiers for enrichment. We also verified that they had on hand boxes of the enrichment premix. Molino Harinero Sula also has a much smaller second mill called Molino Central Harinero, in Tegucigalpa, which we did not visit.

We were not allowed to see the processing facilities at INDUSTRIAS MOLINERAS, S.A. (IMSA), the next largest mill in Honduras (about 20 percent of the market), but we talked to the general manager, who claimed to be enriching flour to U.S. levels. We noted that his label did indicate enrichment, but also claimed vitamin A and vitamin C, which were not being added according to the manager.

MOLINOS MODERNOS claimed to be enriching flour to current U.S. standards and indicated enrichment in their flour label. However, the enrichment dosifier was not in operation at the time of our visit and we saw no evidence of enrichment premix inventory. We have no reason to suspect that they did not enrich on a regular basis, but neither could we confirm that they did.

MOLINO BRUNI, the smallest mill we visited, did not enrich flour, nor did they have any dosifiers capable of enriching flour. They did, however, indicate enrichment on their label. This mill consisted of two small units in which the application of enrichment would be very difficult to accomplish because of way the equipment was set up. The production manager was straight forward about the fact that they were not enriching and asked for technical assistance on how he could enrich the flour.

None of the millers we talked to in Honduras were concerned about enrichment causing any problem with the quality or acceptance of the product. They were quite familiar with the practice and did not consider it a new or different technology. They all had enrichment on their label, whether they practiced it or not. The millers understood that there were some regulations regarding flour enrichment, which is why they all labeled it as enriched, but they all said that they had never been inspected or shown any interest by the government as to whether they were

actually enriching. The only government inspection that they knew of was an occasional health and sanitation inspection by the Ministry of Health.

We estimate that the total flour consumption in Honduras is about 390 MT of flour per day, or about 70 g per person per day. Based on reported flour production capacity, this means that the Honduran mills are operating at about 50 percent capacity on average.

Two of the milling companies (Molineros Harineros Sula and IMSA) also produce nixtamalized corn flour for use in tortillas. Before leaving San Pedro, we visited MASECA, the largest producer of this product with about 60 percent of the market in Honduras. MASECA currently is operating at near capacity. They are prepared to double their capacity if needed and expect good market growth of this product in the next few years. We were informed that there is no enrichment of nixtamalized corn flour in Honduras, as we expected.

Given the high levels of consumption of corn products in all the countries of this initiative and the fact that the nixtamalized corn flour industry seems to be growing rapidly, it would make sense to explore the fortification of this product. However, there are some technical questions that need to be addressed, such as bioavailability in the presence of high calcium content and possible changes in the products' characteristics.

## **Nicaragua**

We visited all three flour mills in Nicaragua. The biggest mill, with about 50 percent of the market, is GEMINA, which is also a former General Mills operation. This mill used a fortificant designed for current U.S. enrichment levels, but they added half the amount to save money. They could do this legally because there is no flour enrichment regulation in Nicaragua. Because of their excellent equipment and quality control, it would be very easy for them to go to INCAP fortification levels.

We met with the general manager of MONISA, the second biggest mill in Nicaragua. MONISA only enriched (to U.S. standards) household flour in five-pound bags, a new product which they have recently introduced. We were not allowed to visit the mill and verify whether enrichment was added or how. This mill also made a significant quantity of flour for NABISCO bakery, but were not adding enrichment or any other additives. We learned from a secondary source that there was no enrichment being added at the bakery either. The general manager indicated that they could enrich if required by the government.

HARINISA, the third mill in Nicaragua, was shown to us by the production manager. They did not add enrichment, despite having all their bags labeled as being enriched. The production manager, when asked if he would prefer to add enrichment or correctly label the product, said he would do the former, but he was not the ultimate decisionmaker.

HARINISA also made a mix for cookies used in a school feeding program in the area of Leon which included a special fortification premix that had been designed by INCAP. This premix was mixed with rice flour in a batch mixer and then the rice flour was mixed with soy flour and wheat flour in a customized continuous mixing system. There were questions of whether this special equipment was capable of producing a uniform product. The composite flour was then used by small bakeries under supervision of the Department of Food Technology of the UNAN University in Leon.

We estimate that the total flour consumption in Nicaragua is about 200 MT of flour per day, or about 50 grams per person per day. Based on reported flour production capacity, this means that the Honduran mills are operating at about 50 percent capacity on average.

In Nicaragua the technical people at the flour mills, from laboratory technicians to production manager, expressed a strong desire to have additional training on quality control of flour, including the control of enrichment. These mills have been isolated from Western technology for some time and are eager for any technical assistance they can get.

We also made a quick visit to a rice mill operated by GEMINA. They told us that about 50 percent of the rice is imported and that there are about 25 operating rice mills in the country. We obtained the address of the Rice Millers Association (see appendix). It is potentially possible to fortify rice with iron and this should be considered for both countries since there is considerable consumption of rice. Technically this would be more difficult than fortifying wheat flour with iron.

### **Economics of Fortification by the Wheat Milling industry in Honduras and Nicaragua**

The cost of fortification/enrichment involves the following expenses:

- ▶ the cost of the vitamin and iron premix, which is usually FOB United States.
- ▶ the cost of shipping and insurance, which we estimate at about \$ 0.60/kg.
- ▶ the tariff costs to bring the premix into the country.
- ▶ the cost for the dosifiers and associated equipment.
- ▶ the quality control costs.

Quality control costs would be very low since all the mills already have laboratory facilities and personnel able to check weights and perform simple semi-quantitative quality control testing. The cost of installing the required equipment for fortification is small since the needed dosifiers can be obtained at a very low cost from the fortification premix suppliers, and for many mills, there is already equipment in place. We do not have information on the tariff costs.

The delivered premix costs (first two category costs) for U.S. enrichment are estimated at \$1.35/MT of enriched flour. Using the INCAP formulation, which has slightly lower levels of vitamins and includes restoration levels of folic acids and higher levels of iron than the U.S.

enrichment, the cost is \$1.12/MT of fortified flour. The INCAP formulation has higher iron levels and does not include calcium. However, since the cost of calcium carbonate is roughly the same as the cost of flour, there is no real cost for adding calcium. It would be possible then for the mills to use the INCAP formulation without additional cost over the U.S. enrichment, which some of the mills are currently using.

The price of wheat flour is mainly dependent on the price of wheat which varies from year to year depending on the crop situation. In recent years the price of wheat in Nicaragua went from \$134 to \$200 per MT, a 50 percent increase. The cost of enrichment would represent about 0.25 percent, based on the current price of flour (\$0.51/kg). The cost of enrichment is therefore negligible compared to the fluctuations in price due to the price of wheat. Neither the Honduran nor the Nicaraguan governments control the price of flour. A 100 pound bag of flour is currently worth \$23.15. The cost of the enrichment in the same bag is \$0.055 per bag, so a miller would expect to be able to increase the price accordingly, probably \$0.06 per bag and to pass it on to the baker. Bakers are likely to object to this increase in price. However, the increase in cost of a 5 pound household flour bag is only \$0.003, which would not be noticeable by the consumer. The biggest economic obstacle to fortification would, therefore, come from the commercial baker using 100 pound bags. The baker cannot easily pass that small cost on to the consumer in a unit price of bread. The normal method in both Honduras and Nicaragua for bakers to pass the cost to the consumer would be to decrease slightly the weight of a loaf of bread. Care should be taken to prevent fortification from being used as a justification for passing on noticeable price increases to consumers. The mills that are currently enriching would actually benefit economically and competitively from mandatory fortification, since they are already bearing this cost which their competitors do not have. One suggestion received from a couple of the mills was that the increase in cost resulting from fortification could be more easily borne if the government coincidentally lowered the tariff on wheat. This approach would not harm the smaller mills that are not currently fortifying.

## CONSUMERS DEMAND ASSESSMENT

### Consumer Data

Dietary habits from the 1993-1994 National Household Consumption, Income, Expenditure and Nutrition Survey in Honduras reveal that only 38 percent of households *do not* consume bread. In comparison with other cereals, only 9 percent and 13 percent of households *do not* consume rice and maize respectively.

The 1993 National Survey on Micronutrient Deficiency in Nicaragua reports that 49 percent of households consume wheat flour, compared to 87 percent for rice and 55 percent for corn.

## Products

Wheat flour can be divided in four main categories:

- ▶ **Hard** ("duro" or "fuerte"): For bakery use to prepare white bread (sandwich and "French" types), and "semitas" (a sweet bread); this type of flour contains 12 to 13 percent protein.
- ▶ **Intermediate** ("intermedia"): For household use or bakery use to reduce price; it contains 11.5 percent protein.
- ▶ **Soft** ("suave"): All purpose flour, e.g., cakes and cookies; 10.5-11.0 percent protein.
- ▶ **Cake**: 9.0 percent protein.

Some millers are marketing a "premium" brand of flour aimed at household use (see Appendix A for list of brand names by company). It is usually presented in small 2 pound to 5 pound bags. Though not the case for larger bags destined for the bakeries, product presentation and labeling for the consumer becomes an important part of creating a product "image."

Other noticeable baked flour products in the two countries include such common household names as Bimbo bread and Nabisco cookies.

## Distribution

Millers in both countries distribute almost 80 percent of their production to bakeries for bread making. They distribute directly to the large bakeries and to wholesalers who then distribute to small bakeries and retail stores. Few millers, mostly those with small household flour bags and processed wheat (i.e., pasta or flour tortilla) distribute directly to retail outlets.

## Promotion

It is more appropriate to talk about selling activities instead of advertising, as promotional activities are very limited. If there are any, they target mostly bakeries, for example, through training seminars and materials. Most millers have a team of sales people who call on the major accounts: bakeries and wholesalers. However, for millers starting to market "brands" to the general public, promotion consists mostly of billboards and posters.

## CONCLUSIONS

### Consuming Public

- ▶ Iron deficiency anemia is prevalent in Honduras and Nicaragua.

- ▶ Wheat flour, nixtamalized corn flour, and rice are possible vehicles for increasing the iron intake of the general population
- ▶ Wheat-based products reach the majority of the population in Honduras and Nicaragua.
- ▶ Because enrichment has been practiced on and off for several decades, consumers are accustomed to seeing enriched flour on the labels of wheat flour since the labels have not been changed, even when enrichment was not being practiced.

### **Industrial Sector**

- ▶ The uniform fortification of wheat flour to INCAP levels in all four countries is feasible in a relatively short time. Flour millers are technically set up to fortify all flour, except for one small mill in Honduras.
- ▶ All the mills have laboratory facilities and personnel able to do check weights and semi-quantitative quality control testing of iron added to flour.
- ▶ Flour millers are not opposed to fortification and some do it voluntarily, but they would expect to ultimately pass the cost on to the consumer, as with all their expenses.
- ▶ The cost of the fortification ingredients is very low, about 0.25 percent of the selling price of flour. This cost is negligible compared to the variations in price caused by fluctuations in the price of wheat. The required equipment is already in place or can be obtained with little cost from most of the fortification premix suppliers.
- ▶ No miller expressed concern about fortification changing the characteristics of their product. While there is no formal association of millers in either country, the millers said they would be willing and able to meet with each other and with the government(s) to discuss implementation of flour fortification.

### **Government Sector**

- ▶ A commitment to support micronutrient fortification was made by the First Ladies in December at their meeting in Bolivia.
- ▶ In Honduras, legislation on fortification already exists. Regulations on flour fortification need only to be updated.
- ▶ In Nicaragua, a proposal was submitted to Parliament for general fortification of staple foods.
- ▶ Ministries of Health of Honduras and Nicaragua have improved capacities for monitoring fortification because of experiences with salt and sugar.

## RECOMMENDED ACTIONS

- ▶ Encourage millers in both countries to meet together and with government agencies to develop a better understanding and consensus on flour fortification.
- ▶ Flour fortification legislation and regulations in all four countries should be harmonized on the INCAP fortification standards to increase iron intakes and expedite free trade. Have INCAP consider raising the folic acid level in flour to those used in North America.
- ▶ Assistance should be provided for quality control training of millers and laboratory technicians.
- ▶ Technical assistance should be provided to the few mills requiring installation of new feeders and associated equipment for fortifying flour.
- ▶ A mechanism should be established for the testing of flour in an independent laboratory (such as INCAP) to determine if it is being properly enriched. This same laboratory can assist in surveillance of flour to promote continuing compliance.
- ▶ While the focus of this initiative should continue to be iron fortification of wheat flour, other cereal staples (nixtamalized corn flour and rice) should be considered for iron fortification, as well as the semolina used to make pasta.
- ▶ It should be determined from existing literature and private sector sources whether iron fortification of nixtamalized corn flour is technically feasible without significantly affecting product characteristics and what the bioavailability of iron is in this product. The optimum type of iron and recommended level of fortification should be determined and whether or not additional bioavailability studies are needed. If more information is needed, further studies should be done by INCAP, possibly in partnership with US universities such as Texas A&M.
- ▶ Multinational companies like Maseca, Bimbo, and Nabisco should be approached to learn about their position on (and possibly encourage) voluntary fortification of their products in Latin American countries.

**APPENDIXES**

**APPENDIX A**

APPENDIX - 1

SUMMARY OF THE WHEAT FLOUR PRODUCTION IN HONDURAS AND NICARAGUA  
 February 1997

Company Name (Location)	Market share (%)	Flour Type (% Production)	Brands	Price (US\$/lbs)	Presentation Sizes (lbs, %)	Users (%)	Fortification practices (mg/kg in flour)	Fortif. labelling	Dosifiers (Manuf.)	QC/QA Practices
HONDURAS										
Molino Bruni S.A. and Pastificio <sup>3</sup> Baresa (San Pedro Sula and Amarateca)	10	Hard (30%)	Bruni	0.22	100 (60%)	Bakers	None.	Enriched with vitamins, calcium and iron.	Not suitable for enrichment.	Humidity Ash Protein Bromate (NO)
		Soft (70%) Semolina	Diva	0.20	5 (10%)	Wholesalers <sup>4</sup>  Supermarkets  Pasta: Urban (75%) Rural (25%)				
Industrias Molineras S.A. (IMSA) (San Pedro Sula)	20	Hard (60%)	San Pedro	0.21	100 (90%)	Bakers	REPCO, Type 17 (Not verified)  Thiamine 6.00 Riboflavine 3.96 Niacin 46.2 Iron 37.4  Calcium Unverified	Enriched with: Vitamins A and C, Thiamine, Riboflavin e Niacin and iron.	Karib (Not verified)	Humidity Protein Bromate spot test  Ash and external QC to the FHIA laboratory.
		Intermediate (20%)	San Martin	0.20	25 (8%)	Wholesalers				
		Soft (15%)	San Francisco	0.20	2-5 (2%)	Supermarkets				
		Cake (5%) Millrum	El Cisne  Fibra 100% Natural	0.22						
Molino Harinero Sula S.A. and Pastificio Hondureño (San Pedro Sula) Molino Central Harinero (Tegucigalpa)	55	Hard (60%)	El Panadero	0.22	100 (92%)	Bakers	Rovifarin 955 (Roche)  Thiamine 4.45 Riboflavine 2.65 Niacin 35.6 Iron 29.3  Calcium 1100	Enriched with Vitamins and Minerals.	Equichem and old Adams feeders for enrichment.	Checking weight in feeders  Standard QC (Unverified)
		Intermediate (30%)	El Gallo	0.21	5 (8%)	Wholesalers				
		Soft (10%)	El Aquila			Supermarkets				
		Semolina	La Rosa  La Cumbre  Espiga Dorada	0.21						
Molinos Modernos (Búfalo, Villanueva)	15	Hard (60%)	León Rojo	0.22	100 (100%)	Bakers (50%)	Capable but unverified: Nutri-Mix, Premix 43 (Equichem)  Thiamine 5.96 Riboflavine 3.78 Niacin 46.2 Iron 37.4  Calcium No	Enriched with Vitamins and Minerals.		Every hour: Humidity Bromate spot test  Day: Protein Ash
		Intermediate (30%)	Gold Star	0.21		Wholesalers (50%)				
		Soft (10%)	Gran Medalla	0.21						

3 Factory of pasta.

4 Wholesalers sell to small bakeries and grocery shops ("tiendas" and "pulperias").

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NICARAGUA										
HARINISA (León)	20	Hard (40%)	Suprema	0.22	100 (50%)	Bakers	None.	Enriched with Vitamins and Minerals.	W & T	Every 6 hours (375- 400 qq): Humidity Bromate quantitative
		Intermediate (40%)	Super Star		25 (50%)	Wholesalers				
		Soft (20%)	Gold Star	0.22						
Molinos de Nicaragua S.A. (MONISA) (Granada)	30	Hard (50%)	Ricarina	0.22				5-lbs bags: Enriched with Vitamins and Minerals.		Borate spot test Ash Color Protein
		Intermediate (50%)	Cañón	0.23	100 (80%)	Bakers (69%)	None for large bags.			
		Soft (<1.0%)	Reina del Canadá	0.22	25 (20%)	Wholesalers (30%)	Richment-A, Type 40 (only soft flour in 5-lbs bags)			
General Mills + Industrias Nacionales Agrícolas (INA) (GEMINA) (Chinandega)	50	Hard (80%)	Blanquita	0.23	5 (<1%)	Supermarkets	Thiamine 6.00 Riboflavine 3.83 Niacin 44.7 Iron 38.3	Unverified for large bags.	Sterwin	Every hour: Humidity Bromate spot test  Every 2 hours: Ash Protein  Every 15 days: External QC to USA
		Intermediate (15%)	Espiga de Oro	0.23		Nabisco <sup>5</sup>	Nutri-Mix, Premix 43 (Equichem)			
		Soft (5%)	Gold Medal	0.23	100 (78%)	Bakers	Thiamine 2.97 Riboflavine 1.93 Niacin 23.1 Iron 18.7			
			Silver Medal	0.23	25 (20%)	Wholesalers				
			Bollo Fino							
			Bollo Fino Especial	0.23	2-5 (2%)	Supermarkets				
			Gemina							

ODM/odm

Estimated production amount based on annual wheat importation is:

Honduras: 390 TM/day (average flour intake: 80 g/day per person)

Nicaragua: 200 TM/day (average flour intake: 50 g/day per person)

A brief description of the terms applied to wheat flour is as follows:

Hard ("duro" or "fuerte"): For bakery use to prepare white bread (sandwich and "French" types), and "semitas" (a sweet bread); 12-13% protein.

Intermediate ("intermedia"): For household use or bakery use to reduce price; 11.5% protein.

Soft ("suave"): All purpose flour, e.g. cakes and cookies; 10.5-11.0% protein.

Cake: 9.0% protein.

## APPENDIX - 2

SUMMARY OF THE CORN-NIXTAMALIZED FLOUR PRODUCTION IN HONDURAS AND NICARAGUA  
 February 1997

Company Name (Location)	Production Capacity (MT/day)	Market share (%)	Brands	Price (US\$/lbs)	Presentation Sizes (lbs, %)	Users (%)	Fortification Practices	QC/QA Practices
HONDURAS								
Industrias Molineras S.A. (IMSA) (San Pedro Sula)	13	10	Masabrosa Del Maizal (Proincesa)	-	2 (100%)	Wholesalers Supermarkets	None.	N/A
Molino Harinero Sula S.A. (San Pedro Sula)	32	30	Sularina Rapimasa Blancarina	-	2 (100%)	Wholesalers Supermarkets	None.	N/A (Lab. was closed during moment of visit)
MASECA (2: Choloma y Comayagua)	85	60	Maseca Tortimasa	0.27-0.29  0.10	2 (80%)  50 (20%)	Wholesalers and Supermarkets (80%) Tortillerias (20%)	None.	Every 30 min: Humidity, acidity yield color granulometry
NICARAGUA								
MASECA (Chinandega)	BUILDING OF INSTALLATIONS HAS INITIATED.							

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**APPENDIX B**

## LIST OF CONTACTS

### **Food Control, Honduran Government:**

Germán Adalid Alfaro Bonilla  
Subcoordinador Dept. Control de Alimentos, Ministerio de Salud  
Manuel Chaves  
Inspector, Dept. de Control de Alimentos, Región III

### **Molino Harinero Sula:**

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Iván Carillo, Gerente de Producción  
Ilsy Zavala, Gerente de Control de Calidad

### **Molino Bruni, S.A.**

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### **Industrias Molineras, S.A. (IMSA)**

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### **Derivados del Maiz de Honduras, S.A. (DEMAHSA-MASECA)**

Javier Bolaños, Gerente de Producción

### **Honduras Ministry of Economy**

Orbelina Navarro  
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Walter Ramirez  
Jefe, Dept. de Normalización y Metrología, Ministerio de Industria

### **INCAP**

Doris Chinchilla  
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**Honduras Ministry of Health**

Virginia Figueroa de Espinoza  
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**Molinos de Nicaragua, S.A. (MONISA)**

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# BASICS

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