

Summary of Mandatory and Voluntary Staple Food Fortification in Developing Countries

Country	Product (1)	Mandate	Fortification nutrients and levels (2)						Sources of Data (3)	
			Thiamin (mg/kg)	Riboflavin (mg/kg)	Niacin (mg/kg)	Folate (mg/kg)	Iron (mg/kg)	Vitamin A (IU/kg)		Others
AFRICA										
Kenya	Wheat flour		2.4		1.6		16.5		Calcium: 2.35-3.90 g/kg	P
	Maize flour		2.4		1.6		16.5		Calcium: 2.35-3.90 g/kg	P
	Maize meal breakfast product						105	2,165		A
	Millet porridge		XX	XX			XX	XX	B6: unknown level	A
	Margarine							XX		A
	Cooking oil/fat							XX		A
Malawi	Cooking oil							XX		M
Namibia	Maize meal		2.03	1.73	19.5	0.37	9.33	4,718	B6: 2.1 mg/kg	M
Nigeria	Flour	Food and Drugs Decree 1974 (No. 35) Cereal & Bakery Products Regulation 1980	4.5-5.5	2.7-3.3	35.5-44.4		28.9-36.7			M
South Africa	Maize meal		2.25	2.5	25			4,246		M
	Enriched maize meal			2.5	25					M
	Margarine			16	180	2		33,000	B6: 20 mg/kg	M
	Margarine							20,000 - 40,000	Vit D: 1,000 IU/kg	M
	Bread		1.6	1.6	30.85	0.22	15	3,130	B6: 2.5 mg/kg	M
Uganda	Soy and maize products									D
	Wheat flour		2.4		1.6		16.5		Calcium: 2.35-3.90 g/kg	P
	Maize flour		2.4		1.6		16.5		Calcium: 2.35-3.90 g/kg	P
Zambia	Maize meal (legislation in process)		3.05	2.6	29.25	0.55	14	7,076	B6: 3.15 mg/kg, zinc: 15 mg/kg	F

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	Refined sugar	Statutory							>33,300	C
	White sugar	Instrument No. 155							≥33,300	C
	Brown, yellow, and golden sugar	of 1998							≥33,300	C
Zimbabwe	Maize meal		3.05	2.6	29.25	0.55	14	7,076	B6: 3.15 mg/kg	F
	Bread		1.48	1.72	19.2	0.22	15.2	3,596	B6: 2.16 mg/kg	M
	Margarine							27,000 - 33,000	Vitamin D	M

ASIA NEAR EAST

Australia	Flour, wholemeal & mixture of flour/wholemeal for making bread	Australian Food Standard Code Part B (B1)	≥6.4							L
	Table margarine	Australian Food Standard Code Part G (G2)						>28300	Vit D: ≥2200 IU/kg	L
Bahrain	Enriched and enriched treated wheat flour	Bahraini Standard 194/1994	6.38	3.96	52.91		36.3		Vit D: ≥551.15 IU/kg (optional), Calcium: ≤2115 mg/kg	R
India	Vanaspati	Prevention of Food Adulteration Act 1954 (37 of 1954) & PFA Rules 1955						≥25,000		E
	Margarine							≥30,000		E
	Wheat flour		XX	XX	XX		XX		Calcium	P
Indonesia	Margarine	DG of FDA Decree No. 02240/B/SK/VII/91						25,000 - 35,000	Vit D: 2,500-3,500 IU/kg	E, L
	Wheat flour						60ppm			L
	Wheat flour		XX	XX		folic acid	XX		Zinc	S
Malaysia	Table margarine	Food Act 1983 and Food Regulations 1985, Amendment 1990						25,000 - 35,000	Vit D: 2,500-3,500 IU/kg	E,L
	Evaporated/unsweetened condensed milk	Food Act 1983 and Food Regulations 1985, Amendment						≥6,700		E

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	Condensed/ sweetened condensed milk	1990						≥6,700		E
	Filled milk/ evaporated or condensed filled milk							≥6,700		E
New Zealand	Table margarine							>28300	Vit D: ≥2200 IU/kg	L
Pakistan	Oil products (ghee/butter oil)							33,000		G
	Wheat flour		XX	XX	XX		XX		Calcium	P
Philippines (4)	Shelf stable margarine		200					117,000	Vit D: 3,300 IU/kg	K
	Wheat flour		XX	XX	XX		XX	16,170		Q
	Edible oil (with Sangkap Pinov Seal)							XX		Q
	Filled milk, sweetened or unsweetened	Administrative Order No. 132 s. 1970						≥4866	Vit D: ≥973 IU/kg (optional)	L
	Margarine	Administrative Order No. 243 s. 1975	≥88					≥33000	Vit D: ≥3300 IU/kg (optional)	L
Saudi Arabia	Enriched wheat and enriched treated flour	Saudi Standard 219/1994	6.38	3.96	52.91		36.3		Vit D: ≥551.15 IU/kg, Calcium: ≤2115 mg/kg, folic acid: 1.5 mg/kg	R
Singapore	Margarine							≥28,300	Vit D: ≥2,200 IU/kg	E
	Table margarine							≥28,300	Vit D: ≥2,200 IU/kg	E
Thailand	Sweet Condensed Milk	MOPH Notification No. 149 (1993)						11000		L
Turkey	Table margarine							20,000	Vit D: 1,000 IU/kg	G
LATIN AMERICA & CARIBBEAN										
Argentina	Fluid and dried milk (whole & skim)	Res. 1505 Art. 1368 (10/08/88)						2,500/L	Vit D: 400 IU/L	N

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Barbados	Wheat flour	Caribbean Standard, 1991	5.7	4	46		37	2,340		P
Belize	Wheat flour	Caricom Standard, 1997	XX	XX	XX		16.4 – 36.4			P
Bolivia	Wheat flour	Decree 21420, Nov 1996	4.45	2.65	35.6	1.5	60			L
Brazil	Dried skim milk for complementary foods	Portaria MS No. 975 (17/09/90)						15,000 – 25,000	Vit D: 2,000-2,400 IU/kg	E
	Margarine	Decree 30.691, Art. 350 (29/03/52)						15,000-50,000	Vit D: 500-2,000 IU/kg	E
Chile	Wheat flour	Reglamento Sanitario de los Alimentos Art. 350 (13/05/97)	6.3	1.3	13	2.0 (proposed)	30			E, L
	Pasta	Reglamento Sanitario de los Alimentos Art. 363 (13/05/97)	9	3	57		30			E
	Margarine	Reglamento Sanitario de los Alimentos Art. 263 (13/05/97)						30,000	Vit D: 3,000 IU/kg (optional)	E, L
Colombia	Margarine	Resolucion 11488/84 Articulo 52 (22/08/84)						30,000	Vit D: 300 IU/kg	E, L
	Wheat flour	Legislation passed in 1996	6	4	55	1.54	44			J, L
Costa Rica	Wheat flour	Decreto 123 (28/07/58) Art. 1 to 31; Decreto 7 (05/05/67), revised in 1997.	6	4	55	1.5	60			J

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Dominican Republic	Wheat flour	Comienza a acatar Dec 92, revised in 1997.	6	4	55	1.5	60			L
Ecuador	Margarine	Norma: INEN 282						20,000-30,000	Vit D: 2,000-4,000 IU/kg	E
	Wheat flour	Legislation passed in 1996	4	7	40	0.6	55			L
El Salvador	Wheat flour	NSD 34030/Decreto No. 426 (30/11/67), revised in 1996	4	2.5	45	1.3	55			L
	Margarine							15,000		E
	Sugar	Decreto No. 843 (14/04/94)						50,000		E
Guatemala	Skim milk	Norma Coguanor NGO-34176						2,000 – 3,000/L	Vit D: 400-600 IU/L	E
	Whole milk	(06/86)						2,000 – 3,000/L	Vit D: 400-600 IU/L	E
	Wheat flour	Decreto 44/92/Acuerdo Legislativo 11/92, revised in 1993	4.0 – 6.0	2.5 – 3.5	35-40	0.35-0.45 folic acid	55-65		Calcium: 1.0-1.1 g/kg	E
	Pasta	Coguanor NGO 34 176 (06/86)	8.8-11.0	3.7-4.8	59.5-74.9		26.8-36.8			E
	Margarine	Norma Coguanor NGO-34092 (10/85)						15,000-50,000		E
	Sugar	Decreto No. 56-74 (28/06/74)						50,000		E
Honduras	Milk	Standard of the Industry						2,000/L	Vit D: 400 IU/L	E
	Wheat flour	Decreto No. 307 (17/05/1960) (05/09/61), revised in 1997	4.4	2.6	35.6	1.5	60			J

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	Margarine	Standard of the Industry							35,000	Vit D: 1,500 IU/kg	E
	Sugar	Decreto No. 385 (07/10/76)							50,000		E
Mexico	Sterilized low-fat milk	Reglamento de la Ley General de Salud, Art. 651 (18/01/88)							4,000/L	Vit D: 400 IU/L	E
	Pasteurized low-fat milk	Art. 262 (18/01/88)							4,000/L	Vit D: 400 IU/L	E
	Evaporated whole and low-fat milk	Art. 328 (18/01/88)							4,000/L	Vit D: 400 IU/L	E
	Margarine/spreads	Reglamento de la Ley General de Salud, Art. 651 (18/01/88)							20,000	Vit D: 2,000 IU/kg	E
	Wheat flour (proposed)		4.0 - 8.0	2.4 - 5.0	28 - 45	1.6 - 3.2	24 - 40			Zinc: 16-26 mg/kg	L
	Corn flour (proposed)		4.0 - 8.0	2.4 - 5.0	28 - 45	0.4 - 0.8	24 - 40			Zinc: 16-26 mg/kg	F, L
Nicaragua	Milk								XX		L
	Sugar	Legislation passed in 1999							50,000		L
	Wheat flour	Legislation passed in 1997	6	3.5	40	1.3	60				J, L
Panama	Wheat flour	Decreto 258 - Art. 22 (20/07/62), revised in 1997	6	4	55	1.5	60				J
	Margarine	Decreto 256/258, Art. 223 (20/07/62)							20,000	Vit D: 1,500 IU/kg	E
	Sugar	Decreto No. 385 (07/10/76) (Not enforced)							50,000		E
Paraguay	Wheat flour	Decree 20830, 1998	4	7	40	0.6	55				L

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Peru	Wheat flour	DS No. 004-96-SA (8/96)					30			J
	Margarine	Norma ITINTEC						30,000	Vit D: 3,000 IU/kg	E, L
Trinidad & Tobago	Wheat flour	Caricom Standard, 1997	XX	XX	XX		16.4-36.4			O, P
Venezuela	Dried milk powder	Covenin 1981						4,000/L	Vit D: 400 IU/L	E
	Wheat flour	Decreto 1993	1.5	2	20		20			E, P
	Precooked corn flour	Decreto No. 2.492 (20/08/92)	3.1	2.5	51		50	9,500		E, P

FOOTNOTES:

(1) Products in bold letters are fortified under mandatory legislation. All others denote voluntary fortification.

(2) "XX" indicates that levels of fortification are either not known or not specified in the regulations.

(3) Sources:

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F. Fortification Basics: Maize Meal, MOST/USAID/Roche, 1999.

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O. Fortification gains momentum – News feature, Milling & Baking News, July 8, 1997.

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S. Personal communication, Peter Ranum, SUSTAIN, 1999.

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(4) The Sangkap Pinoy Seal Program in the Philippines, launched in August 1996, currently includes fortified edible oil and 24 fortified non-staple products, including instant noodles, cracker biscuits, snack foods, and beverages.