

Global data on food fortification (maize flour, rice, and wheat flour) with thiamine

The following table shows the countries with existing mandatory and voluntary thiamine fortification programs of maize flour, rice, and wheat flour, including the year in which the fortification program was initiated and the recommended level of thiamine.

Source: [Global Fortification Data Exchange](#) (updated October 1, 2018)⁶⁵

Country	Year	Mandatory or voluntary	Recommended Nutrient Level	Average Value (mg/kg)
Maize Flour				
Burundi	2015	Voluntary	6.5 +/- 2.9 mg/kg recommended factory level, 3.6 mg/kg minimum regulatory level, 9.4 mg/kg maximum regulatory level, addition of this nutrient is optional	6.5
Costa Rica	1999	Mandatory	minimum level of 4.0 mg/kg	4
Dominican Republic	2009	Voluntary	minimum level of 6.2 mg/100 g, we assumed the units were expressed per kg	6.2
El Salvador	2009	Mandatory	minimum level of 6.1 mg/kg	6.1
Guatemala	2016	Mandatory	2.5 mg/kg (average content to add)	2.5
Kenya	2012	Mandatory	4.0 +/- 2.0 mg/kg recommended factory level, 1.5 to 6.0 mg/kg (regulatory requirements)	4
Malawi	2011	Mandatory	3.6 - 9.4 mg/kg (regulatory requirements)	4.5
Mexico	2005	Mandatory	5 mg/kg	5
Mozambique	2012	Voluntary	5 mg/kg is the minimum addition level, no safety limit set, addition of this nutrient is optional	5
Nigeria	2014	Mandatory	6.0 mg/kg	6
Rwanda	2010	Voluntary	6.5 +/- 2.9 mg/kg recommended factory level, 3.0 mg/kg minimum regulatory level, no maximum level set	6.5
South Africa	2008	Mandatory	2.1875 mg/kg	2.19
Uganda	2006	Mandatory	0.2 mg/100 g minimum required level, no tolerable maximum set, for low-extraction maize flour	2
United States of America	2017	Mandatory	It contains in each pound not less than 2.0 milligrams (mg) and not more than 3.0 mg of Thiamine	5.5
Venezuela, Bolivarian Republic of	1996	Mandatory	0.31 mg/ 100 g average addition level, 0.20 mg/100 g minimum addition level, 0.50 mg/100 g maximum addition level	3.1
Zimbabwe		Mandatory	minimum level of 4.5 mg/kg	4.5
Rice				
Costa Rica	2006	Mandatory	5.3 mg/kg	5.3

India	2016	Voluntary	3.5 mg/kg minimum required level, addition of this nutrient is optional	3.5
Nicaragua	2014	Mandatory	5 mg/kg	5
Panama	2009	Mandatory	5 mg/kg	5
Papua New Guinea	2007	Mandatory	0.5 mg/100 g	5
United States of America	2017	Mandatory	each pound of the rice contains not less than 2.0 milligrams (mg) and not more than 4.0 mg of Thiamine	6.6
Venezuela, Bolivarian Republic of	1993	Voluntary	1.0 mg/100 g	10

Wheat Flour

Antigua and Barbuda	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Argentina	2002	Mandatory	6.3 mg/kg	6.3
Australia	2014	Mandatory	not less than 6.4 mg/kg	6.4
Bahamas	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Barbados	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Belize	1998	Mandatory	6.0 mg/kg	6
Bolivia, Plurinational State of	2011	Mandatory	minimum level of 4.4 mg/kg	4.4
Burundi	2015	Mandatory	9.8 +/- 4.4 mg/kg recommended factory level, 4.6 mg/kg minimum regulatory level, 14.2 mg/kg maximum regulatory level	9.8
Canada	2016	Mandatory	0.64 mg/100 g	6.4
Chile	2014	Mandatory	6.3 mg/kg	6.3
China, People's Republic of	2012	Voluntary	3 - 5 mg/kg	4
Colombia	1996	Mandatory	6 mg/kg	6
Costa Rica	2001	Mandatory	5.4 mg/kg	5.4
Cuba	2012	Mandatory	5 - 6 mg/kg	5.5
Dominica	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Dominican Republic	2009	Mandatory	minimum level of 6.2 mg/kg	6.2
Ecuador	2011	Mandatory	2.2 - 5.8 mg/kg	4
El Salvador	2007	Mandatory	minimum level of 6.2 mg/kg	6.2
Ethiopia	2017	Voluntary	9 mg/kg, recommended factory level	9
Fiji	2009	Mandatory	6.0 mg/kg	6
Ghana	2006	Mandatory	8.4 mg/kg +/- 10%	8.4
Grenada	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Guatemala	2001	Mandatory	4.0 - 6 mg/kg	5

Guinea	2006	Mandatory	4.05 g/ton	4.05
Guyana	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Haiti	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Honduras	2007	Mandatory	6.2 mg/kg	6.2
India	2016	Voluntary	minimum level of 3.5 mg/kg for Atta flour, addition of this nutrient is optional	3.5
Indonesia	2009	Mandatory	minimum level of 2.5 mg/kg	2.5
Jamaica	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Kazakhstan	2008	Mandatory	1.8 - 3.6 mg/kg	2.7
Kenya	2012	Mandatory	5.0 to 15 mg/kg (regulatory requirement)	10
Kiribati	2014	Mandatory	6.0 mg/kg	6
Kuwait	2006	Mandatory	minimum level of 6.38 mg/kg	6.38
Liberia	2016	Mandatory	5.1 - 13.3 mg/kg	8.5
Malawi	2011	Mandatory	9.0 mg/kg recommended factory level, 5.4 to 14.2 mg/kg regulatory requirements	9
Malaysia	2017	Voluntary	not less than 0.42 mg thiamine/100 g flour	4.2
Mexico	2009	Mandatory	5 mg/kg	5
Morocco	2006	Mandatory	4.5 g/ton	4.5
Mozambique	2012	Voluntary	5 mg/kg is the minimum addition level, no safety limit set, addition of this nutrient is optional	5
Nicaragua	2007	Mandatory	minimum level of 6.2 mg/kg	6.2
Nigeria	2014	Mandatory	6.0 mg/kg	6
Palestine, State of	2010	Mandatory	2.9 mg/kg average addition level, minimum level of 2.0 mg/kg, no maximum tolerance level set	2.9
Panama	2003	Mandatory	minimum level of 6.2 mg/kg	6.2
Paraguay	2002	Mandatory	minimum level of 4.50 mg/kg	4.5
Peru	2006	Mandatory	minimum level of 5 mg/kg	5
Qatar	2006	Voluntary	minimum level of 6.38 mg/kg	6.38
Saint Kitts and Nevis	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Saint Lucia	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Saint Vincent and the Grenadines	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Saudi Arabia	2006	Mandatory	minimum level of 6.38 mg/kg	6.38
Sierra Leone	2010	Voluntary	8.4 mg/kg +/- 10%	8.4
Solomon Islands	2010	Mandatory	6.0 mg/kg	6
South Africa	2008	Mandatory	1.9444 mg/kg	1.94
Suriname	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Tanzania, United Republic of	2010	Mandatory	5 to 15 mg/kg	10

Trinidad and Tobago	1992	Mandatory	not less than 0.44 mg/100 g, not more than 0.77 mg/100 g	6.05
Uganda	2016	Mandatory	9.8 +/- 4.4 mg/kg recommended factory level, 4.6 mg/kg minimum regulatory level, no maximum regulatory level set	9.8
United Arab Emirates	2006	Voluntary	minimum level of 6.38 mg/kg	6.38
United Kingdom of Great Britain and Northern Ireland	1998	Mandatory	not less than 0.24 mg/100 g	2.4
United States of America	2017	Mandatory	it contains in each pound 2.9 milligrams of thiamine	6.38
Venezuela, Bolivarian Republic of	2001	Mandatory	1.5 average addition level, minimum level of 1.2 mg/kg, 1.8 mg/kg maximum tolerance level	1.5
Zimbabwe	2016	Mandatory	9.0 mg/kg	9