

ECSA GUIDELINES OF FORTIFICATION LEVELS FOR STAPLES

NUTRIENT	Fortificant compound	Level of Addition (mg/kg)	Factory Average (Target Level) (mg/kg)	Tolerable analytical range at factories (mg/kg)		Tolerable analytical range at retail stores (mg/kg)		Claim level at the market (mg/kg)	Fortificant Cost [§] (US\$/MT)	Estimated Total Cost [¶] (US\$/MT)	Price of Unfortified Food (US\$/kg)	Price Increase (%)	Cost per Person consuming daily the serving size (US\$/year)	Serving size (g/day)
				Minimum	Maximum	Minimum	Maximum							
SALT (76 g fortificant per metric ton -1000 kg- of salt)														
Iodine	Potassium Iodate	45	45	33.5	56.5	30.1	56.5	43	\$2.19	\$2.44	\$0.30	0.81%	\$0.004	5
OIL (69 g fortificant per metric ton -1000 kg- of oil)														
Vit. A	Vit. A (oily)	35	35	30.5	39.5	21.4	39.5	30	\$8.24	\$9.15	\$2.00	0.46%	\$0.033	10
SUGAR (100 g fortificant, diluted to 1000 g premix, per metric ton -1000 kg- of sugar)														
Vit. A	Vit. A (water disp.)	7.5	7.5	4.1	10.9	2.9	10.9	7	\$6.40	\$8.72	\$1.30	0.67%	\$0.080	25
WHEAT FLOUR (550 g premix of fortificants per metric ton -1000 kg- of wheat flour)														
Vit. A	Vit. A Palm. SD	1	1	0.6	1.4	0.5	1.4	1	\$0.85		\$0.80	1.15%	\$0.168	50
B-1	Thiamin Mononitrate	9	9.8	5.4	14.2	4.6	14.2	9	\$0.56					
B-2	Riboflavin	6	6.6	3.6	9.6	3.3	9.6	6	\$0.75					
Niacin	Niacinamide	50	60	33.1	86.9	29.8	86.9	58	\$1.11					
B-6	Pyridoxine	0	-	-	-	-	-	-	-					
Folate	Folic acid	2	2.3	1.3	3.3	1.1	3.3	2	\$0.42					
B-12	Vitamin B12 0.1% WS	0.020	0.020	0.011	0.029	0.01	0.029	0.020	\$1.30					
Iron	NaFeEDTA*	30	30	20	40	20	40	30	\$1.51					
	Total Iron	-	39	27	51	27	51	39	-					
Zinc	Zinc oxide**	80	88	60	116	60	116	88	\$0.55					
									\$7.05	\$9.19				
MAIZE FLOUR (350 g premix of fortificants per metric ton -1000 kg- of maize flour)														
Vit. A	Vit. A Palm. SD	1	1	0.6	1.4	0.5	1.4	1	\$0.85		\$0.50	1.18%	\$0.216	100
B-1	Thiamin Mononitrate	4.5	6.5	3.6	9.4	3.0	9.4	6	\$0.28					
B-2	Riboflavin	3	4	2.2	5.8	2.0	5.8	4	\$0.38					
Niacin	Niacinamide	25	30	16.6	43.4	14.9	43.4	29	\$0.56					
B-6	Pyridoxine	0	-	-	-	-	-	-	-					
Folate	Folic acid	1	1.2	0.7	1.7	0.6	1.7	1	\$0.21					
B-12	Vitamin B12 0.1% WS	0.015	0.015	0.008	0.022	0.007	0.022	0.015	\$0.98					
Iron	NaFeEDTA*	20	20	10	30	10	30	20	\$1.01					
	Total iron	-	31	21	41	21	41	31	-					
Zinc	Zinc oxide**	40	49	33	65	53	65	59	\$0.27					
									\$4.54	\$5.91				

* If these iron levels from NaFeEDTA are technologically incompatible with the wheat or maize flours, try lower levels. If even the iron level at 20 mg/kg were found incompatible with wheat flour of its products, switch to 40 mg/kg Ferrous Fumarate. In the case of maize flour, try lower iron levels until finding the one that is technologically compatible.

** If these zinc levels from ZnO are technologically incompatible with the wheat or maize flours, try lower levels until finding the technologically appropriate level for each type of flour and their products.

§ Updated prices in August 2010. These prices are for reference only; the final price depends on volumen of purchasing and place of shipment.

¶ These are estimations considering fortificant price, annual cost and maintenance of fortification equipment, quality control procedures, packaging, and labeling.