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Nutritional Guidance for Complementary Food

1. INTRODUCTION

1.1 Purpose

This guidance defines minimum nutritional requirements of formulated complementary food in dry powder form to be used at a daily dose of 25g to 50g for children aged 6 to 23 months.

This guidance is not a specification used for WFP's procurement of specialized nutritious foods such as Super Cereal plus or LNS products¹. Instead, this document has been developed to support the screening of formulated complementary foods² available in markets for ensuring those complementary foods meet minimum nutritional requirements, before recommending their consumption by children 6 to 23 months of age and to guide

decisions on eligibility of a food for redemption against commodity specific vouchers or purchasing by public sector buyers. In addition, the guidance can be used by food manufacturers to improve existing formulated complementary food formulations.

1.2 Definition

Complementary foods are liquid and solid foods introduced to complement breast milk in a child's diet when, from the age of 6 months³, breast milk alone is no longer sufficient to meet nutritional requirements. The target age range for complementary feeding is 6 to 23 months old. Complementary foods are not intended to replace breast milk. Complementary foods can be prepared from local foods or family foods and from formulated foods.



2. REFERENCES

- Guideline on Formulated Complementary Foods for Older Infants and Young Children, CAC/GL 08-1991 of the Codex Alimentarius
- Standard for Processed Cereal-Based Food for Infants and Young Children, STAN 074-1981 of the Codex Alimentarius
- WHO Guideline on sugar intake for Adults and Children⁴
- WHO Guiding Principles on Feeding of The Breastfed and Non-Breastfed Child⁵
- FAO/WHO Vitamins and Mineral Requirements in Human Nutrition. 2nd Edition 2004 (RNIs)
- Dietary Reference Intakes (DRIs) from the Food and Nutrition Board, Institute of Medicine (IOM), National Academies, 2010
- Nutritional Guidelines for Complementary Foods and Complementary Food Supplements Supported by GAIN. Published by GAIN, Global Alliance for Improved Nutrition⁶

3. PRODUCT

3.1 General Requirement

- **Production:** conform to Guideline on formulated complementary foods for older infants and young children, CAC/GL 08-1991 of the Codex Alimentarius
- **Ingredients:** flour can include ingredients such as

wheat, rice, corn and soy, milk powder, vegetable oil, a vitamin and mineral premix and may include sugar (max 10%) and alpha-amylase

- **Shelf life:** minimum 6 months under conditions prevalent in the country
- **Acceptability:** pleasant with a soft, semi-solid consistency when prepared as per product preparation instructions.

3.2 Nutritional Requirement

- **Energy density:** once prepared according to the instructions, the product should provide 0.8 kcal/g or more (rule of thumb: 50 g flour cooked with max 250 ml water or reconstituted with max 200 ml water, or 25 g flour cooked with max 125 ml water or reconstituted with max 100 ml water [since no evaporation])
- **Nutrient density:** as per Target in table 1 to get as close as possible to 100% of recommended nutrient intake (RNI/DRI) in a daily dose of 50g (± 200 kcal). In this case, when assuming that the child consumes also other foods that contribute to meeting their nutrient needs besides the formulated complementary foods, an average consumption of 25g/d (± 100 kcal) will result in meeting 50% of the RNI/DRI for most nutrients, except for energy (i.e. protein, fat, carbohydrates). The minimum requirement will result in meeting 50% of RNI/DRI for most nutrients, in case of a daily dose of 50 g, and 25% in case of 25 g/d. The maximum nutritional values were set for nutrients with a specified Upper Level available for this age group.

Table 1. Nutrient content per 100g powder, from natural ingredients and premix

Nutrient content per 100g powder	Min ⁷ (1RNI/100g)	Target ⁸ (2RNI/100g)	Max ⁹ (/100g)	Reference			
				RNI 7-12 m	RNI 1-3 y	DRI 6-12 m	DRI 1-3 y
Energy (kcal)	400	420	440				
Protein (g)	8	16	16.5				
Protein from dairy sources (g)	3.6 ¹⁰	7.2					
Fat (g)	9	10					
Linoleic acid (g)	1.5	2.5 ¹¹					
Sugars added (g) ¹²	0	5	10				
Vitamin A (µg RE)	300	800	1250	400	400	500	300
Thiamin B1 (mg)	0.3	0.6		0.3	0.5	0.3	0.5
Riboflavin B2 (mg)	0.4	0.8		0.4	0.5	0.4	0.5
Niacin B3 (mg NE)	4	8	10	4	6	4	6
Pantothenic acid (mg)	1.8	3.6		1.8	2	1.8	2
Pyridoxine (Vitamin B6) (mg)	0.3	0.6		0.3	0.5	1.8	0.5
Biotin (Vitamin B7) (µg)	6	12		6	8	6	8
Folates (Vitamin B9) (µg DFE)	80	160 ¹³	300	80	150	80	150
Vitamin B12 (µg)	0.5	1.4		0.7	0.9	0.5	0.9
Vitamin C (mg)	15	60		30	30	50	15
Vitamin D (µg)	5	10	24	5	5	10	15
Vitamin E (mg α-TE ¹⁴)	2.7	5.4		2.7	5	5	6
Vitamin K (µg)	2.5	20		10	15	2.5	30
Calcium (mg)	260	800		400	500	260	700
Copper (mg)	0.22	0.44	1.0			0.22	0.34
Iodine (µg) ¹⁵	90	90	200	90	90	130	90
Iron (mg)	11.6	23	40	18.6 ¹⁶	11.6 ¹⁶	11	7
Magnesium (mg)	54	108	168	54	60	75	80
Manganese (mg)	0.6	1.2	2			0.6	1.2
Phosphorus (mg)	180 ¹⁷	550 ¹⁷				275 ¹⁸	460 ¹⁸
Potassium (mg)	700	773 ¹⁹				700	3000
Selenium (µg)	10	15 ²⁰	36	10	17	20	20
Sodium (g)			0.4 ²¹			0.37	1.0
Zinc (mg)	4.2 ²²	8.4 ²²	14	8.4 ²³	8.3 ²³	3	3

Footnotes

¹ WFP food specifications are available from: <http://foodqualityandsafety.wfp.org/specifications>.

² WFP supports the use of local nutritious foods as complementary foods for young children, however, this guidance is focused on formulated complementary foods only.

³ Exclusive breastfeeding is recommended for the first 6 months of life and it is recommended to continue breastfeeding to 24 months of age and beyond

⁴ WHO guidelines are available from: http://www.who.int/nutrition/publications/guidelines/sugars_intake/en/

⁵ World Health Organization. (2005). Guiding principles for feeding non-breastfed children 6-24 months of age, and; World Health Organization. (2003). Guiding principles for complementary feeding of the breastfed child. *Geneva: WHO*.

⁶ <http://www.gainhealth.org/wp-content/uploads/2014/05/69.-Nutritional-Guidelines-for-Complementary-Foods-and-Complementary-Food-Supplements-Supported-by-GAIN.pdf>

⁷ For micronutrients, the minimum is equivalent to 1 RNI in 100g (i.e. 50% RNI/DRI in a daily dose of 50 g or 25% in 25 g).

⁸ Where a daily dose of 50 g is unlikely (e.g. when food is self-purchased in small amounts), the target level (2 RNI in 100 g, i.e. 1 RNI in 50g) is recommended as it will provide 50% RNI/DRI in a daily dose of 25 g. This target level can also be chosen where nutrient intake gap is likely large and/or undernutrition prevalence is high.

⁹ Maximum level is only specified where the Upper Level is close to the target nutrient content in 100 g.

¹⁰ If dry skimmed milk with 36% protein is used this is equivalent to 10% dry skimmed milk.

¹¹ If soybean oil with 50% linoleic acid is used this is equivalent to 5% soybean oil.

¹² Inclusion of sugar is often important to achieve the required energy density. The maximum 10 g sugar remains within the WHO recommendation on sugar intake, i.e. maximum 10% of total energy intake from sugar.

¹³ This is equivalent to 96 µg folic acid.

¹⁴ This is equivalent to 1 mg RRR- α -tocopherol (FAO/WHO). The DRI (IOM) includes both RRR- α -tocopherol that occurs naturally in foods and 2R-stereoisomeric forms of α -tocopherol that occurs in fortified foods and supplements.

¹⁵ Where iodized salt consumption by the target group is likely substantial, the minimum level can be adjusted. Target level is set at 50% of the daily requirement in a daily dose of 50g to take into account iodized salt consumption.

¹⁶ Assuming 5% bioavailability as fortificant iron has higher bioavailability than native iron from plant-source foods.

¹⁷ This is bio-available Phosphorus (P), derived from calcium level to ensure Ca/P ratio is between 1 - 1.5. To estimate bioavailable P from foods, assume a 30% P bioavailability from plant sources and 100% P bioavailability from animal sources and premix. The P level can be adjusted if necessary to ensure that the Ca/P ratio is between 1 - 1.5.

¹⁸ This is total Phosphorus (P).

¹⁹ Set below 2 RNI in 100 g (1 RNI in 50g) considering its impact on taste.

²⁰ Level that can be reached without fortification (homogeneity requirements for selenium are very strict to avoid toxicity related to a too high content in an individual serving).

²¹ STAN 074-1981.

²² To not exceed the maximum zinc content in 100 g, the minimum zinc level is set at 50% RNI in 100 g and target at 1 RNI in 100 g.

²³ Assuming low bioavailability.



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