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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 products<sup>1</sup>. Instead, this document has been developed to support the screening of formulated complementary foods<sup>2</sup> 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 months<sup>3</sup>, 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 Children<sup>4</sup>
- WHO Guiding Principles on Feeding of The Breastfed and Non-Breastfed Child<sup>5</sup>
- 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 Nutrition<sup>6</sup>

## 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 ( $\pm 200$ 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 ( $\pm 100$ 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 <sup>7</sup> (1RNI/100g)	Target <sup>8</sup> (2RNI/100g)	Max <sup>9</sup> (/100g)	Reference			
Energy (kcal)	400	420	440	RNI 7-12 m	RNI 1-3 y	DRI 6-12 m	DRI 1-3 y
Protein (g)	8	16	16.5				
Protein from dairy sources (g)	3.6 <sup>10</sup>	7.2					
Fat (g)	9	10					
Linoleic acid (g)	1.5	2.5 <sup>11</sup>					
Sugars added (g) <sup>12</sup>	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 <sup>13</sup>	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 <sup>14</sup> )	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) <sup>15</sup>	90	90	200	90	90	130	90
Iron (mg)	11.6	23	40	18.6 <sup>16</sup>	11.6 <sup>16</sup>	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 <sup>17</sup>	550 <sup>17</sup>				275 <sup>18</sup>	460 <sup>18</sup>
Potassium (mg)	700	773 <sup>19</sup>				700	3000
Selenium (µg)	10	15 <sup>20</sup>	36	10	17	20	20
Sodium (g)			0.4 <sup>21</sup>			0.37	1.0
Zinc (mg)	4.2 <sup>22</sup>	8.4 <sup>22</sup>	14	8.4 <sup>23</sup>	8.3 <sup>23</sup>	3	3

## Footnotes

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

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

<sup>3</sup> 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

<sup>4</sup> WHO guidelines are available from: [http://www.who.int/nutrition/publications/guidelines/sugars\\_intake/en/](http://www.who.int/nutrition/publications/guidelines/sugars_intake/en/)

<sup>5</sup> 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*.

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

<sup>7</sup> 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).

<sup>8</sup> 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.

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

<sup>10</sup> If dry skimmed milk with 36% protein is used this is equivalent to 10% dry skimmed milk.

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

<sup>12</sup> 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.

<sup>13</sup> This is equivalent to 96 µg folic acid.

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

<sup>15</sup> 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.

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

<sup>17</sup> 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.

<sup>18</sup> This is total Phosphorus (P).

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

<sup>20</sup> 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).

<sup>21</sup> STAN 074-1981.

<sup>22</sup> 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.

<sup>23</sup> Assuming low bioavailability.



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**Developed: WFP New Foods Committee;**

**Reviewed: Nutrition Division (OSN) and Food Quality and Safety Unit (OSCQ)**

**World Food Programme**

Via Cesare Giulio Viola 68/70,  
00148 Rome, Italy  
T +39 06 65131 [wfp.org](http://wfp.org)