

**Formulated complementary foods for
older infants and young children -
Guidelines**

PUBLIC REVIEW DRAFT

DKS 2515:2013

Technical committee representation

The following organizations were represented on the Technical Committee:

University of Nairobi — School of Pharmacy
Egerton University — Department of Human Nutrition
Consumer Information Network
Unilever (K) Ltd.
Nestle (K) Ltd.
DSM Nutritional Products
Phillips Health Care Services
Global Alliance for Improved Nutrition
Proctor and Allan
Nutrition and Dietetic Unit — Ministry of Health
Food safety unit — Ministry of Health
Kenyatta National Hospital — Department of Nutrition
Kenya Industrial Research and Development Institute (KIRDI)
Government Chemist's Department
Ministry of Industrialization and Enterprise Development — Department of Industry
Kenya Bureau of Standards — Secretariat

REVISION OF KENYA STANDARDS

In order to keep abreast of progress in industry, Kenya Standards shall be regularly reviewed. Suggestions for improvements to published standards, addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

© Kenya Bureau of Standards, 2013

Copyright: Users are reminded that by virtue of section 6 of the Copyright Act, Cap. 130 of the Laws of Kenya, copyright subsists in all Kenya Standards and except as provided under section 7 of this Act, no Kenya Standard produced by Kenya Bureau of Standards may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from the Managing Director.

ISBN 9966-19-932-2

Formulated complementary foods for older infants and young children - Guidelines

KENYA BUREAU OF STANDARDS (KEBS)

Head Office: P.O. Box 54974, Nairobi-00200, Tel.: (+254 020) 605490, 602350, Fax: (+254 020) 604031
E-Mail: info@kebs.org, Web:<http://www.kebs.org>

Coast Region

P.O. Box 99376, Mombasa-80100
Tel.: (+254 041) 229563, 230939/40
Fax: (+254 041) 229448

Lake Region

P.O. Box 2949, Kisumu-40100
Tel.: (+254 057) 23549, 22396
Fax: (+254 057) 21814

Rift Valley Region

P.O. Box 2138, Nakuru-20100
Tel.: (+254 051) 210553, 210555

DKS 2515:2013

Foreword

This Draft Kenya Standard was developed by the Technical Committee on Nutrition and Foods for Special Dietary Uses under the supervision of the Standards Projects Committee and is in accordance with the Procedures of the Bureau.

This standard is developed to provide for guidelines to ensure quality and safety of formulated complementary foods. The standard is expected to further guide in the choice of raw materials and preliminary treatment of the raw material to ensure the anti-nutrient factors are reduced in the final products

During the preparation and revision of this standard reference was made to the following documents:
CODEX STAN 08 1991 Rev. 2013: Guidelines on Formulated Complementary Foods for Older Infants and Young Children; Global Strategy for Infants and Young Child Feeding and World Health Assembly Resolution and Pearson's composition and analysis of foods (Ninth Edition).

Acknowledgement is hereby made for the assistance derived from these sources.

PUBLIC REVIEW DRAFT

Formulated complementary foods for older infants and young children - Guidelines

1 Scope

This draft Kenya standard provides specifications, methods of sampling and test for formulated complementary foods for older infants and young children.

2 Normative references

KS EAS 38, *Labelling of pre-packaged foods — Specification*

KS EAS 39, *Hygiene in the food and drink manufacturing industry — Code of practice*

KS EAS 72, *Processed Cereal-Based Foods for Infants and Young Children*

KS CODEX STAN 73-198, *Canned Baby Foods*

KS CODEX STAN 192-1995, *General Standard for Food Additives*

KS 2455,

KS ISO 5498 *Agricultural food products -- Determination of crude fibre content -- General method*

KS ISO 5555 *Method of sampling*

KS ISO 9648, *Sorghum — Determination of tannin content*

ISO 11085 *Cereals, cereals-based products and animal feeding stuffs -- Determination of crude fat and total fat content by the Randall extraction method*

KS ISO 14902, *Animal feeding stuffs — Determination of trypsin inhibitor activity of soya products* KS ISO

KS ISO 16050, *Foodstuffs — Determination of aflatoxin B1, and the total content of aflatoxins B1, B2, G1 and G2 in cereals, nuts and derived products — High-performance liquid chromatographic method*

ISO 20483 *Cereals and pulses -- Determination of the nitrogen content and calculation of the crude protein content -- Kjeldahl method*

3 Definitions

For the purposes of this standard, the following definitions shall apply:

3.1

formulated Complementary Food

food that is prepared/processed with appropriate nutritional quality to provide additional energy and nutrients suitable for use during the complementary feeding period.

3.2

older infant

is a person from the age of 6 months and not more than 12 months of age.

3.3

young child

is a person from the age of 12 months up to the age of three years (36 months).

3.4

Complementary feeding period

is the period when an older infant and young child transitions from exclusive breastfeeding and/or breastmilk substitutes to feeding on the family diet

4 Recommended Preliminary Treatment of Raw Materials

Cereals, legumes, pulses and oilseeds should first be treated to obtain wholesome and clean raw materials of good quality. Formulations containing milled cereals, legumes, pulses and/or oilseeds that have not been pre-processed require adequate boiling to gelatinize the starch portions, and/or eliminate anti-nutritional factors present in legumes and pulses and to improve the digestibility and absorption of nutrients. Such pre-processing technologies include, but are not limited to:

4.1 Cleaning or washing: to eliminate dirt, damaged grains, foreign grains and noxious seeds, insects and insect excreta and any adhering material.

4.2 Dehulling: when necessary, pulses, legumes, oilseeds and certain cereals such as oats, barley, sorghum and millet should be dehulled as completely as is feasible to reduce the fiber content to acceptable levels and to decrease, and if possible, to eliminate phytates, tannins and other phenolic materials, trypsin and chymotrypsin inhibitors which can lower the protein digestibility, amino acid bioavailability and mineral absorption.

4.3 Degermination: where necessary and appropriate, degermination of wheat, corn, soy, beans and other crops may be considered in order to reduce the phytate content.

4.4 Milling

Milling or grinding of suitable raw materials should be carried out in such a way as to minimize the loss of nutritional value and to avoid undesirable changes in the technological properties of the ingredients.

Formulations containing milled cereals, legumes, pulses and/or oilseeds that have not been pre-processed require adequate boiling to gelatinize the starch portions, and/or eliminate anti-nutritional factors present in legumes and pulses and to improve the digestibility and absorption of nutrients.

Note The bulkiness of foods from food formulations containing dry ingredients obtained by milling of the raw materials may be reduced by adding adequate amounts of enzymes such as alpha- amylase which(during the slow heating to boiling) predigest partially the starch and reduce the amount of water needed for the preparation of the food.

4.5 Toasting

4.5.1 Toasting (dry heating) enhances the flavour and the taste of the food through dextrinization of starch, improves digestibility and contributes to reducing the bulkiness of the formulated food. In addition, it reduces microorganisms and enzyme activity and destroys insects, thus improving keeping qualities.

4.5.2 The toasting process should be carefully controlled to avoid protein damage due to Maillard reaction.

4.5.3 Pulses as well as oilseeds such as soya beans, groundnuts and sesame seeds may be toasted as whole grains directly or after soaking.

4.6 Sprouting, Malting and Fermentation

4.6.1 Cereals and pulses may be induced to germinate by soaking or humidifying however, caution should be taken to ensure that growth of mycotoxin producing microorganisms does not occur.

During sprouting, malting and fermentation, the action of natural amylases contained in the grains results in the predigestion of the starchy portion of the grain (dextrinization) thus reducing the bulk of the food when prepared for feeding and, ultimately, increasing the nutrient density of the food. In addition sprouting, malting and fermentation can induce hydrolysis of phytates and decrease its inhibitory effect on mineral absorption, and may improve B vitamins content.

4.6.2 During the germination process, the split seed coat of the grain can be removed by washing. The malted raw material is milled or ground after drying

4.7 Extrusion cooking

4.7.1 The mix of milled or ground basic ingredients (cereals, pulses, oilseed flours) may be further processed by extrusion cooking. Extrusion cooking should be carefully controlled to avoid possible reduction of available L-lysine, sulphur-containing amino acids, L- arginine, L-tryptophan and vitamins in the food.

4.7.2 The extruded product, after drying if necessary, is milled or ground to the desired particle size.

4.7.3 Extrusion cooking will lead to gelatinization of the starchy portion of the mixture with minimal quantities of water; inactivation of lectins and reduction of trypsin inhibitor activity; reduction in the quantities of water needed for preparation of the food and enhanced flavour.

4.8 Enzymatic Predigestion

4.8.1 In this process the milled or ground basic ingredients (cereals, pulses, and oilseed flours) may be processed in the presence of water and appropriate enzymes under continuous stirring to the desired fluidity. Upon enzyme inactivation the slurry is dried and comminuted to flour or to small flakes to allow for greater nutrient density.

4.8.2 The enzymatic pre-digestion may improve organoleptic characteristics, digestibility, solubility, water requirement for food preparation, and nutrient density.

5 Quality requirements

5.1 General requirements

5.1.1 Formulated complementary foods shall be

- a) processed/prepared from cereals, legumes and/or pulses complying with the relevant Kenya Standard;
- b) free from any foreign matter, insects, rodent contamination and fungal infestation;
- c) free from fermented, musty or other objectionable flavours;
- d) free from rancidity and foreign odour;
- e) wholesome and fit for human consumption in all aspects

5.2 Quality and compositional requirements

Formulated complementary food shall comply with requirements specified in Table 1.

Table 1 — Quality and Compositional requirements of formulated complementary foods for older infants and young children

S. No.	Parameter	Requirement	Method of test
i)	Energy, kcal/g, Max.	4	
ii)	Protein, % of total energy	6 – 15	ISO 20483
iii)	Fat, % of total energy, Min.	20	ISO 11085
iv)	Fibre, g/100g, on dry matter content, max.	5	KS ISO 5498

Note 1: The Protein Digestibility Corrected Amino Acid Score (PDCAAS) shall not be less than 70 per cent of that of the WHO amino acid reference pattern for children from 2 – 5 years

Note 2: Any carbohydrate added for sweetness shall be used sparingly

Note 3: The level of linoleic acid (in the form of glycerides) should not be less than 333 mg per 100 kcal or 1.6 g per 100 g of dry product and the fat or oil when used in the production of Formulated Complementary Foods should ensure a ratio between linoleic acid and alpha-linolenic acid of between 5:1 and 15:1.

6 Serving size

The serving size shall be 10 – 50 g of the Formulated Complementary Food, when prepared according to the instructions depending on energy density with the lower serving corresponding to the high energy density foods.

7 Specific prohibition

7.1 Field beans or faba beans (*Vicia faba L.*) shall not be used in the formulation of Complementary Food for Older Infants and Young Children because of the danger of favism.

Note: Heat treatment does not completely inactivate the toxic components (vicine and co-vicine) of faba bean.

7.2 Partially hydrogenated fats (and oils) shall not be used in Formulated Complementary Foods

8 Food additives

8.1 Food additives and flavours listed in the KS EAS 72 and KS CODEX STAN 73-1981 may be used in Formulated Complementary Foods to the maximum limits given in those Standards.

8.2 Only the food additives referred to in those Standards may be present in the foods covered by these Guidelines, as a result of carry-over from a raw material or other ingredients (including food additives) used to produce the food, subject to the following conditions:

- a) The amount of the food additive in the raw materials or other ingredients (including food additives) does not exceed the maximum level specified; and
- b) The food into which the food additive is carried over does not contain the food additive in greater quantity than would be introduced by the use of the raw material or ingredients under good manufacturing practice, consistent with the provisions on carry-over in the Preamble KS CODEX STAN 192-1995.

9 Contaminants

9.1 Pesticide residues

Formulated complementary foods shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity

Note 1: The products should be prepared with special care under good manufacturing practices, so that residues of those pesticides which may be required in the production, storage or processing of the raw materials or the finished food ingredients do not remain, or, if technically unavoidable, are reduced to the maximum extent possible.

Note 2: These measures should take into account the specific nature of the products concerned and the specific population group for which they are intended

9.2 Other contaminants

9.2.1 The product shall be free from residues of hormones and antibiotics as determined by validated methods of analysis and practically free from other contaminants, especially pharmacologically active substances.

9.2.2 The product shall not contain contaminants or undesirable substances (for example, biologically active substances) in amounts which may represent a hazard to the health of the infants and young children.

9.2.3 The product shall comply with those maximum residue limits and maximum levels established by the Codex Alimentarius Commission.

9.2.4 The product shall be practically free from mycotoxins in amounts which may represent a hazard to the health of the infant and young children and in particular comply with table for aflatoxin limits.

9.2.5 The products shall comply with requirements in table 2 for anti-nutrient factors

Table 2 – Limits of aflatoxin and anti-nutrients factors in formulated complementary foods for older infants and young children

SI no.	Contaminant	Maximum limit	Method of Test
i)	Trypsin inhibitor activity mg/g	5	KS ISO 14902
ii)	tannin content mg/kg	3	KS ISO 9648
iii)	Total Aflatoxin, µg/kg, max.	10	KS ISO 16050
iv)	Aflatoxin B ₁ , µg/kg, max	5	KS ISO 16050

10 Hygiene

10.1 Formulated complementary foods shall be prepared and packaged in premises built and maintained under hygienic condition in accordance with Public Health Act, Cap. 242, Food, Drugs and Chemicals Substances Act, Cap. 254 of the Laws of Kenya and KS EAS 39.

10.2 The microbiological limits in formulated complementary foods shall comply with KS 2455

11 Packaging

Formulated complementary foods shall be packaged and transported in food grade containers and sealed in such a manner as to ensure the safety and quality of the products is maintained.

12 Labelling

Labeling of formulated complementary foods shall be done in accordance with KS EAS 38 and shall be in compliance to the Breast milk substitute Act of the laws of Kenya.

13 Sampling

13.1 Any package/container drawn at random from a lot or batch shall constitute a representative sample of that lot or batch.

13.2 Sampling of formulated complementary foods shall be done in accordance with KS ISO 5555.