RWANDA STANDARD

DRS 636

First edition

2026-mm-dd

Fortified pre-packaged cooked beans— Specification

ICS 67.230

Reference number

DRS 636: 2026

In order to match with technological development and to keep continuous progress in industries, standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

Requests for permission to reproduce this document should be addressed to:

Rwanda Standards Board

P.O Box 7099 Kigali-Rwanda

KK 15 Rd, 49

Tel. +250 788303492

Toll Free: 3250

E-mail: info@rsb.gov.rw

Website: www.rsb.gov.rw

ePortal: www.portal.rsb.gov.rw

Contents

Page

Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 636 was prepared by Technical Committee RSB/TC 22, *Nutrition and Foods for Special Dietary Uses*

In the preparation of this standard, reference was made to the following standard (s):

1) RS EAS 1162: 2024 Pre-packaged cooked beans — Specification

2) FDEAS 1235 2025 Iron-biofortified dry beans — Specification

The assistance derived from the above source is hereby acknowledged with thanks.

Committee membership

The following organizations were represented on the Technical Committee on *Nutrition and Foods for Special Dietary Uses* (RSB/TC 22) in the preparation of this standard.

Africa Improved Foods (AIF)

Amazon Nutrition Cabinet

ANARECO Ltd

Farmfresh Company Ltd

Global Alliance for Improved Nutrition (GAIN)

ISHYO FOODS Ltd

MINIMEX Ltd

National Industrial Research and Development Agency (NIRDA)

One Acre Fund Tubura

Rwanda Consumer's Rights Protection Organization (ADECOR)

Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA)

SOSOMA Industries Ltd

University of Rwanda-College of Agriculture, Forestry and Food Sciences (UR-CAFF)

University of Rwanda-College of Medicine and Health Sciences (UR-CMHS)

World Food Program (WFP)

Rwanda Standards Board (RSB) – Secretariat

Introduction

Many populations, especially in low-income family in Rwanda, suffer from "hidden hunger" due to insufficient intake of essential vitamins and minerals like iron and zinc. Beans are a staple food in many diets, and fortifying them allows for a widespread, passive delivery of these crucial nutrients without requiring significant changes in dietary habits. This directly addresses issues like anaemia, impaired cognitive development, weakened immune systems, and increased susceptibility to diseases.

Fortified pre-packaged cooked beans — Specification

1 Scope

This Draft Rwanda Standard specifies requirements, sampling and test methods for fortified pre-packaged cooked beans obtained from different varieties of *Phaseolus spp*. intended for human consumption

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

AOAC 2011.14, *Calcium, copper, iron, magnesium, manganese, potassium, phosphorus, sodium and zinc in fortified food products. Microwave digestion and inductively coupled plasma-optical emission spectrometry*

AOAC 944.02, *Official method for determination of iron in flour. Spectrophotometric method*

AOAC 968.30, *Canned vegetables. Drained weight procedure*

AOAC 985.16, *Tin in canned foods — Atomic absorption spectrophotometric method*

AOAC 999.11, *Determination of lead, cadmium, copper, iron, and zinc in foods, atomic absorption spectrophotometry after dry ashing*

EAS 900, *Cereals and pulses — Sampling*

EAS 901, *Cereals and pulses — Test methods*

RS CXS 192, *General standard for food additives*

RS EAS 1235, *Iron-biofortified dry beans — Specification*

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

RS 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*

RS ISO 16649-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of beta-glucuronidase-positive Escherichia coli — Part 2: Colony-count technique at 44 degrees C using 5-bromo-4-chloro-3-indolyl beta-D-glucuronide*

RS ISO 1842, *Fruit and vegetable products — Determination of pH*

RS ISO 21527-1, *Microbiology of food and animal feedstuffs — Horizontal method for the enumeration of yeasts and moulds — Part 1: Colony count technique in products with water activity greater than or equal to 0.95*

RS ISO 2173, *Fruit and vegetable products — Determination of soluble solids — Refractometric method*

RS ISO 6579-1, *Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of salmonella — Part 1: Detection of salmonella spp.*

RS ISO 7937, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of Clostridium perfringens — Colony-count technique*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply.

3.1

dry beans

dry threshed field and garden beans, whole, or broken, and split, seed obtained from different variety of *Phaseolus spp*. commonly used for edible purpose

3.2

pre-packaged cooked beans

beans which have been subjected to heat but not limited to boiling, steaming and packed in food grade packaging materials

3.3

fortified pre-packaged cooked beans

pre-packaged cooked beans to which micronutrients have been added specifically to provide additional nutrients which are either lacking or are present in insufficient quantities in the diet

3.4

fortification

practice of deliberately adding micronutrient(s) that is vitamins and minerals (including trace elements) in a food, so as to improve the nutritional quality of the food supply and provide a public health benefit with minimal risk to health

3.5

drained weight

weight of the contents of the container after draining

3.6

food grade packaging material

material made of substances which are safe and suitable for their intended use and which will not impart any toxic substance or undesirable odour or flavour to the product

3.7

loose skin

skin or portions of a skin which have become separated wholly from the cotyledons

3.8

broken

cotyledon or portions of a cotyledon which have become separated; or a bean or portions of a bean with the skin or portions of the skin missing

3.9

mashed beans

beans that have been crushed or flattened to the extent that the appearance is seriously affected

3.10

blemished beans

beans that have been affected or damaged by any means to the extent that the appearance or eating quality is adversely affected

3.11

severely blemished beans

beans which are spotted, discoloured or otherwise blemished to an extent that the appearance or eating quality is seriously affected; these shall include worm eaten beans

3.12

extraneous matter

organic and inorganic materials other than cooked beans or any optional ingredients used

3.13

bio-fortified beans

beans that nutrient content (mainly iron and zinc) has been improved through agronomic practices, convectional breeding or biotechnology

3.14

mixed dry beans

dry beans that consist of a mixture of same size groups, different colour and shape groups irrespective of their varieties

3.15

objectionable odour

distinct odour for example musty, rotten, putrid, rancid, gamey or pungent

4 Requirements

4.1 Ingredients

4.1.1 Essential ingredients

The following ingredients shall be used in the preparation of fortified pre-packaged cooked beans and shall comply with the relevant standards:

a) dry beans/mixed dry beans/bio fortified beans complying with RS EAS 46 or RS 288 or RS EAS 1235 respectively

b) premixes containing vitamins, minerals, omega-3 and omega-6;

c) fortified salt complying with RS EAS 35; and

d) potable water complying with RS EAS 12.

4.1.2 Optional ingredients

In addition to the essential ingredients given in 4.1.1, optional ingredients complying with the relevant standards shall include but not limited to the following:

a) sweetening ingredients – sucrose, invert sugar, dextrose, glucose syrup;

b) tomato paste/puree;

c) aromatic plants, spices or extracts thereof;

d) cheese;

e) cooking oil;

f) dried vegetables;

g) fortified edible salt; and

h) starch thickening agent.

4.2 General requirements

Fortified pre-packaged cooked beans shall:

a) be free from off flavours and objectionable odours;

b) be free from insects, worms, filth, fungi and extraneous matter;

c) have uniform texture;

d) be practically free from hard beans, mushy beans, and beans with tough skins; and

e) be well cooked, slightly soft or slightly firm; and their skins shall be tender.

4.3 Specific requirements

4.3.1 Fortified pre-packaged cooked beans shall comply with the specific requirements given in Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Specific requirement for Fortified pre-packaged cooked beans

S/N	Parameter	Requirement	Test method
i.	Total soluble solid in sauce, Brix, min.	2	RS ISO 2173
ii.	Drained net weight, %, min.	65	AOAC 968.30
iii.	Salt content (as sodium chloride), % m/m, max.	1.2	Annex A
iv.	pH	5 – 6	RS ISO 1842

4.3.2 The product shall comply with the specific requirements for micro-nutrients given in Table 2 when tested in accordance with test methods specified therein.

Table 2 — Specific requirements for micronutrients in Fortified pre-packaged cooked beans

S/N	Parameter	Requirement	Test method
i.	Vitamin A, µg/100 g	210	RS ISO 20633
ii.	Vitamin B12 µg/100 g	0.5-0.8	RS ISO 20634
iii.	Iron (for pre-packaged cooked bio-fortified beans) mg/kg	60 -90	AOAC 944.02

iv.	Zinc (for pre-packaged cooked bio-fortified beans) mg/100g, max	3.3	AOAC 2011.14

4.4 Defects and tolerances

Fortified pre-packaged cooked beans shall not exceed limits for common defects given in Table 3 when tested in accordance with the test methods specified therein.

Table 3 — Classification of defects for Fortified pre-packaged cooked beans

S/N	Defect	Maximum limit in drained weight %, m/m	Test method
i.	Blemished beans	2	EAS 901
ii.	Severely blemished beans	2	
iii.	Bean fragments	10	
iv.	Extraneous plant material	0.5	
v.	Total defects	10	
NOTE The parameter, total defective grains is not the sum total of the individual defects. It is limited to 70 % of the sum total of individual defects.			

5 Hygiene

5.1 Fortified pre-packaged cooked beans shall be manufactured and handled in accordance with RS CXC 1.

5.2 Fortified pre-packaged cooked beans shall comply with the microbiological requirements given in Table 4 when tested in accordance with the test methods specified therein.

Table 4 — Microbiological limits for Fortified pre-packaged cooked beans

S/N	Micro-organism	Limit	Test method
i.	Escherichia coli, per g	Absent	RS ISO 16649-2
ii.	Salmonella spp., per 25 g	Absent	RS ISO 6579-1
iii.	Yeasts and moulds, CFU/g, max.	10^2	RS ISO 21527-1
iv.	Clostridium botulinum, per g	Absent	RS ISO 7937

6 Food additives

Food additives when used in the preparation of fortified pre-packaged cooked beans shall comply with RS CXS 192.

7 Heavy metals

Fortified pre-packaged cooked beans shall comply with the heavy metal limits given in Table 5 when tested in accordance with the test methods specified therein.

Table 5 — Maximum limits for heavy metal in Fortified pre-packaged cooked beans

S/N	Heavy metal	Maximum limit mg/kg	Test method
i.	Cadmium	0.1	AOAC 999.11
ii.	Lead	0.1	
iii.	Tin (canned cooked beans)	250	AOAC 985.16

8 Packaging

Fortified pre-packaged cooked beans shall be packaged in food grade materials that will safeguard the hygienic, nutritional and organoleptic qualities of the product.

9 Labelling

9.1 General

9.1.1 In addition to the requirements given in RS EAS 38, the product shall be legibly and indelibly labelled with the following information:

a) name of the product as “Fortified pre-packaged cooked beans”;

b) declaration of micronutrient contents;

c) declaration if bio-fortified beans have been used;

d) name, and physical address of the manufacturer/distributor and/or trade name/brand name;

e) date of manufacture;

f) lot identification;

g) expiry date;

h) country of origin;

i) net weight in metric units;

j) the statement ‘Human food’;

k) storage instructions;

l) instructions on disposal of used package;

m) instructions for use;

n) declaration of Genetically Modified Organism, if the product is derived from GMO raw materials;

o) declaration of allergens, if any;

p) declaration of drained weight; and

q) list of ingredients.

9.1.2 When labelling non-retail packages, information for non-retail packages shall either be given on the packages or in accompanying documents, except that the name of the product, lot identification and the name and address of the manufacturer or packer shall appear on the packages.

9.2 Nutritional labelling and health claims

9.2.1 Nutritional labelling shall be done in accordance with RS EAS 803.

9.2.2 Nutritional and health claims shall be declared in accordance with RS EAS 804 and RS EAS 805

10 Sampling

Sampling of Fortified pre-packaged cooked beans shall be done in accordance with EAS 900.

Annex A
(normative)

Determination of salt content as sodium chloride

A.1 General

The chloride content corresponds to the sum of all anions (halides) calculated as sodium chloride precipitable with silver ions in a nitric acid solution.

A.2 Principle

Quantitative precipitation of the halides extracted from the ash in a nitric acid solution with AgNO3 in excess. Back titration of the surplus AgNO3 with ammonium thiocyanate, using ferric alum (ferric ammonium sulphate) as the indicator.

A.3 Reagents

A.3.1 Distilled or demineralized water.

A.3.2 $AgNO_3$ solution, 0.1 N (16.9888 g $AgNO_3$).

A.3.3 NH_4SCN solution, 0.1 N (7.6113 g NH_4SCN). In practice a slightly higher weight is taken and the solution is adjusted by dilution against a 0.1 N $AgNO_3$ solution.

A.3.4 Cold saturated $NH_4Fe\ (SO_4)2.12H_2O$ solution, (approximately 40 %). The ensuing brown colouring is eliminated by adding pure nitric acid drop wise.

A.3.5 HNO_3 (approximately 30 %).

A.3.6 Diethyl ether of nitrobenzene.

A.4 Apparatus

A.4.1 Measuring flask, 100 ml

A.4.2 Burette, 50 ml

A.4.3 Erlenmeyer flask, 200 ml

A.4.4 Pipettes

A.4.5 Funnel, filtering paper

A.5 Procedure

The ash (residue after carbonization and incineration of the beans at a maximum temperature of 550 °C in a muffle furnace) obtained from 1 g – 2 g dry matter is extracted by means of 80 ml – 90 ml hot distilled water acidified with a few drops of nitric acid. The washings are filtered off into a 100 ml measuring flask; after cooling distilled water is added until the mark is reached (stock solution). In proportion to the expected chloride content aliquot part of this solution, which should preferably contain 50 mg – 100 mg NaCl, taken off, distilled water being added to obtain a quantity of approximately 100 ml. Subsequently 5 ml ferric alum solution (see A.3.4), 20 ml 0.1 N $AgNO_3$ solution (see A.3.2) and 5 ml – 10 ml ether or 1 ml nitrobenzene are added; titration is carried out by means of an ammonium thiocyanate solution 0.1 N (see A.3.3), until the red coloring remains after stirring.

A.6 Expression of results

A.6.1 Sodium chloride content shall be calculated using the formula below:

$$X = \frac{5.56\,(V_2 - V_3) \times V \times 100}{V_1 \times P}$$

where

X is the percent sodium chloride content;

P is the test portion, in milligrams, incinerated;

V is the millilitres of the stock solution derived from the ash;

V_1 is the volume, in millilitres, of stock solution used from titration;

V2 is the volume, in millilitres, of $AgNO_3$ added; and

V3 is the volume, in millilitres, of NH_4SCN necessary for back titration.

A.6.2 Report the results in percentage by weight to one decimal place.

Price based on nnn pages