RWANDA STANDARD

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Second edition

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Spirulina — Specification

ICS 67.220.10

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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

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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.

RS 359 was prepared by Technical Committee RSB/TC 019, *Spices, condiments and food additives.*

This second edition cancels and replaces the first edition (RS 359: 2017) which has been technically revised.

Committee membership

The following organizations were represented on the Technical Committee on Spices, condiments and food additives (RSB/TC 019) in the preparation of this standard.

Rwanda Standards Board (RSB) – Secretariat

Spirulina — Specification

1 Scope

This Rwanda Standard specifies the requirements, sampling and test methods for spirulina.

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.

RS EAS 82, *Determination of Acid insoluble ash*

RS ISO 5498, *Agricultural food products — Determination of crude fibre content — General method*

ISO 16634-2, *Food products — Determination of the total nitrogen content by combustion according to the Dumas principle and calculation of the crude protein content — Part 2: Cereals, pulses and milled cereal products*

RS ISO 7305, *Milled cereal products — Determination of fat acidity*.

3 Terms and definitions

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

3.1

spirulina

blue-green algae (cyanobacterium) of the Genus Spirulina: processed as a valuable source of proteins and other nutrients such as vitamins and minerals

3.2

foreign matter

organic and inorganic materials (such as sand, soil, glass) other than spirulina

3.3

filth

impurities of animal origin, including dead insects.

4 Product presentation

Spirulina may be presented in different form such as pellet, powder, flake form, dried and freeze-dried.

5 Requirements

5.1 General requirements

Spirulina shall:

a) be free from filth;

b) be practically free of any visible foreign matter;

c) be safe and suitable for human consumption; and

d) have characteristic colour, odour and flavour of spirulina

5.2 Specific requirements

Spirulina shall comply with the requirements in Table 1.

Table 1 — Specific requirements

S/N	Characteristics	Requirement	Test method
i.	Protein content %, min, m/m	50	ISO 16634-2
ii.	Moisture content, %, max, m/m	10	RS ISO 712
iii.	Lipids %, max, m/m	7	ISO 7305
iv.	Fiber content, %, max, m/m	7	RS ISO 5498
v.	Total ash, %, max, m/m	13	RS EAS 82
vi.	Acid insoluble ash %, max, m/m	0.35	
vii.	pH	7 - 9	

5.3 Particle size

When presented in powder form, not less than 90 % of particles of the product shall pass through a 0.60-mm sieve.

6 Contaminants

6.1 Heavy metals

The product shall be free from heavy metals in amounts set in Table 2 when tested in accordance with test methods specified therein.

Table 2 — Limits for metal contaminants

S/N	Heavy metals	Maximum Limits mg/kg	Test method
i.	Lead	0.1	RS ISO 6633
ii.	Arsenic	1	RS ISO 6634
iii.	Mercury	0.1	RS ISO 6637
iv.	cadmium	2.0	RS ISO 6561-2

6.2 Pesticide residues

Spirulina shall conform to those maximum residue limits established by the Codex Alimentarius Commission for the ingredients used in the preparation of this product.

6.3 Microbiological requirements

Spirulina shall conform to microbiological maximum limits in Table 3 when tested in accordance with test methods specified therein.

Table 3 — Microbiological limits

Microorganisms	Maximum limit	Test method
Total viable count, CFU/g	10^4	RS ISO 4833-1
Escherichia. coli, CFU/g	absent	RS ISO 16649-1
Salmonella, spp in 25 g	absent	RS ISO 6579-1
Staphylococcus aureus, CFU/g	absent	RS ISO 6888-1
Yeast and moulds, CFU/g	10^2	RS ISO 21527-2

7 Hygiene

Spirulina shall be processed, packaged, stored and distributed under hygienic conditions prescribed in RS CAC/RCP 1.

8 Packaging

Spirulina shall be packaged in food grade packaging materials that shall not affect the safety and the quality of the product.

9 Labelling

In addition to the requirements of RS EAS 38, the labelling shall include the following:

a) the name of the product as “Spirulina”,

b) form in which the product is presented (powder, pellet, flaked),

c) net content,

d) name, location and address of the manufacturer,

e) country of origin,

f) lot or batch number,

g) manufacture date,

h) expiry date,

i) storage instructions, and

j) instruction for use.

10 Sampling

Sampling shall be done in accordance with CAC/GL 50.

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Annex A
(normative)

Gravimetric determination of water-insoluble solids content (Type II method)

A.1 Sampling

A.1.1 Liquid or strained honey

If sample is free from granulation, mix thoroughly by stirring or shaking; if granulated, place closed container in water-bath without submerging, and heat 30 min at 60 °C; then, if necessary, heat at 65 °C until liquefied. Occasional shaking is essential. Mix thoroughly and cool rapidly as soon as sample liquefies. Do not heat honey intended for Hydroxymethylfurfural or diastatic determination. If foreign matter, such as wax, sticks, bee's particles or comb, etc., is present, heat sample at 40 °C in water-bath and strain through cheesecloth in hot-water-funnel before sampling

A.1.2 Comb honey

Cut across top of comb, if sealed, and separate completely from comb by straining through a sieve the meshes of which are made by so weaving wire as to form square opening of 0.500 mm by 0.500 mm when portions of comb or wax pass-through sieve, heat sample as in A.1.1 and strain through cheesecloth. If honey is granulated in comb, heat until wax is liquefied; stir, cool and remove wax.

A.2 Procedure

A.2.1 Preparation of test sample

Weigh 20 g of honey and dissolve in a suitable quantity of distilled water at 80 °C and mix well.

A.2.2 Gravimetric determination

The test sample is filtered through a previously dried and weighed fine sintered glass crucible (pore size 15.40) and washed thoroughly with hot water (80 °C) until free from sugars (Mohr test). The crucible is dried for one hour at 135 °C, cooled and weighed to 0.1 mg.

A.2.3 Expression of results

The result is expressed as percent water insoluble solids (m/m).

Annex B
(normative)

Determination of fructose-glucose ratio

B.1 Principle of the method

The glucose portion of the invert sugar content of honey is determined by reacting it with iodine. The fructose content is calculated by subtraction.

B.2 Apparatus

B.2.1 0.05 N iodine solution

B.2.2 0.01 N sodium hydroxide solution

B.2.3 0.05 N standard sodium thiosulphate solution

B.3 Procedure

Pipette 50 ml of honey solution in a 250-ml stoppered flask. Add iodine solution and 25 ml of sodium hydroxide solution. Stopper the flask and keep in dark for 20 min. Acidify with 5 ml of sulphuric acid and titrate quickly the excess of iodine against standard thiosulphate solution. Conduct a blank using 50 ml of water instead of honey solution.

B.4 Calculation and expression of results

B.4.1 Approximate glucose, percent by mass (g of glucose per 100 g honey):

$$w = \frac{(B - S) \times 0.004502 \times 100}{a}$$

where

B is the volume, in millilitres, of sodium thiosulphate solution required for the blank.

S is the volume, in millilitres, of sodium thiosulphate solution required for the sample, and

a is the mass, in grams, of honey taken for the test.

B.4.2 Approximate fructose, per cent by mass (g fructose per 100 g honey):

$$x = \frac{Total\ reducingsugars(c) - approximateglucosecontent\ (w)}{0.925}$$

B.4.3 Actual glucose content (g per 100 g honey), per cent (Y)= W-0.012X and

$$Fructosecontent(gper\ 100g\ honey), percent\ (z) = \frac{Total\ reducingsugars - y\ actual}{0.925}$$

B.4.4 Fructose-glucose ratio

$$Fructose - glucos\ ratio = \frac{Actual\ fructosecontent\ (z)}{Actual\ glucosecontent\ (y)}$$

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Annex C
(normative)

Fiehe's test

C.1 Reagent

C.1.1 Resorcinol solution

Dissolve 1 g of resublimed resorcinol in 100 ml of hydrochloric acid (specific gravity 1.18 or 1.19).

C.2 Procedure

Dissolve 2 g of honey in 10 ml of water and extract with 30 ml ether. A continuous extractor is preferable. Remove ether in a separating funnel and concentrate the layer at 5 ml. Add 2 ml of freshly prepared resorcinol solution, shake and note the colour.

C.3 Expression of results

A cherry red colour appearing in a minute indicates the presence of commercial invert sugar.

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Price based on 9 pages