
Flavoured drinking water — Specification



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Flavoured drinking water — Specification

1 Scope

This African standard specifies requirements, sampling and test methods for flavoured drinking water.

2 Normative references

The following referenced documents are indispensable for the application 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 932.15, *Fructose in sugars and syrups*

AOAC 950.29, *Sucrose in non-alcoholic beverages*

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Pre-packaged foods — Labelling*

ARS 2216, *Packaged mineral water — Specification*

ARS 2231, *Packaged drinking water — Specification*

ARS 1713, *Nutrition labelling — Requirements*

ARS 1714, *Claims on food — General requirements*

ARS 1715, *Use of nutrition and health claims — Requirements*

ASTM D 1246, *Standard test method for iodide or bromide ion in water*

ASTM D 1976, *Standard test method for elements in water by inductively-coupled argon plasma atomic emission spectroscopy*

ASTM D 4128, *Standard guide for identification and quantitation of organic compounds in water by combined gas chromatography and electron impact mass spectrometry*

ASTM D 4129, *Standard test method for total and organic carbon in water by high temperature oxidation and by coulometric detection*

ASTM D 5907, *Standard test methods for filterable matter (total dissolved solids) and non-filterable matter (total suspended solids) in water*

CXG 66, *Guidelines for the use of flavourings*

CXS 192, *General standard for food additives*

ISO 4832, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique*

ISO 7980, *Water quality — Determination of calcium and magnesium — Atomic absorption spectrometric method*

ISO 6222, *Water quality — Enumeration of culturable microorganisms — Colony count by inoculation in nutrient agar culture media*

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ISO 6332, *Water quality — Determination of iron — Spectrometric method using 1,10-phenanthroline*

ISO 6333, *Water quality — Determination of manganese — Formaldoxime spectrometric method*

ISO 6461-2, *Water quality — Detection and enumeration of the spores of sulphite-reducing anaerobes (clostridia) — Part 2: Method by membrane filtration*

ISO 6635, *Fruits, vegetables and derived products — Determination of nitrite and nitrate content — Molecular absorption spectrometric method*

ISO 6703-1, *Water quality — Determination of cyanide: total cyanide*

ISO 6777, *Water quality — Determination of nitrite — Molecular absorption spectrometric method*

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 7027-1, *Water quality — Determination of turbidity — Part 1: Quantitative methods*

ISO 7393-1, *Water quality — Determination of free chlorine and total chlorine — Part 1: Titrimetric method using N, N-diethyl-1,4-phenylenediamine*

ISO 7393-2, *Water quality — Determination of free chlorine and total chlorine — Part 2: Colorimetric method using N,N-dialkyl-1,4-phenylenediamine, for routine control purposes*

ISO 7393-3, *Water quality — Determination of free chlorine and total chlorine — Part 3: Iodometric titration method for the determination of total chlorine*

ISO 7887, *Water quality — Examination and determination of colour*

ISO 7890-3, *Water quality — Determination of nitrate — Part 3: Spectrometric method using sulfosalicylic acid*

ISO 7899-2, *Water quality — Detection and enumeration of intestinal enterococci — Part 2: Membrane filtration method*

ISO 7980, *Water quality — Determination of calcium and magnesium — Atomic absorption spectrometric method*

ISO 8165-1, *Water quality — Determination of selected monovalent phenols — Part 1: Gaschromatographic method after enrichment by extraction*

ISO 8165-2, *Water quality — Determination of selected monovalent phenols — Part 2: Method by derivatization and gas chromatography*

ISO 8288, *Water quality — Determination of cobalt, nickel, copper, zinc, cadmium and lead — Flame atomic absorption spectrometric methods*

ISO 9174, *Water quality — Determination of chromium — Atomic absorption spectrometric methods*

ISO 9297, *Water quality — Determination of chloride — Silver nitrate titration with chromate indicator (Mohr's method)*

ISO 9308-1, *Water quality — Enumeration of Escherichia coli and coliform bacteria — Part 1: Membrane filtration method for waters with low bacterial background flora*

ISO 9377-2, *Water quality — Determination of hydrocarbon oil index — Part 2: Method using solvent extraction and gas chromatography*

- ISO 9696, *Water quality — Gross alpha activity — Test method using thick source*
- ISO 9697, *Water quality — Gross beta activity in non-saline water — Test method using thick source*
- ISO 9963-2, *Water quality — Determination of alkalinity — Part 2: Determination of carbonate alkalinity*
- ISO 9964-1, *Water quality — Determination of sodium and potassium — Part 1: Determination of sodium by atomic absorption spectrometry*
- ISO 9964-2, *Water quality — Determination of sodium and potassium — Part 2: Determination of potassium by atomic absorption spectrometry*
- ISO 9965, *Water quality — Determination of selenium — Atomic absorption spectrometric method (hydride technique)*
- ISO 10304, *Water quality — Determination of dissolved anions by liquid chromatography of ions*
- ISO 10359, *Water quality — Determination of fluoride*
- ISO 10523, *Water quality — Determination of pH*
- ISO 10530, *Water quality — Determination of dissolved sulfide — Photometric method using methylene blue*
- ISO 10566, *Water quality — Determination of aluminium — Spectrometric method using pyrocatechol violet*
- ISO 11423, *Water quality — Determination of benzene and some derivatives*
- ISO 11732, *Water quality — Determination of ammonium nitrogen — Method by flow analysis (CFA and FIA) and spectrometric detection*
- ISO 11885, *Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES)*
- ISO 12846, *Water quality — Determination of mercury — Method using atomic absorption spectrometry (AAS) with and without enrichment*
- ISO 14402, *Water quality — Determination of phenol index by flow analysis (FIA and CFA)*
- ISO 15061, *Water quality — Determination of dissolved bromate — Method by liquid chromatography of ions*
- ISO 15089, *Water quality — Guidelines for selective immunoassays for the determination of plant treatment and pesticide agents*
- ISO 16265, *Water quality — Determination of the methylene blue active substances (MBAS) index – Method using continuous flow analysis (CFA)*
- ISO 16266, *Water quality — Detection and enumeration of Pseudomonas aeruginosa — Method by membrane filtration*
- ISO 11969, *Water quality — Determination of arsenic — Atomic absorption spectrometric method (hydride technique)*
- ISO 13877, *Soil quality — Determination of polynuclear aromatic hydrocarbons — Method using highperformance liquid chromatography*
- ISO 17294, *Water quality — Application of inductively coupled plasma mass spectrometry (ICP-MS — Part 2: Determination of selected elements including uranium isotopes*
- ISO 15553 *Water quality — Isolation and identification of Cryptosporidium oocysts and Giardia cysts from water*
- ISO 19250, *Water quality — Detection of Salmonella spp*

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ISO 21567, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Shigella spp*

ISO/TS 21872-1, *Microbiology of food and animal stuffs — Horizontal method for the detection of potentially enteropathogenic vibrio spp. — Part 1: Detection of vibrio parahaemolyticus and vibrio cholera*

ISO/TS 28581, *Water quality — Determination of selected non-polar substances — Method using gas chromatography with mass spectrometric detection (GC-MS)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:
ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

flavoured drinking water

drinking water containing extracts of herbs, fruits or parts of plant origin, permitted flavour/concentrates in trace amounts, singly or in combination, intended for sale as ready-to-drink for human consumption

3.2

sweetened flavoured drinking water

flavoured drinking water with added permitted non-nutritive sweeteners and/or nutritive sweeteners.

3.3

nutritive sweeteners

sugars, honey or other carbohydrate derivatives used to sweeten food or beverage and contribute to the caloric value of the product when consumed

3.4

non-nutritive sweeteners (sugar substitutes or artificial sweeteners)

food additives that provide sweetness with little to no calories or nutritional value

3.5

carbonated flavoured drinking water

3.5.1

natural carbonated flavoured drinking water

flavoured drinking water, which is naturally carbonated from the source without artificial carbonation

3.5.2

non-carbonated flavoured drinking water

flavoured drinking water that, by nature or after permitted treatment, does not contain free carbon dioxide except in minimum amount required to keep the hydrogen carbonate salts dissolved

3.5.3

artificially carbonated flavoured drinking water

flavoured drinking water, and after possible treatment as provided for in this standard and before packaging has been made more effervescent by addition of carbon dioxide. This includes sparkling, carbon dioxide fortified and fizzling flavoured drinking water

3.6

drinking water

water that meets the requirements of the prescribed drinking water standards

3.7

flavour concentrate/extract

any permitted extracts of herbs, fruits or extracts parts of plant origin

3.10**food grade 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 food product

3.11**flavourings**

products that are added to food to impart, modify, or enhance the flavour of food (with the exception of flavour enhancers considered as food additives under CXG 36). Flavourings do not include substances that have an exclusively sweet, sour, or salty taste (e.g. sugar, vinegar, and table salt). Flavourings may consist of flavouring substances, natural flavouring complexes, thermal process flavourings or smoke flavourings and mixtures of them. They are not intended to be consumed as such.

4 Types of flavoured drinking water

Flavoured drinking water can be identified as follows:

- a) carbonated sweetened;
- b) carbonated unsweetened;
- c) non-carbonated sweetened;
- d) non-carbonated unsweetened;
- e) alkaline; or
- f) natural carbonated

5 Requirements**5.1 General requirements**

Flavoured drinking water shall:

- a) be manufactured from water that complies with either ARS 2216 or ARS 2231;
- b) be safe for human consumption and health;
- c) have a colour characteristic of the product flavour;
- d) be free from abnormal odour, foreign matters, insects and part of them;
- e) be from a source free from any contamination;
- f) not have any sediment or suspended matter during its shelf life; and
- g) not contain any organic or inorganic substances at a level injurious to health.

5.2 Flavours concentrates/extracts

Flavour concentrate/extract shall be used in accordance with CXG 66.

5.3 Preservatives

5.3.1 Preservatives (carry over food additives) approved by Joint Expert Committee for Food Additives (JEFCA) and/or Codex Alimentarius Commission (CXS 192) may be added for one or more of the following purposes:

- a) retain the flavour, concentrate and extract properties in good condition;
- b) retain quality, stability and enhance shelf life;

- c) add or enhance taste to flavoured drinking water; and/or
- d) process flavoured drinking water, to retain properties during manufacture, packaging and transport.

5.3.2 Preservatives shall not be directly added to flavoured drinking water.

5.3.3 Preservatives used for concentrates or extracts shall be of food grade.

5.6 Herbs, fruits or extracts parts of plant origin

Extracts of herbs, fruits or parts of plant origin used to manufacture flavoured drinking water shall comply with the requirements of CXS 192.

5.7 Specific requirements

Flavoured drinking water shall comply with specific requirements given in Table 1 when tested in accordance with test methods specified therein.

Table 1 — Specific requirements for flavoured drinking water

S/N	Substance	Types of flavoured drinking water limits						Test method
		Carbonated sweetened	Carbonated non sweetened	Non-carbonated sweetened	Non-carbonated non sweetened	Alkaline	Natural carbonated	
i.	Turbidity, NTU, max.	2	2	2	2	2	2	ISO 7027
ii.	Flavours, sweeteners, concentrates, extracts, essential oils % m/v, preservatives, max.	1.0	1.0	1.0	1.0	1.0	1.0	— ^{a)}
iii.	pH	3.0 – 5.4	3.0 – 5.4	6.0 – 8.5	6.0 – 8.5	8.6 – 10	5.5 – 6.0	ISO 10523
iv.	Protein	ND	ND	ND	ND	ND	ND	ISO 6635
v.	Sugars, g/100ml, max.	5	ND ^{a)}	5	ND ^{b)}	ND ^{b)}	ND ^{b)}	AOAC 932.15 AOAC 950.29
vi.	Aluminium as Al ³⁺ , mg/l, max.	0.2						ISO 10566
vii.	Calcium as Ca ²⁺ , mg/l, max.	150						ISO 7980
viii.	Chloride as Cl ⁻ , mg/l, max.	250						ISO 9297
ix.	Fluoride as F ⁻ , mg/l, max.	1.5 ^{c)}						ISO 10359
x.	Iron as Fe ²⁺ , mg/l, max.	0.3						ISO 6332
xi.	Magnesium as Mg ²⁺ , mg/l, max.	100						ISO 7980
xii.	Nitrate as NO ₃ ⁻ , mg/l, max.	45						ISO 7890
xiii.	Potassium as K ⁺ , mg/l, max.	50						ISO 9964-1
xiv.	Sodium as Na ⁺ , mg/l, max.	200						ISO 9964-1
xv.	Sulphate as SO ₄ ²⁻ , mg/l, max.	400 ^{d)}						ISO 10304
xvi.	Sulphide as H ₂ S, mg/l, max.	0.05						ISO 10530
xvii.	Total Alkalinity (as HCO ₃ ⁻), mg/l, max.	250						ISO 9963-2

a) Manufacturer should provide the ratio of flavours used to regulator.
 b) The ND (Not Detected) is applicable to sugars as sweeteners. For non-nutritive sweeteners this shall be confirmed organoleptically.
 c) Flavoured drinking water containing more than 1.5 mg/L up to 4 mg/L fluoride shall have a labelling declaration “Contains Fluoride” and “Not suitable for infants and children under the age of seven years”.
 d) Flavoured drinking water containing more than 200 mg/L up to 400 mg/L sulphate shall have a labelling declaration “Contains High Sulphate”.

5.8 Contaminants

5.8.1 Inorganic contaminants

Flavoured drinking water shall not contain inorganic contaminants exceeding the limits given in Table 2 when tested in accordance to the test methods specified therein.

Table 2 — Requirements for limits of inorganic contaminants in flavoured drinking water

S/N	Substance	Maximum limit, mg/L	Test method
i.	Ammonia as NH ₃	0.5	ISO 11732
ii.	Arsenic as As	0.01	ISO 11969
iii.	Barium as Ba ⁺⁺	0.7	ISO 11885
iv.	Borate as B	5.0	ISO11885
v.	Cadmium as Cd	0.003	ISO 5961
vi.	Chromium as total Cr	0.05	ISO 9174
vii.	Copper as Cu ⁺⁺	1	ISO 8288
viii.	Cyanide as CN ⁻	0.07	ISO 6703
ix.	Free residual chlorine as Cl ₂	Nil	ISO 7393
x.	Iodine as I ⁻	1.0	ASTM D 1246
xi.	Lead as Pb	0.01	ISO 8288
xii.	Manganese as Mn ⁺⁺	0.4	ISO 6333
xiii.	Mercury as Hg	0.001	ISO 12846
xiv.	Nitrite as NO ₂ ⁻	0.1	ISO 6777
xv.	Selenium as Se	0.01	ISO 9965
xvi.	Silver as Ag	0.5	ASTM D 1976
xvii.	Zinc as Zn ⁺⁺	5	ISO 8288
xviii.	Bromate as BrO ₃	0.01	ISO 15061
xix.	Antimony as Sb	0.005	ISO 11885
xx.	Nickel as Ni	0.02	ISO 8288
xxi.	Uranium	0.03	ISO 17294-2

5.8.2 Organic contaminants

Flavoured drinking water shall comply with the requirements for organic contaminants indicated in Table 3 when tested in accordance to the test methods specified therein.

Table 3 — Limits of organic contaminants in flavoured drinking water

S/N	Substance	Maximum limit, µg/l	Test method
i.	Aromatics		
	Benzene	10	ISO 11423
	Toluene	700	
	Xylene	500	
	Polynuclear aromatic hydrocarbon	0.7	ISO 13877
ii.	Chlorinated alkanes and alkenes		
	Carbon tetrachloride	2	ASTM D 4128
	1,2-Dichloroethane	30	
	1,1-Dichloroethylene	0.3	
	1,1-Dichloroethene	30	
Tetrachloroethene	40		
iii.	Phenolic substances		
	Phenols	2	ISO 8165
	2,4,6-Trichlorophenol	200	ISO 14402
iv.	Trihalomethanes		
	Chloroform	30	ASTM D 4128
v.	Pesticides		
	Aldrin/Dieldrin	0.03	ISO/TS 28581
	Chlordane (total)	0.3	
	2,4- Dichlorophenoxyacetic acid	30	
	DDT (total)	1	
	Heptachlor and Heptachlor Epoxide	0.03	
	Hexachlorobenzene	1	
	Lindane BHC	2	
Methoxychlor	20		
vi.	Surfactants (reacting with methylene blue)	200	ISO 16265
vii.	Mineral oil	0.01	ISO 9377-2
viii.	Organic matter	3	ASTM D 4129

5.8.3 Radioactive matter

Flavoured drinking water shall comply with the requirements of radioactive matter given in Table 4 when tested in accordance to the test methods specified therein.

Table 5 — Requirements of radioactive matter in flavoured drinking water

S/N	Radioactive material	Limit, Bq/L	Test method
i.	Gross alpha activity	0.5	ISO 9696
ii.	Gross beta activity	1.0	ISO 9697

5.8.4 Microbiological contaminants

Flavoured drinking water shall comply with the microbiological requirements given in Table 5 when tested in accordance to the test methods specified therein.

Table 5 — Microbiological requirements for flavoured drinking water

S/N.	Micro-organism	Limit	Test method
i.	Total viable counts at 22 °C in mL, max. ^a	100	ISO 6222
	Total viable counts at 37 °C, in mL, max. ^a	50	
ii.	Total Coliforms in 100 mL	Not detectable	ISO 9308-1 ISO 9308-2
iii.	<i>Escherichia coli</i> in 100 mL	Not detectable	ISO 9308-1 ISO 9308-2
iv.	<i>Staphylococcus aureus</i> in 100 mL	Not detectable	ISO 6888-1
v.	Sulphite reducing anaerobes in 100 mL	Not detectable	ISO 6461-1 ISO 6461-2
vi.	<i>Pseudomonas aeruginosa</i> fluorescence in 100 mL	Not detectable	ISO 16266
vii.	<i>Enterococcus faecalis</i> in 100 mL	Not detectable	ISO 7899-2
viii.	<i>Shigella</i> in 100 mL	Not detectable	ISO 21567
ix.	<i>Salmonella</i> in 100 mL	Not detectable	ISO 19250
x.	<i>Cryptosporidium</i>	Not detectable	ISO 15553
xi.	<i>Giardia</i>	Not detectable	
xii.	<i>Legionella spp.</i>	Not detectable	ISO 11731

^a This parameter is for monitoring the system at source/processing facility. Determination of total viable counts start within 6 h of collection. If this is not practical, the sample is preserved at 4 °C for not more than 6 h and analysed within 12 h from the time of collection.

6 Hygiene

Flavoured drinking water shall be collected, processed, packaged, and marketed under hygienic conditions complying with ARS 53.

7 Food additives

Food additives when used in the manufacture flavoured drinking water shall comply with the requirements of CXS 192.

8 Flavourings

Flavoring used in the manufacture of flavoured drinking water shall comply with the requirements of CXG 66

9 Packaging and labelling

9.1 When packaged, the flavoured drinking water shall be packaged in sealed retail containers suitable for preventing the possible adulteration or contamination of water.

9.2 The package shall be made from food grade material and strong enough to withstand normal handling and transportation.

10 Labelling

10.1 General

The labels shall be legible and indelible marked. In addition to the requirements of ARS 56, the following provisions shall apply:

- a) name of the product: “**Flavoured drinking water**” followed by the “**Types of flavoured drinking water**” as mentioned in Clause 4;
- b) brand name;
- c) added flavours/extracts (e.g.: herbs; fruits or parts of plant origin extracts; flavours) shall be declared;
- d) name, address and physical location of manufacturer;
- e) date of manufacture;
- f) batch number;
- g) net volume of content;
- h) condition for storage;
- i) expiry date;
- j) processing method (optional);
- k) country of origin;
- l) crush the bottle after use; (if it’s one time use container);
- m) preservatives and food additives added;
- n) if non-nutritive artificial sweetener is used, the following words: “Contains Artificial Sweetener for Special Dietary use only” shall be declared on the label.

10.2 Nutritional labelling and health claims

Nutritional labelling and health claims may be made in accordance with ARS 1713, ARS 1714 and ARS 1715.

10.3 Labelling prohibitions

10.3.1 No claims concerning medical (preventative, alleviative or curative) or other beneficial effects relating to the health of the consumer is made in respect of the properties of the product.

10.3.2 The name of the locality, hamlet or specified place shall not form part of the trade name unless it refers to flavoured drinking water collected at the place designated by that trade name.

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10.3.3 The use of any statement or of any pictorial device which may create confusion in the mind of the public or in any way mislead the public about the nature, origin composition and properties of a containerized flavoured drinking water offered for sale shall be prohibited.

10.3.4 The use of more than one brand name for similar products exploited from the same water source shall be prohibited.

10.3.5 The use of one brand name for products exploited from different water source shall be prohibited.

11 Sampling

11.1 In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed:

- a) sample shall be drawn in original sealed bottle/container and kept in protected place not exposed to damp air, dust or soot; and
- b) each original bottle/container shall be sealed and marked with full details of sampling.

11.2 The quantity of packed water of the same type belonging to the same batch of manufacture and packed in a day shall constitute a lot.

11.3 For ascertaining the conformity of the material to the requirements of the specification, samples shall be tested from each lot separately.

11.4 The number of containers to be selected from a lot shall depend on the size of the lot and shall be according to the sampling plan in Table 6.

Table 6 — Sampling plan for flavoured drinking water

No. of containers in the lot, (L)	Sample size (number of containers)
$L \leq 5\ 000$	3
$5\ 000 < L \leq 10\ 000$	5
$10\ 000 < L \leq 15\ 000$	7
$L > 15\ 000$	9

12 Parameters required for minimum monitoring

In consideration of high cost of performing all tests provided in Table 1, Table 2, Table 3, Table 4 and Table 5, monitoring of the processes in water treatment plant may be done as mentioned in Annex A.

Annex A
(informative)

Parameters required for minimum monitoring

Table A1 — Physico-chemical and microbiological parameters required for minimum monitoring

Property	Test method
Physicochemical: Conductivity, or dissolved solids Colour Turbidity Taste Odour Flavors, sweeteners, concentrates, extracts, essential oils %, max.	See Table 1
Microbiological: Faecal coliform bacteria or <i>E. coli</i> ; <i>Shigella spp</i> <i>Salmonella spp</i>	See Table 6
Chemical: Fluoride as F ⁻ Nitrate Nitrite pH value Aluminum Iron (total) Ammonia Residual chlorine	See Table 3
NOTE Monitoring record/register of flavoured drinking water shall be maintained.	

If abnormal results are encountered in any of these analyses, sampling frequency should be increased and/or additional analyses carried out.

Bibliography

- [1] EAS 941:2020, *Flavoured drinking water — Specification*

Draft African Standard for comments only — Not to be cited as African Standard

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