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# DARFT TANZANIA STANDARD

## Malt drink — Specification



## TANZANIA BUREAU OF STANDARDS



Third Edition 2025

# Malt drink — Specification

## 0 Foreword

Malting has traditionally been known to be one of the processes involved in brewing; barley being the principle raw material in brewing technology.

Malting is a name given to germinating or sprouting cereal. The ultimate result of malting is the production of fermentable extracts through the activities of some endogenous enzymes produced during the malting process. The major constituents of the fermentable extracts are sugars, dextrin and amino acids.

In light of the need to safeguard the consumer and in order to ensure that malt drinks are safe and of good quality this Tanzania Standard was thus developed.

This Tanzania Standard is a revision of the second version finalized in 2003. This third edition cancels and replaces the second edition TZS 697:2017 which has been technically revised.

In reporting the results of a test or analysis made in accordance with this Tanzania Standard, if the final value observed or calculated is to be rounded off, it shall be done in accordance with TZS 4 (see Clause 2).

## 1 Scope

This Tanzania Standard specifies the requirements, sampling and test methods for malt drinks intended for direct human consumption.

## 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.

CAC/GL 66, *Guidelines for the use of flavourings*

CXS 192, *General Standard for Food Additives*

TZS 4, *Rounding off numerical values*

TZS 56, *Beer — Specification*

TZS 59, *Water — Distilled quality — Specification*

TZS 76, *Method for determination of arsenic*

TZS 101, *Refined sugar — Specification*

TZS 109, *Code of hygiene for food processing units — General*

TZS 118, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 °C*



 

TZS 119, *Food stuffs — Methods for detection and examination of coliform bacteria*

TZS 268, *General atomic absorption spectrophotometric method for determination of lead in foodstuffs*

TZS 471, *Methods of sampling and test for alcoholic beverages*

TZS 481, *Nutrition Labelling - Requirements*

TZS 538, *Packaging and labeling of foods*

TZS 550, *Use of nutrition and health claims - Requirements*

TZS 665, *Ready to drink unfermented fruit based alcoholic beverages — Specification*

TZS 730-2, *Microbiology — General guidance for the enumeration of E.coli — Most probable number technique*

TZS 789*, Potable water — Specification*

TZS 799/ 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*

TZS 1492, *Fruits and vegetables — Determination of Tin*

TZS 2426-1/ISO 21527-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 1, Colony count technique in products with water activity greater than 0.95*

## 3 Terms and definitions

For the purposes of this Tanzania Standard, the following terms and definitions shall apply.

**3.1 malt drink**

non-alcoholic beverage prepared from potable water, Malt and/or malt extract; with or without adjuncts, natural enzymes, flavours, and with other ingredients given under clause 4.1.4 and 4.1.5.

**3.2 non–alcoholic beverage**

beverage containing alcohol content not exceeding 0.5 % of ethyl alcohol by volume.

**3.3 adjunct**

supplementary source of carbohydrate example (maize grits, maize flakes)

**3.4 malted cereals**

cereals that have undergone the malting process.



 

## 4 Requirements

### 4.1 General requirements

**4.1.1** Malt drink shall be a carbonated non-alcoholic beverage, obtained by mashing with potable water and the addition of other ingredients to the enzymic degraded soluble constituents of ground sprouted cereal; without further fermentation; and with or without the addition of any preservative, stabilizer, flavouring substances, or other additives as prescribed in CXS 192 with alcoholic content not exceeding 0.5 % by volume.

**4.1.2** Malt drinks shall have the taste and flavour characteristic of malt and shall also have the characteristic colour; free from suspension, sediments or any foreign matter.

**4.1.3** Malt drinks shall be processed and handled in such a manner that will maintain it to be safe and in good quality state within the expected shelf life.

**4.1.4** Malt drinks shall at least contain 50 % of the malt constituents in order to ensure that the product bears the minimum malt quality characteristics.

### 4.2 Ingredients

The following raw materials shall be used for the production of malt drinks:

i. Potable water, conforming to TZS 789
ii. Malted cereals
iii. Sugar, conforming to TZS 101
iv. Carbon dioxide; The carbon dioxide shall be pure and fit for human consumption
v. Hops
vi. Vitamins; In accordance with Good Manufacturing Practice and/or as per FAO/WHO Codex established recommended daily allowances.

### 4.3 Specific requirements

Malt drinks shall conform to the requirements given in Table 1 when tested in accordance with the test methods specified therein.



 

**Table 1 — Specific requirements for malt drinks**

| S/No. | Parameter | Requirement | Test method |
|---|---|---|---|
| i. | pH | 4.0 – 5.5 | TZS 56 |
| ii. | Carbon dioxide, percent v/v. | 2.5 – 4.5 | TZS 56 |
| iii. | Original wort extract, % m/m | 13.0 – 18.0 | TZS 56 |
| iv. | Ethyl alcohol, % v/v, max. | 0.5 | TZS 471 |

## 5 Food additives

**5.1** Malt drinks may contain food additives as prescribed in CXS 192 and the use of food additives in the manufacture of malt drink shall be governed by Good Manufacturing Practice and CAC/GL 66.

**5.2** Use of non-nutritive sweeteners is not permitted in this product.

## 6 Contaminants

### 6.1 Heavy metals

Malt drinks shall not exceed Heavy metal limits as specified in Table 2 when tested in accordance with methods specified therein.

**Table 2 — Maximum Heavy metal Limits for Malt drinks**

| S/No. | Parameter | Maximum Limits | Test method |
|---|---|---|---|
| i. | Lead as Pb mg/l, | 0.1 | TZS 268 |
| ii. | Arsenic as As mg/l, | 0.1 | TZS 76 |
| iii. | Tin as Sn, mg/l, | 250 | TZS 1492 |

### 6.2 Mycotoxins

**6.2.1** Malt drinks shall not exceed total aflatoxin of 10 ppb and 5 ppb for aflatoxin B1 when tested in accordance with TZS 799

**6.2.2** Malt drinks shall not exceed total of 2 ppm fumonisins when tested in accordance with annex A.



 

## 7 Hygiene

**7.1** Malt drinks shall be manufactured in premises built and maintained under hygienic conditions. The handling equipment like tanks, bottling machines and packing equipment shall be clean. In all cases TZS 109 shall apply.

**7.2** Malt drinks shall be free from pathogenic and spoilage microorganisms and their toxins. It shall also conform to the microbiological limits stated in Table 3 when tested in accordance with the method prescribed therein.

**Table 3 — Microbiological requirements for malt drinks**

| S/N | Parameter | Limits | Test method |
|---|---|---|---|
| **1** | Total plate count, CFU/ml, max. | $1*10^{1}$ | TZS 118-1 |
| **2** | *Escherichia coli,* CFU/ml | Absent | TZS 730-2 |
| **3** | Yeasts and moulds at 25 °C, CFU/ml, max. | $1*10^{1}$ | TZS 2426-1 |
| **4** | Coliform (MPN/ml), max. | $1*10^{1}$ | TZS 119 |

## 8 Packaging, Marking and Labelling

### 8.1 Packaging

**8.1.1** The product shall be packed in suitable and hygienic food grade packaging materials which protect the safety and quality of the product. The packaging shall not impart any toxic substance or undesirable smell or taste to the product.

**8.1.2** Crowns and other closures in case of bottled drinks shall be lined internally with harmless materials. Malt drinks shall be packaged in open hermetically sealed lacquered cans and glass bottles or other suitable containers that have no effect on the product and would not render the product be adulterated.

### 8.2 Marking and labelling

**8.2.1** Malt drinks shall be marked and labelled in accordance with TZS 538.

**8.2.2** In addition each container/packet of product shall be legibly and indelibly marked with the following information:

i. Name of the product as ‘’Malt drink’;
ii. Brand or trade name of the product; if any



 

iii. Name and address of the manufacturer or packer;
iv. Non-alcoholic declaration statement;
v. A declaration of common name of any additive used;
vi. The net content by volume in SI Units;
vii. List of ingredients in descending orders of proportion;
viii. Country of origin;
ix. Date of manufacture;
x. Batch or code number;
xi. Best before date; and
xii. Storage condition.

**8.2.3** The language on the label shall be “Kiswahili” or “Kiswahili and English”. Any other language may be used depending on the designated market.

**8.2.4** The containers may also be marked with the TBS standards mark of quality.

NOTE – The TBS standards mark of quality may be used by the manufacturers only under licence from TBS. Particulars of conditions under which the licences are granted may be obtained from TBS

### 8.2.5 Nutritional labelling

Nutritional labelling, nutrition and health claims may be made in accordance with TZS 481 and TZS 550.

## 9 Sampling and test methods

### 9.1 Sampling

The method of drawing representative samples shall be as specified in TZS 471.

### 9.2 Test methods

Testing shall be in accordance with TZS 471 and as provided in the respective tables of this Tanzania Standard.

**Annex A**
(normative)

**Determination of fumonisins B1 and B2 in malt drink by liquid chromatography with immune-affinity column cleanup**

**Applicability** — It is applicable to determination of fumonisins $B_1$ in malt drinks at total levels from 0.5 µg/g to 2 µg/g

**Caution**

Fumonisins are nephrotoxic, hepatotoxic, and carcinogenic to rats and mice, however effects on humans are not fully known. Wear protective gloves to reduce skin contact with extracts. Laboratory spills should be cleaned up by washing with a 5 % dilution of commercial bleach (sodium hypochlorite) followed by water.

## A.1 Principle

Fumonisins are extracted from malt drink with methanol–acetonitrile–water (25 + 25 + 50, v/v/v), the filtered extract is cleaned up by an immunoaffinity column, and the fumonisins are eluted with methanol. The eluate is evaporated just to dryness, and the residue is dissolved in acetonitrile–water (50 + 50, v/v). O- Phthaldialdehyde and 2-mercaptoethanol is added to form fluorescent fumonisin derivatives, which are separated by reversed phase liquid chromatography (LC) with fluorescence detection.

## A.2 Reagents

a) **Methanol**, LC grade.
b) Acetonitrile, LC grade.
c) O-Phthaldialdehyde (OPA), CAS 643-79-8.
d) 2-Mercaptoethanol (MCE), CAS 60-24-2.
e) Sodium dihydrogen phosphate solution, 0.1 M. Dissolve 15.6 g NaH2PO4·2$H_2O$ in water and dilute to 1 L.
f) Sodium tetraborate solution, 0.1 M. Dissolve 3.8 g Na2B4O7·10H2O in water and dilute to 100 mL.
g) Hydrochloric acid, 2 M. Dilute HCl (12M) 1+5 with water.
h) Extraction solvent, Acetonitrile–methanol–water (25 + 25+ 50, v/v/v).
i) Acetonitrile–water, 50 + 50, v/v.
j) Phosphate-buffered saline (PBS), Dissolve 8.0 g NaCl, 1.2 g anhydrous Na 2HPO4, 0.2 g KH2PO4, and 0.2 g KCl in approximately 990 mL water. Adjust pH to 7.0 with 2M HCl, and dilute to1 L. Phosphate-buffered saline tablets can also be used.
k) Immunoaffinity columns, Specific for fumonisin cleanup with 100 % cross reactivity for both FB1 and FB2. The column must have a total capacity of $ 10 µg fumonisins B1 and B2 and should give a recovery of $ 90 % when a calibrant solution of fumonisins B1 and B2 in methanol–PBS containing 5µg fumonisins is applied. Follow the manufacturer's instructions for the type of column used.
l) LC mobile phase, Methanol, 0.1 M NaH2PO4 (77 + 23, v/v), adjusted to pH 3.35 with



 

H3PO4. Filter mobile phase through 0.45 µm membrane, and pump at 1 mL/min flow rate. Adjust com- position to conform with individual LC column characteristics.

m) OPA reagent, dissolve 40 mg OPA in 1 mL methanol, and dilute with 5 mL 0.1 M Na2B4O7 solution. Add 50 µL MCE and mix. Store in the dark for up to 1 week at room temperature in a capped amber vial.
n) Fumonisins B1 and B2, Crystalline form, purity of >95 %.
o) Fumonisin stock solution for LC, Prepare calibrant solution containing fumonisins B1 and B2 in acetonitrile–water (50 + 50, v/v) at concentration of 100 µg/mL for FB1 and 50 µg/mL for FB2. Fumonisin calibrant solution is stable up to 6 months when stored at 4 °C. Pipet 500 µL fumonisin calibrant solution into a 5-mL calibrated volumetric flask. Dilute to volume with acetonitrile–water (50 + 50,v/v), and shake well to obtain stock solution containing FB1 at10 ng/µL and FB2 at 5 ng/µL.
p) Fumonisin working calibrant solutions for LC, Prepare 4 LC calibrant solutions in separate 5-mL volumetric flasks according to table 2001.04C. Dilute contents of each flask to volume (5 mL) with acetonitrile–water (50 + 50, v/v).

## A.3 Apparatus

a) Centrifuge bottle, Plastic, 250 mL, with screw cap
b) Centrifuge, Operating up to 2500 ×g
c) Filter papers, Whatman No. 4, 12 cm.
d) Glass microfiber filters, Whatman GF/A, 9 cm
e) Reservoir, 25 mL with Luer tip connector for immunoaffinity column
f) Calibrated microliter syringe or microliter pipet, 25 to 1000 µL
g) Vacuum manifold, To accommodate immunoaffinity columns
h) Liquid chromatograph, LC pump delivering 1 mL/min constant flow rate and with injection system calibrated to deliver 20 µL; and data system
i) LC column, Stainless steel (150×4.6 mm id), packed with5 µm C18 deactivated reversed-phase material, preceded by corresponding reversed-phase guard column or guard filter (0.5 µm) porosity.
j) Fluorescence detector, Fitted with flow cell and set at 335 nm (excitation) and 440 nm (emission).

## A.4 Extraction

Permit materials to reach room temperature before removing test portion. Weigh, to nearest 0.1 g, 20 g test portion of malt drink into 250 mL centrifuge bottle, and add 50 mL extraction solvent, 2(h). Cover centrifuge bottle, and shake bottle for 20 min with orbital shaker. Centrifuge for 10 min at 2500×g, and filter supernatant through filter paper, A.3 (c), avoiding transfer of solid ma-terial on filter. Again extract remaining solid material by adding 50 mL extraction solvent, 2 (h), to centrifuge bottle and shaking bottle for 20 min. Centrifuge for 10 min at 2500 ×g, and filter extract through the same filter paper. Collect and combine the 2 filtrates, and pipet 10 mL filtrate into 100 mL flask. Add 40 mL PBS, 2 (j), and mix well. Filter diluted extract through microfiber filter, A.3 (C) or (d), and collect 10 mL filtrate (equivalent to 0.4 g test portion) for cleanup through immune-affinity column.

## A.5 Immunoaffinity column cleanup

Follow manufacturer's instructions for the type of column used. Remove top cap from column, and connect column with reservoir. Remove end cap from column and attach column to vacuum manifold. Pipet 10 mL filtrate into reservoir. Let filtrate flow through column at ca 1–2 drops/s and discard eluate. Wash column with 10 mL PBS, 2(j), at rate of 1–2 drops/s until air comes through column. Place 4 mL vial under column. Elute fumonisin with 1.5 mL LC grade methanol at 1 drop/s, and collect fumonisin in vial. Evaporate eluate just to dryness under stream of N at ca 60 °C. Retain dried residue at ca 4 °C for derivatization and LC analysis

## A.6 Calibration curve

Prepare calibration curves, using working calibrant solutions 2 (p). These solutions cover the range of 0.025–2.000 µg/g for FB1 and the range of 0.0125–1.000 µg/g for FB2. Prepare calibration curves, before LC analysis, according to table 2001.04C, and check plots for linearity. If curve is not linear, repeat derivatization following instructions carefully and/or reduce the range of the calibrants.

## A.7 Derivatization and LC analysis

Re-dissolve purified residue in 200 µL acetonitrile–water (50 + 50,v/v),B(i). Transfer 50µL aliquots of extract or standards to bottom of 1 mL test tube, and add 50µL OPA reagent, B(m). Mix solution for 30 s with vortex mixer, and inject 20 µL derivatized solution (equivalent to 20 mg matrix) into LC system exactly 3 min after add-ing OPA reagent. With the described LC mobile phase,B(l), and column,C(i), satisfactory (baseline) resolution of FB1–OPA and FB2–OPA must be obtained, with expected retention times at ca 6 and 15 min, respectively. If fumonisin content of derivatized extract is higher than calibration range, dilute purified extract with acetonitrile–water (50 + 50, v/v), B(i), derivatize with OPA reagent, and repeat LC analysis.

## A.8 Quantification of fumonisin B1and B2

Quantify FB1 and FB2 by measuring peak area (or peak height) at retention time of each fumonisin and comparing measured value with corresponding calibration curve.

From calibration curves determine amounts of FB1 and FB2 (in µg) in aliquot of test solution injected into LC column.

Separately calculate concentrations (CFB) of FB1 and FB2 in micrograms per gram (µg/g), as follows:

$$CFB = \frac{10^3 M_A \times 1}{10^3 M_B} \quad \frac{M_A}{20}$$

Where;

MA is mass of FB1 or FB2 (in µg) in aliquot of test solution injected on column, as determined from calibration curve,
MB is mass of matrix (in mg) injected on column (20 mg), obtained as follows:

$$\frac{20\text{ g (Extraction step)}}{100\text{ mL}} \times \frac{10\text{ mL (dilution)}}{50\text{ mL}} \times 10\text{ mL (purified aliquot)}$$

$$\times\ 1\text{ (reconstitution volume)} \times \frac{0.05\text{ mL (derivatization)}}{0.2\text{ mL}} \times \frac{}{0.1\text{ mL}}$$

0.02 mL (injected aliquot)
And $10^{-3}$ is a factor to convert $M_A$ and $M_B$ from ng to µg and mg to g, respectively.



 