LIQUEURS – SPECIFICATION
LIQUEURS – SPECIFICATION
(DRAFT FOR COMMENTS ONLY)

0 Foreword

0.1 A liqueur is an alcoholic beverage that has been flavored with fruit, herbs, nuts, spices, flowers or cream and bottled with added sugar. There are different types of liqueur such as Chocolate liqueurs, Coffee liqueurs, Cream liqueurs, Fruit liqueurs, Crème liqueurs, Berry liqueurs, Flower liqueurs, Herbal liqueurs and Nut-flavored liqueurs.

0.2 This Standard was prepared to ensure the safety and quality of liqueurs produced and/or traded in the country.

0.3 In reporting the results of a test or analysis made in accordance with this standard, if the final value observed or calculated is to be rounded off, it shall be done in accordance with TZS 4: 2009 Rounding off numerical values (See clause 2).

1.0 Scope

This Standard specifies requirements, methods of sampling and tests for liqueurs.

2.0 Reference

For the purpose of this Tanzania standard the following references shall apply:

a) TZS 4:2009 – Rounding off numerical values
b) TZS 1018:2008 - Neutral (fine) spirit-Specification
c) TZS 109:1981-Food processing units – Code of hygiene
d) TZS 268:1986- General atomic absorption – Spectro - Photometric method for determination of lead in food stuffs
e) TZS 471: 1992 Methods of sampling and test for alcoholic beverages
g) TZS 119: 2010 (Rev) Microbiology of food and animal feeding stuff horizontal method for the detection and enumeration of coliforms- most probable number technique.
k) TZS 538:1999 Packaging and labeling of foods

3.0 Terminology

For the purpose of this standard the following definitions shall apply:

3.1 liqueurs
Alcoholic beverage produced by mixing or redistilling neutral spirit with permitted food additives, produced by distillation, infusion, percolation or maceration, which may be sweetened with sugar or honey and colored with permitted colorants and may contain aromatic materials/from extracts derived from animal or plant origin.

3.2 neutral spirit
The alcoholic distillate obtained from fermented wort or wash of mash of cereals and other carbohydrates, saccharified by diastase of malt or other permitted enzymes; or it may be a distillation product from sugarcane or honey; fermented by the action of Saccharomyces cerevisiae, from which a distilled liquor
with a minimum alcohol content of 96% v/v is obtained after a series of concentration by distillation process.

3.3 alcohol
Ethyl alcohol (ethanol).

4.0 General requirements

4.1 Description and Quality requirements

4.1.1 A liqueur shall be the product obtained by mixing or redistilling neutral spirits with, or over flavouring materials and containing any of the sugars, or a combination of these.

4.1.2 The product shall be free from any extraneous and foreign matter substances injurious to health.

4.1.3 The flavouring extracts materials may include:
   a. fruits, flowers, plants or pure juices;
   b. other natural flavouring materials and;
   c. permitted artificial or synthetic flavourants.

4.1.4 Blending materials such as egg, milk, cream, fat or vegetable oil products may be added.

4.1.5 The product shall be free from sediments.

4.1.6 The water used to dilute liqueurs to bottling strength shall be distilled, in accordance with TZS 59: 1980 (See clause 2) or demineralized or deionized.

4.2 Food additives

The product may contain food additives as prescribed in TZS 115: 1999 (See clause 2).

4.3 Liqueurs shall comply with the chemical requirements given in Table 1.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Requirements</th>
<th>Methods of test TZS 471: 1992 (See clause 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol content % v/v</td>
<td>15 - 45</td>
<td>Clause 6</td>
</tr>
<tr>
<td>Total acids as acetic acid, g/100 L, max</td>
<td>15</td>
<td>Clause 10</td>
</tr>
<tr>
<td>Total esters as ethyl acetate, g/100 L, max</td>
<td>5</td>
<td>Clause 11</td>
</tr>
<tr>
<td>Aldehydes as acetaldehyde, g/100 L, max</td>
<td>2</td>
<td>Clause 12</td>
</tr>
<tr>
<td>Furfural, mg/100 mL, max</td>
<td>0.5</td>
<td>Clause 13</td>
</tr>
<tr>
<td>Higher alcohols, g/100 L, max</td>
<td>3</td>
<td>Clause 16</td>
</tr>
<tr>
<td>Methanol, mg/L, max</td>
<td>60</td>
<td>Clause 14</td>
</tr>
<tr>
<td>Total sugars %, min</td>
<td>2.5</td>
<td>Annex A or Refractometer</td>
</tr>
</tbody>
</table>

5.0 Metal contaminants

The level of metal contaminants shall conform to the limits specified in Table 2.

<table>
<thead>
<tr>
<th>Metal</th>
<th>Limit</th>
<th>Methods of test (See clause 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead mg/L, max</td>
<td>0.1</td>
<td>TZS 268:1986</td>
</tr>
<tr>
<td>Arsenic mg/L, max</td>
<td>0.1</td>
<td>TZS 76: 1980</td>
</tr>
<tr>
<td>Copper mg/L, max</td>
<td>2</td>
<td>AAS</td>
</tr>
</tbody>
</table>
6.0 Hygiene

6.1 Liqueurs shall be prepared under Good Hygienic Practices as stipulated in TZS 109: 1981 (See clause 2).

6.2 Liqueurs shall be free from pathogenic microorganisms and shall comply with the microbiological limits given in Table 3.

Table 3 – Microbial requirements for liqueurs

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Requirements</th>
<th>Methods of test (See clause 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total plate count cfu/ml</td>
<td>$10^3$</td>
<td>TZS 118: 2007</td>
</tr>
<tr>
<td>Coliforms MPN/ml</td>
<td>Shall be absent</td>
<td>TZS 119:2010</td>
</tr>
</tbody>
</table>

7.0 Packaging, marking and labeling

7.1 Packaging

The product shall be packed in suitable and hygienic food grade packaging materials which protect the safety and quality of the product.

7.2 Marking and labeling

7.2.1 The product shall be marked and labeled either in English or English and Kiswahili in accordance with TZS 538:1999 (see clause 2).

7.2.2 In addition each Container/packet of product shall be legibly and indelibly marked with the following information:
   a) Name of the product shall be “Liqueur”
   b) Alcohol content i.e v/v
   c) Batch or code number
   d) Date of packing and expiry date
   e) Name, postal and physical address of the manufacturer
   f) Net volume
   g) Manufacturer registered trade mark, if any
   h) Country of origin
   i) List of Ingredients
   j) Declaration of statutory warning on age of end-user and excessive consumption
   k) Storage condition

7.2.3 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.

8.0 Sampling and tests methods

8.1 Sampling

The product shall be sampled as prescribed in TZS 471: 1992 (See clause 2)
8.2 Test methods

8.2.1 Testing shall be done in accordance with TZS 471: 1992 (see clause 2) and as provided in the respective Tables of this standard.

8.2.2 Quality of reagents
Unless specified otherwise, pure chemicals and distilled water shall be used in tests.
ANNEX A

HPLC METHOD FOR DETERMINATION OF SUGAR IN LIQUEURS

A.1 Apparatus

A.1.1 Liquid Chromatograph with:
   a. solvent delivery system and injector;
   b. differential refractometer detector (10 MV full scale deflection);
   c. recorder with variable chart speed.

A.1.2 HPLC column 30 cm x 4 mm stainless steel tube packed with μ Bondapak/carbohydrate.

A.1.3 Sample clarification kit (0.45 μm-pore diameter)

A.2 Reagents

A.2.1 Reference sugars. D-glucose, D-fructose, sucrose, lactose, and maltose.

A.2.2 Mobile phase. Acetonitrile and water (80 + 20)

A.3 Operating conditions

| flow rate | 2.0 mL/min (approx. 600 psi) |
| Mode      | isocratic                     |
| Temperature | ambient                      |
| Attenuation | 8                            |
| chart speed | 5 mm/min                     |

A.4 Preparation

A.4.1 Sample preparation

Dilute sample to known volume containing 10 mg to 15 mg of each sugar/mL. Filter about 2 mL sample solution through 0.45 μm-pore diameter membrane (Sample Clarification Kit) to remove particulate matter.

A.4.2 Standard preparation

Mixed sugar standard solution. Accurately weigh 1.0 g to 1.5 g of each reference sugar, transfer to 100-mL volumetric flask, and dilute to volume with water. Filter about 2 mL through to 0.45 μm-pore diameter membrane (Sample Clarification Kit).

A.5 Determination

A.5.1 Chromatography.

Inject 20 μL mixed sugar standard solution filtrate into liquid Chromatograph. Under these conditions the retention times (min) of reference sugars are:

<table>
<thead>
<tr>
<th>Sugar</th>
<th>Retention Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fructose</td>
<td>4.55</td>
</tr>
<tr>
<td>Glucose</td>
<td>5.30</td>
</tr>
<tr>
<td>Sucrose</td>
<td>7.88(min)</td>
</tr>
<tr>
<td>Lactose</td>
<td>10.84(min)</td>
</tr>
<tr>
<td>Maltose</td>
<td>11.40(min)</td>
</tr>
</tbody>
</table>

Measure peak height of each reference sugar. Inject 20 μL sample solution filtrate into liquid Chromatograph. Measure height of peak corresponding to each sugar.
A.5.2 Calculation

Calculate amount of each sugar in 100 g sample as follows;

\[
W = \frac{C \times PH' \times V \times I \times 100}{PH \times V' \times S \times 1000}
\]

Where by:

- \( W \) = weight of sugar (g)
- \( C \) = concentration of sugar (mg/mL) in mixed sugar standard solution
- \( PH' \) & \( PH \) = peak heights of sugar in sample and standard, respectively
- \( V \) & \( V' \) = volume (μL) of mixed sugar standard solution and sample solution injected, respectively
- \( I \) = volume (mL) of sample assay solution
- \( S \) = Weight of sample (g) taken for assay.