DRAFT PROPOSAL

Bread – Specification

NOTE: This is a draft proposal and it shall neither be used nor regarded as a Malawi standard
Bread – Specification

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FOREWORD

This draft proposal was prepared by MBS/TC 19, the Technical Committee on Bread and confectioneries, to provide requirements and methods of test for bread.

This draft proposal is a result of the second review of MS 31. The revision has been done to incorporate latest technical changes in bread.

In preparing this draft proposal, reference was made to the following standards:


East African Standard, EAS 43: 2012, Corrigendum 1-2013, Bread – Specification; and


Acknowledgement is made for the use of the information.

TECHNICAL COMMITTEE

This draft proposal was prepared by MBS/TC 19, the Technical Committee on Bread and confectioneries, and the following companies, organizations and institutions were consulted:

Bakhresa Grain Milling;
Blantyre City Council;
Bread Talk;
Bvumbwe Agricultural Research Station;
International Potato Center Malawi;
Lilongwe University of Agriculture & Natural Resources;
Ministry of Health – Department of Nutrition, HIV & AIDS;
National Fortification Alliance;
Universal Industries Limited; and
University of Malawi.

NOTICE

This standard shall be reviewed every five years, or earlier whenever it is necessary, in order to keep abreast of progress. Comments are welcome and shall be considered when the standard is being reviewed.
1 SCOPE

This draft proposal prescribes the requirements and methods of sampling and analysis of bread intended for human consumption.

2 NORMATIVE REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this draft proposal. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this draft proposal are encouraged to take steps to ensure the use of the most recent edition of the standards indicated below. Information on current valid national and international standards can be obtained from the Malawi Bureau of Standards.

MS 19: Labelling of prepacked foods – General standard;
MS 21: Food and food processing units – Code of hygienic conditions;
MS 30: Wheat flour – Specification;
MS 144: Agricultural food products – Determination of crude fibre content – General method;
MS 188: Edible salt – Specification;
MS 202: White sugar – Specification;
MS 214: Drinking water – Specification;
MS 237: Food additives – General Standard;
MS 302: Contaminants and toxins in foods – General standard;
MS 610: Cereals and cereal products – Determination of moisture content – Reference method;
MS 624: Nutrition labelling – Guidelines;
MS 1257: Baker’s yeast – Specification;
MS 1382: Cassava flour – Specification;
MS 1385: Sweet potato flour – Specification;
MS 1386: Cassava and cassava products – Determination of total cyanogens – Enzymatic assay method;
MS 1635: Fruit and vegetable products – Determination of pH;
CXG 23: Guidelines for use of nutrition and health claims;
ISO 4833-1: Microbiology of the food chain – Horizontal method for the enumeration of microorganisms – Part 1: Colony count at 30 °C by the pour plate technique;
ISO 6579-1/AMD 1: Microbiology of the food chain – Horizontal method for the detection, enumeration and serotyping of Salmonella – Part 1: Detection of Salmonella spp. – Amendment 1: Broader range of incubation temperatures, amendment to the status of Annex D, and correction of the composition of MSRV and SC;

ISO 7251: Microbiology of food and animal feeding stuffs – Horizontal method for the detection and enumeration of presumptive Escherichia coli – Most probable number technique; and

ISO 21527-2: Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of yeasts and moulds – Part 2: Colony count technique in products with water activity less than or equal to 0.95.

3 TERMS AND DEFINITIONS

For the purposes of this draft proposal, the following terms and definitions shall apply:

3.1
bread
product obtained by baking fermented dough made from a single or mixture of flours from; wheat, maize, sorghum, millet, cassava, sweetpotato, rice, rye and soya bean

3.2
white bread
product obtained by baking fermented dough made from white flour

3.3
brown bread
product obtained by baking fermented dough made from wholemeal flour or a mixture of wholemeal and white flour, bran or molasses

3.4
whole wheat meal bread
product obtained by baking fermented dough made from wholemeal wheat flour

3.5
milk bread
product obtained by baking fermented dough containing milk

3.6
cassava bread
product obtained by baking fermented dough made from cassava flour

3.7
sweetpotato bread
product obtained by baking fermented dough made from at least 20 % of sweetpotato puree or 10 % sweetpotato flour

3.8
fortified bread
product obtained by baking fermented dough made from fortified flour

3.9
wheat germ bread
product obtained by baking fermented dough which contains added processed wheat germ

3.10
gluten bread
product obtained by baking fermented dough which contains added gluten

3.11
high protein bread
product obtained by baking fermented dough which contains more of protein than ordinary bread
3.12 fruit bread
bread made from dough which contains of added fruit in the form of sultanas, currants, fruit peel, or any combination of these ingredients

3.13 malt bread
product obtained by baking fermented dough which contains added malt products

3.14 texture
the structure formed by the strands of gluten, including the area they surround

3.15 stale bread
a bread which has lost the power of pleasing and which when placed in the mouth the crumb feels dry and crumby, requires a substantial quantity of saliva and has no sensation of dissolution as it passes from the mouth during deglutination unfit for human consumption

3.16 food grade material
material which safeguard the hygienic, nutritional, technological and organoleptic qualities of the products

3.17 foreign matter
organic and inorganic materials (such as sand, soil, glass) other than extraneous matter in the bread

4 ESSENTIAL COMPOSITION AND QUALITY REQUIREMENTS

4.1 Essential ingredients

4.1.1 Flour, complying with relevant Malawi standards.

4.1.2 Sweet potato puree, complying with MS 1605.

4.1.3 Baker’s yeast, complying with MS 1257.

4.1.4 Edible common salt, complying with MS 188.

4.1.5 White sugar, complying with MS 202.

4.1.6 Potable water, complying with MS 214.

4.1.7 Edible fats and oils, complying with relevant Malawi standards.

4.2 Optional ingredients

4.2.1 Milk or milk products, complying with relevant Malawi standards.

4.2.2 Fruits and fruits products, complying with relevant Malawi standards.

4.2.3 Oilseeds and oilseeds products, complying with relevant Malawi standards.

4.2.4 Added gluten.
4.3 General quality requirements

4.3.1 Bread crust

The crust shall have an appetizing golden, light-brown colour and shall be free from blisters. The crust shall not be burned and shall be free from soot or any other foreign matter. The loaf shall be evenly baked on all sides including the bottom.

4.3.2 Character of crust

A good crust is thin and breaks easily. It shall not be thick, tough, or rubbery.

4.3.3 Volume

The bread shall have a good volume. The loaf shall be considered to have a good volume if the volume to weight ratio is not more than 5.75 to 1 when tested according to the method in Annex E.

4.3.4 The crumb

4.3.4.1 The crumb shall be springy, with small pores uniformly distributed throughout and with thin cell walls.

4.3.4.2 It shall be free from non-porous mass, lumps of flour or salt, or any other evidence of incomplete mixing.

4.3.4.3 There shall be no hollow between the crust and the crumb.

4.3.4.4 The crumb shall have colour characteristic of the ingredients used. When sliced, the surface of the slices shall present a uniform shade without streaks or dark patches.

4.3.5 Flavour

The flavour shall be characteristic of fresh, well-baked bread, free from staleness, bitterness, or any other objectionable flavour or taste.

4.3.6 Mould or rope

The bread shall be free from indications of ‘rope’ or ‘mould’.

4.3.7 Internal texture

The structure shall be uniform with thin-walled cells. The internal texture shall be soft and velvety, without weakness, and should not crumble.

4.3.8 Aroma

The aroma shall be fresh and shall not be musty, metallic or sour.

4.3.9 Taste mastication

The bread shall have pleasant and acceptable taste. The loaf shall be free from doughiness and shall not dry or tough.

4.3.10 Foreign matter

The bread shall be free from any foreign matter except for negligible amount of edible grains, dusting bran, maize flour or rice flour from the baker’s shovel, which may adhere to the bottom of the loaf.

4.3.11 Whole wheat bread shall be made from 100 % wheat meal.

4.3.12 Brown bread shall contain not less than 20 % wheat bran or 60 % whole wheat flour.

4.3.13 Milk bread shall contain not less than 3.6 % by weight of milk solids.
4.3.14 Fortified bread shall be made according to national fortification regulations.

4.3.15 Wheat germ bread shall contain not less than 10 % by weight of added processed wheat germ and 'wheat germ' for the purpose of this paragraph means a product of wheat milling containing not less than 23 % protein and not less than 6.5 % oil.

4.3.16 Gluten bread shall contain not less than 16 % gluten calculated on the dry weight of bread.

4.3.17 Gluten free bread shall contain less than 20 mg/kg of gluten when sold as such.

4.3.18 High protein bread shall contain not less than 22 % protein calculated on the dry weight of the bread.

4.3.19 Fruit bread shall be made from dough which contains not less than 6 % of added fruit in the form of dry fruit calculated on the weight of the flour used.

4.3.20 Malt bread shall be made from dough, which contains not less than 6 % of added malt products, calculated on the weight of the flour used.

4.3.21 Rye bread shall be made from dough which contains not more than 15 % of rye flour calculated on the weight of flour used.

4.4 Specific quality requirements

4.4.1 The bread shall also conform to the specific quality requirements specified in Table 1.

Table 1 – Specific requirements for bread

<table>
<thead>
<tr>
<th>S/N</th>
<th>Characteristic</th>
<th>White bread</th>
<th>Brown bread</th>
<th>Whole wheat flour bread</th>
<th>Milk bread</th>
<th>Cassava bread</th>
<th>Sweet potato bread</th>
<th>Method of analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Moisture content, % (m/m), max.</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
<td>12.0 – 14.0</td>
<td>40</td>
<td>MS 610</td>
</tr>
<tr>
<td>2</td>
<td>pH of aqueous extract</td>
<td>5.3 – 6.0</td>
<td>5.3 – 6.0</td>
<td>5.3 – 6.0</td>
<td>5.3 – 6.0</td>
<td>5.3 – 6.0</td>
<td>5.3 – 6.0</td>
<td>MS 1635</td>
</tr>
<tr>
<td>3</td>
<td>Acid insoluble ash, % (m/m) on dry basis, max.</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>Annex B</td>
</tr>
<tr>
<td>4</td>
<td>Crude fibre, % (m/m) on dry basis.</td>
<td>0.3 (max.)</td>
<td>0.6 (min.)</td>
<td>1.0 (min.)</td>
<td>0.3 (max.)</td>
<td>3.5 – 4.0</td>
<td>N/A</td>
<td>MS 144</td>
</tr>
<tr>
<td>5</td>
<td>Milk solids (whole or skimmed), % (m/m), min.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>3.6</td>
<td>N/A</td>
<td>N/A</td>
<td>Annex C</td>
</tr>
<tr>
<td>6</td>
<td>Fat, % (min.)</td>
<td>0.7</td>
<td>2.0</td>
<td>0.7</td>
<td>2.0</td>
<td>N/A</td>
<td>N/A</td>
<td>Annex D</td>
</tr>
<tr>
<td>7</td>
<td>Total solids, % (m/m) min.</td>
<td>60.0</td>
<td>60.0</td>
<td>60.0</td>
<td>60.0</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

4.4.2 Cassava bread shall not contain more than 10 mg/kg of hydrogen cyanide when analysed according to MS 1386.

4.5 Microbiological limits

Bread shall conform to the microbiological limits in Table 2 when analysed according to the methods specified therein.
Table 2 – Microbiological limits for bread

<table>
<thead>
<tr>
<th>S/N</th>
<th>Microorganism</th>
<th>Limit</th>
<th>method of analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Total viable count, cfu/g, max.</td>
<td>$10^4$</td>
<td>ISO 4833</td>
</tr>
<tr>
<td>3</td>
<td><em>Escherichia coli</em>, cfu/g</td>
<td>Absent</td>
<td>ISO 7251</td>
</tr>
<tr>
<td>4</td>
<td><em>Salmonella</em>, 25 g</td>
<td>Absent</td>
<td>ISO 6579</td>
</tr>
<tr>
<td>5</td>
<td>Yeasts and moulds, cfu/g, max.</td>
<td>$10^3$</td>
<td>ISO 21527-2</td>
</tr>
</tbody>
</table>

5 FOOD ADDITIVES

Only those food additives listed under this product in MS 237, may be used and only within the limits specified.

6 CONTAMINANTS

6.1 Bread shall comply with the maximum residue limits for pesticides established by the Codex Alimentarius Commission.

6.2 Bread shall comply with the maximum levels for contaminants and toxins in accordance with MS 302.

7 HYGIENE

Bread shall be prepared and handled in a hygienic manner in accordance with MS 21.

8 PACKAGING AND LABELLING

8.1 Packaging

Bread shall be packaged in food grade materials that will safeguard the hygienic, nutritional and organoleptic qualities of the product.

8.2 Labelling

8.2.1 In addition to the requirements of MS 19, the following specific labelling requirements shall apply and shall be legibly and indelibly marked:

8.2.1.1 Name of the product according to section 3 and/or Table 1;

8.2.1.2 Name and address of the manufacturer, packer, distributor, importer, exporter or vendor;

8.2.1.3 List of ingredients in descending order of proportion of ingoing weight;

8.2.1.4 Details of enrichment and quantities added;

8.2.1.5 Lot identification;

8.2.1.6 Net weight, in metric units;

8.2.1.7 Date of manufacture;

8.2.1.8 Number of days within which bread shall have to be consumed/used from the date of manufacture; and

8.2.1.9 Instructions on disposal of used package.
8.2.2 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.

8.2.3 Nutrition labelling

The amount of nutrients in the bread shall be declared on the label in accordance with MS 624.

8.2.4 Nutrition and health claims

Bread may have claims on the importance of the micronutrients in nutrition and health. Such claims when declared shall be in compliance with CXG 23.

9 METHODS OF SAMPLING AND ANALYSIS

9.1 Sampling of bread shall be done in accordance with Annex A.

9.2 Analysis of bread shall be done in accordance with methods of test specified in Tables 1 and 2 indicated against each parameter.
Annex A  
(Normative)

SAMPLING OF BREAD

A.1 GENERAL

The following precautions are observed in drawing, preparing, storing and handling bread intended for testing:

A.1.1 Samples are taken in a place protected from exposure to damp air, dust or soot;

A.1.2 Samples, the container for the samples, and any sampling equipment are protected from contamination;

A.1.3 Samples consisting of loose cassava bread or retail packs are placed in a clean, dry airtight container made of metal or glass, or in sealable moisture-proof plastic bags;

A.1.4 Samples are stored at room temperature; and

A.1.5 Containers used are sealed and marked with the date, time, and place of sampling, and other identifying details.

A.2 SAMPLING FROM A LOT

A.2.1 The number of containers in the lot to be sampled depends on the size of the lot and is chosen in accordance with Table 1.

<table>
<thead>
<tr>
<th>No. of Containers in Lot (N)</th>
<th>No. of containers to be sampled (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 50</td>
<td>1</td>
</tr>
<tr>
<td>51 – 150</td>
<td>2</td>
</tr>
<tr>
<td>151 – 300</td>
<td>3</td>
</tr>
<tr>
<td>301 – 500</td>
<td>4</td>
</tr>
<tr>
<td>501 and over</td>
<td>5</td>
</tr>
</tbody>
</table>

A.2.2 The containers to be sampled are selected at random, using random number tables. If such tables are not available, every \(\frac{r}{n}\) container is chosen, by starting to count at any one, and counting 1, 2, 3 … \(r\), where \(r\) is the whole number of the fraction \(N/n\), until \(n\) of the containers have been selected.

A.3 SIZE OF THE SAMPLE LOT

A.3.1 Either two bread pieces, or the equivalent of 200 g if packed in small slices, are taken from each container selected for sampling.

A.3.2 One bread piece or 100 g of the loose bread is set aside in a sealed, labelled sample container for examination and inspection for conformity with clause 8.2.

A.3.3 The remainder of the sample drawn from the container is weighed and the weight recorded. These are then stored in sealed containers, labelled with the number of the container in the lot they were taken, until needed for sample preparation.
A.4 PREPARATION OF TEST SAMPLE

A.4.1 The bread from each sampled container is ground separately, as soon as possible. Grinding is done in a dry atmosphere.

A.4.2 About 15 g of ground bread from each sampled container is placed immediately in a sealed container, labelled appropriately (including the number of the sampled container), for use in the test for moisture content.

A.4.3 The rest of the ground bread from each sampled container is placed in one container, representing the whole lot, and thoroughly mixed by shaking to produce a composite sample for use in the tests for ash and cyanogenic glycosides.

A.4.4 In the event of a dispute between the purchaser and the vendor as to the acceptability of a lot of bread, the procedure described in A.1 to A.4 may be followed, using three times the amounts mentioned, to produce separate samples for the vendor, the purchaser, and for the reference.
Annex B
(Normative)

DETERMINATION OF ACID INSOLUBLE ASH

B.1 REAGENT
Dilute hydrochloric acid prepared by diluting concentrated hydrochloric acid with water in a ratio of 2:5.

B.2 APPARATUS
B.2.1 Muffle furnace, at 600 ± 20 °C.
B.2.2 Water bath.

B.3 PROCEDURE
B.3.1 Weigh accurately 5-10 g of finely powdered bread in a porcelain or platinum dish. Ignite the material in the dish with a suitable flame until it chars. Place the ignited bread in the muffle furnace.
B.3.2 Heat at 600 ± 20 °C for at least 1 h. Remove the dish from the furnace and cool.
B.3.3 Wet the ash with a suitable amount of hydrochloric acid, and place on a water bath for 10 min. Filter through a No.1 sinter glass crucible. Wash the crucible with water until the washings are free from acid. Dry the crucible in an air-oven for 2 h. Cool in a desiccator and weigh. Repeat the process until the difference between two successive weighings is less than 1 mg. Take the lowest mass.

B.4 CALCULATION
Acid insoluble ash (AI), per cent by mass (on dry basis), is calculated as follows:

\[ \frac{M_2 \times 100}{M_1} \]

Where,

\( M_1 \) is mass of sample; and

\( M_2 \) is mass of insoluble matter.
Annex C
(Normative)

DETERMINATION OF WHOLE MILK SOLIDS

C.1 PRINCIPLE

Milk bread should contain lactose. The lactose is determined in bread after removing the other sugars present by fermentation with yeast. The following method involves extracting the sugars from bread with dilute alcohol, destroying the non-lactose reducing sugars by fermenting the alcohol-free extract with yeast and determining the lactose remaining by Somogyi’s method.

C.2 REAGENTS

C.2.1 Yeast suspension, wash baker’s yeast by centrifuging with 4 times its volume of distilled water. Dilute to a 25% suspension.

C.2.2 Yeast nutrient solution, containing 1.7% bacto-peptone, 0.5% dipotassium phosphate and 0.33% magnesium sulphate.

C.2.3 Protein precipitant, dissolve 50.0 g Sodium tungstate and 6.0 g Disodium phosphate in 200 ml water. Add slowly 220 ml of 2 N HCl, mix and dilute to 500 ml.

C.2.4 Somogyi’s reagent, dissolve 12.0 g Sodium potassium tartrate, 20.0 g anhydrous Sodium carbonate and 25.0 g Sodium bicarbonate in 500 ml water. To this add with stirring 6.5 g Copper sulphate (CuSO₄·5H₂O) previously dissolved in 100 ml water. Then mix this solution with another containing 10.0 g Potassium iodide, 0.8 g Potassium iodate and 18.0 g Potassium oxalate dissolved in 200 ml water and dilute to a litre.

C.3 METHOD

Weigh 15.0 g of air-dried bread into a 200 ml volumetric flask containing 60 ml water. Mix, add 35 ml ethanol (95%) and immerse in a boiling water bath for 15 min. Cool, dilute to the mark with more ethanol and centrifuge. Evaporate 150 ml of the supernatant liquor to 40 ml and dilute to 100 ml in a volumetric flask.

Transfer 10 ml of this bread extract to a 50 ml conical flask, add 6.0 ml yeast suspension and 5 ml yeast nutrient solution. Also set up a blank commencing with 10 ml water. Close the flask with a stopper through which passes 6 mm glass tubing (about 10 cm long) and incubate at 30 °C for 2 h 30 min with shaking. Then centrifuge for 10 min at 1 000 r.p.m. Transfer the supernatant liquor into a 50 ml volumetric flask and wash the residue with two 10 ml portions of water. To the liquor plus washings add 2.5 ml, mix and filter, rejecting the first few millilitres of filtrate. For the determination of lactose, pipette 5 ml of the filtrate into a tube, neutralize to phenol red with 0.5 N sodium hydroxide, add 5 ml Somogyi’s reagent and drops of benzene. Then immerse the tube capped with glass bulb in boiling water for 15 min, cool, add 2.5 ml 2 N Sulphuric acid and titrate the excess iodine with 0.005 N Sodium thiosulphate using starch.

Set up the reference curve by taking 5 ml portions of Somogyi’s reagent and plotting the difference between the blank and lactose solutions against the corresponding lactose content.

C.4 CALCULATION OF RESULTS

If \( L \) is g lactose in a 5-ml aliquot (obtained from the calibration curve);

\( M \) is moisture in air-dried bread, per cent lactose in the air-dried bread; then

\[
\frac{8.33 \times L \times 10^4}{100 - M} - 0.35
\]

% non-fatty acid milk solids in the air dried bread is equal to:
Determination of Fat

D.1 Preparation of Sample

Cut a loaf or half a loaf of bread into slices 2 to 3 mm thick. Spread the slices on paper and let them dry in a warm room until sufficiently crisp and brittle to grind well in a mill. Grind the entire sample to pass No. 20 sieve, mix well and keep in an air-tight container.

D.2 Procedure

D.2.1 Transfer 50 g of the sample to a 600 ml beaker. Add 100 ml of distilled water and mix. Add 100 ml HCl, mix, cover and heat on a steam bath for 1 h, stirring well for about 6 or 7 times. Cool in a coldwater bath (≤ 15 °C) and stir. Add 10 g of Filter-Cel, or similar absorbent, stir, and mix completely.

D.2.2 Prepare 90 mm buchner as follows:

D.2.2.1 Place two 9 cm S and S 588 blue ribbon, or equivalent, filter papers in a funnel and apply suction. Mix 10 g Filter-Cel with 50 ml H2O and rapidly pour the mixture into the funnel. (This should make a smooth, even layer of Filter-Cel over paper, without cracks or openings.) Immediately filter the sample. Rinse the beaker several times with ice-cold H2O just before filtration is complete, wash the sides of buchner with 100 ml ice-cold H2O (or until a clear filtrate comes through). Up to this point do not let the pad suck dry. Continue with suction until Filter-Cel pad seems dry. Transfer this mass, without paper, from the buchner to the original beaker. Break up the mass with a rod, dry overnight on a steam bath, and then heat in oven at 100 °C for 30 min to remove all moisture (material shall be dry or fat results will be low). Break up any lumps and cool.

D.2.2.2 Prepare a large knorr extension tube of about 200 ml capacity (glass tubing 5 cm diameter, 12 cm high from shoulder to top of tube). Pack the tube with asbestos tamped tightly to form about 1 cm pad. Insert the stem of the tube into a 2-hole rubber stopper in a filtering bell jar connected to suction through a 2-way stopcock. Place 500 ml erlenmeyer within the bell jar so that the stem of the tube passes through the neck of the flask.

D.2.2.3 To the beaker and contents, add 100 ml ether-pet ether (+1) and macerate 3 to 4 min against the sides of the beaker with medium size, stiff metal spatula. Decant into the extension tube. Suck dry. Add 80 ml mixed ethers to the beaker. Work as before for 2 min. Transfer contents of the beaker to the extension tube, suck dry, and tamp with flattened stirring rod until all ether is removed.

D.2.2.4 To the material in the tube add 80 ml mixed ethers used just previously to rinse out the beaker, mix thoroughly with the stirring rod for a few minutes, let it stand for 1 min, then suck dry, and tamp the material as before. Make two additional extensions, turning the suction on and off carefully to avoid loss of the sample in erlenmeyer. Transfer to 1 litre beaker. Evaporate on a steam bath, completely transfer fat with small amounts of pet ether to a weighed 150 ml beaker, carefully evaporate pet ether on a steam bath, dry at 100 °C to constant weight (about 30 min), cool, and weigh.

D.3 Calculation

Fat content (on moisture free basis) per cent w/w is equal to

\[ 100 \times \frac{M_2}{M_1} \]

Where,

\( M_1 \) is mass, in g, of the sample; and

\( M_2 \) is mass, in g, of the fat after drying.
Annex E
(Normative)

DETERMINATION OF VOLUME/WEIGHT RATIO

E.1 APPARATUS

E.1.1 Rigid container.

E.1.2 Rape seeds.

E.1.3 Weighing scale.

E.1.4 Measuring cylinder.

E.1.5 Loaf volumeter.

E.1.6 Plate.

E.2 DETERMINATION OF VOLUME/WEIGHT RATIO BY DISPLACEMENT METHOD

E.2.1 Procedure

Weigh the loaf after it is cooled to room temperature and record the weight. Fill the container with rape seeds and level the top of seeds with a plate. Empty out the seeds leaving a layer at the bottom of the container. Place the loaf on the layer of seeds. Fill the rest of the container with seeds and level the top surface with a plate. Pour the remaining rape seeds into the measuring cylinder and measure the volume.

E.2.1.1 Volume (V) /weight ratio for the bread is calculated as follows:

\[
\frac{V}{W}
\]

Where,

\(V\) is the volume, in ml, of the remaining seeds after displacement; and

\(W\) is the weight, in g, of the loaf.

NOTE 1: Do not press the loaf while keeping in the box.

NOTE 2: For sliced bread, test before bread is sliced.

E.3 DETERMINATION OF VOLUME OF LOAF BY LOAF VOLUMETER

E.3.1 Procedure

E.3.1.1 Calibration of volumeter with dummy loaf Open the container and place a dummy loaf into it. Close the container and open the gate. Remove the hopper lid and fill the calibrated column with rape seeds. Tap the column three times to ensure maximum use of seeds around the dummy loaf. Empty all excess seeds by closing the gate and swinging down the column. Return the column to upright position and secure the lid to the container. Open the gate and swing down the volumeter to allow rape seeds to empty from bottom pan. When it is completely empty, close the gate and swing the volumeter to upright position.

E.3.1.2 Measurement of the volume of loaf Weigh the loaf after it is cooled to room temperature and record the weight. Place the loaf in the volumeter and repeat the procedure as that for dummy loaf. The volume of the loaf will be indicated by the level of seeds in the calibrated column.

NOTE: The loaf must be larger than the dummy loaf.
**E.3.1.3** Volume \((V)\)/weight \((W)\) ratio for the bread is calculated as follows:

\[
\frac{V}{W}
\]

Where,

\(V\) is the volume, in ml, of the loaf; and

\(W\) is the weight, in g, of the loaf.
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