



CD/K/610:2010
ICS 67.120.20

EAST AFRICAN STANDARD

Methods for evaluation of quality of chicken eggs

EAST AFRICAN COMMUNITY

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

© East African Community 2010 — All rights reserved*

East African Community

P O Box 1096

Arusha

Tanzania

Tel: 255 27 2504253/8

Fax: 255-27-2504481/2504255

E-Mail: eac@eachq.org

Web: www.each.int

Introduction

In the preparation of this East African Standard, the following sources were consulted extensively:

Regulations Governing the Voluntary Grading of Shell Eggs, 7 CFR Part 56, Effective March 30, 2008

United States Standards, Grades, and Weight Classes for Shell Eggs, AMS 56, Effective July 20, 2000

IS 9810:1981(R2000), *Methods for Evaluation of Quality of Chicken Eggs*

Codex Alimentarius website: http://www.codexalimentarius.net/mrls/vetdrugs/jsp/vetd_q-e.jsp

USDA Foreign Agricultural Service website: <http://www.mrldatabase.com>

USDA Agricultural Marketing Service website: <http://www.ams.usda.gov/AMSv1.0/Standards>

European Union: http://ec.europa.eu/enterprise/sectors/pharmaceuticals/veterinary-use/maximum-residue-limits/index_en.htm

Assistance derived from these sources is hereby acknowledged.

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

Contents

1	Scope	1
2	Normative references	1
3	Descriptions	2
3.1	Description of shell condition and its cleanliness	2
3.2	Description of air cell	2
3.3	Description of yolk shadow outline	3
3.4	Description of yolk defects	3
3.5	Description of egg white	3
4	Sampling and testing	4
4.1	Sampling	4
4.2	Testing	4
4.3	Candling	4
4.4	Shell thickness	4
4.5	Haugh Unit (HU)	4
4.6	Albumen Index	5
4.7	Yolk Index	6

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

Methods for evaluation of quality of chicken eggs

1 Scope

This East African Standard specifies methods of sampling and test necessary to determine quality of fresh eggs. It includes external quality factors as they appear under direct examination and internal quality factors as they appear before candling light or when the egg is broken out and measured by Haugh units plus visual examination of the yolk portions.

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 Official Method 931.06:1931, *Phosphorus (Total) (P_2O_5) in Eggs*

CAC/RCP 1, *Recommended international code of practice — General principles of food hygiene*

EAS 35, *Edible salt — Specification*

EAS 12, *Drinking (potable water) — Specification*

EAS 38, *Labelling of prepackaged foods — Specification*

EAS 39, *Hygiene in the food and drink manufacturing industry — Code of practice*

EAS 41, *Fruits, vegetables and derived products — Sampling and methods of test*

EAS 103, *Schedule for permitted food additives*

EAS 123, *Distilled water — Specification*

ISO 936, *Meat and meat products — Determination of total ash*

ISO 1736, *Dried milk and dried milk products — Determination of fat content — Gravimetric method (Reference method)*

ISO 1737, *Evaporated milk and sweetened condensed milk — Determination of fat content — Gravimetric method (Reference method)*

ISO 4831, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of coliforms — Most probable number technique*

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

ISO 4833, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 degrees C*

ISO 5537, *Dried milk — Determination of moisture content (Reference method)*

ISO 5985, *Animal feeding stuffs — Determination of ash insoluble in hydrochloric acid*

ISO 6491, *Animal feeding stuffs — Determination of phosphorus content — Spectrometric method*

ISO 6579, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Salmonella spp.*

ISO 13730, *Meat and meat products — Determination of total phosphorus content — Spectrometric method*

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*

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 Descriptions

3.1 Description of shell condition and its cleanliness

3.1.1

sound

shell is unbroken

3.1.2

checked

shell having a crack in the shell but shell membranes intact

3.1.3

leaker

egg showing leakage through the shell and shell membranes allowing the contents to come out. Area of shell missing from the surface is more than 6 mm square.

3.1.4

smashed

an egg the shell of which is smashed, crushed or scattered allowing the contents to come out

3.1.5

clean

free from foreign material, stain or other visual discolouration

3.1.6

slightly stained

a shell surface which is almost free from adhering dirt, but has slight stains without appreciably detracting its appearance limited to 1/16th of the shell surface

3.1.7

moderately

a shell that is free from adhering dirt but stained has stains covering to a moderate degree and limited to ¼th of the shell surface

3.1.8

dirty

egg shell having adhering dirt and stains covering more than ¼th of the shell surface

3.2 Description of air cell

3.2.1

practically regular

an air cell which maintains practically a fixed position inside the egg and presents an even outline with not more than 6 mm movement in any direction when it is turned

3.2.2**free air cell**

an air cell that moves freely towards the uppermost point inside the egg as it is rotated slowly. The shell membranes are intact allowing the air cell to move freely in any direction between them.

3.2.3**bubbly air cell**

a ruptured air cell consisting of one or more small separate air bubbles floating beneath the main air cell

3.3 Description of yolk shadow outline**3.3.1****outline slightly defined**

a yolk outline which is distinctly visible and blends into the surrounding white as the egg is rotated in front of the candler

3.3.2**outline fairly well defined**

a yolk outline which is discernible but cannot be outlined clearly when twirled in front of a candler

3.3.3**outline well defined**

outline of the yolk clearly visible as it casts a dark shadow when twirled in front of a candler

3.4 Description of yolk defects**3.4.1****Practically free from defects**

a yolk that shows no germ development, meat or blood spots

3.4.2**definite but not serious defects**

a yolk may show definite meat or blood spots on the surface with slight indications of germ development but without any pronounced or serious defects

3.4.3**definite and serious defects**

yolk showing development of germ spot on the yolk, visible as a definite area with no blood ring

3.5 Description of egg white**3.5.1****clear**

egg white which is free from discolourations and presence of any free floating foreign bodies on it

3.5.2**firm**

egg white which is sufficiently thick or viscous and thus makes the outline of yolk slightly or indistinctly visible when twirled in front of a candler

3.5.3**reasonably firm**

egg white which is reasonably thick or viscous but enough to allow casting of the outline of the yolk when twirled and candled

3.5.4**weak and watery**

egg white which is thin and lacks in viscosity. It permits the yolk to approach the shell closely on candling, making yolk outline clearly visible on twirling.

4 Sampling and testing

4.1 Sampling

Twenty eggs should be drawn from a lot at random for estimating the breakout quality of eggs.

4.2 Testing

Carry out the following tests to determine the egg quality.

4.2.1 External quality

Determine the external quality of egg for the parameters given in 3.1 and 3.2.

4.2.2 Internal quality

Determine the internal quality of eggs for the parameters given in clauses 3.3, 3.4 and 3.5 by candling and breaking out tests.

4.3 Candling

4.3.1 Hold the egg before a beam of 60 watt light in such a way that the light rays penetrate and illuminate the interior of the egg for inspection. Note any internal defects.

4.3.2 Measure the aircell height by means of aircell gauge while candling prior to breaking.

4.4 Shell thickness

After breaking the egg, boil the shell in 2.5 percent sodium hydroxide solution for 5 minutes. Wash and dry in a thermostatically controlled oven at 100 °C to 105 for 24 hours. Determine the thickness of the shell by screw gauge at three different longitudinal points and take the average of the readings.

4.5 Haugh Unit (HU)

4.5.1 Haugh unit can be measured by using the interior egg quality calculator. The following precautions should be followed while estimating the same:

- i) The internal temperature of eggs should not be lower than 7 °C or higher than 15 °C at the time of performing the breakout test.
- ii) Care should be exercised to see that the thick white is not punctured while breaking.
- iii) One egg at a time should be broken since it is important to measure the albumen height immediately after breaking.
- iv) Measurement of height of thick albumen should be made with the help of a spherometer or Haugh meter or micrometer as given in Figure 1.
- v) Care should be taken to avoid measuring the albumen height in an area where there is a chalaza or air bubble.

4.5.2 Eggs removed from the refrigerator should be kept for three hours at ambient temperature of 23 °C ± 2 °C. Determine the Haugh unit reading of the eggs by the following procedure:

- a) Check the zero reading by placing the instrument on a flat surface and lowering the plunger until the point touches the surface. The pointer should be at zero. If not, slacken the clamp and turn the bezel so that the zero mark coincides with the pointer. Retract the point upwards to its full extent.

- b) Open the egg on to a flat glass plate of sufficient size to contain it, place the instrument over the egg, and lower the point until just touches the albumen. The height is then indicated on the dial.

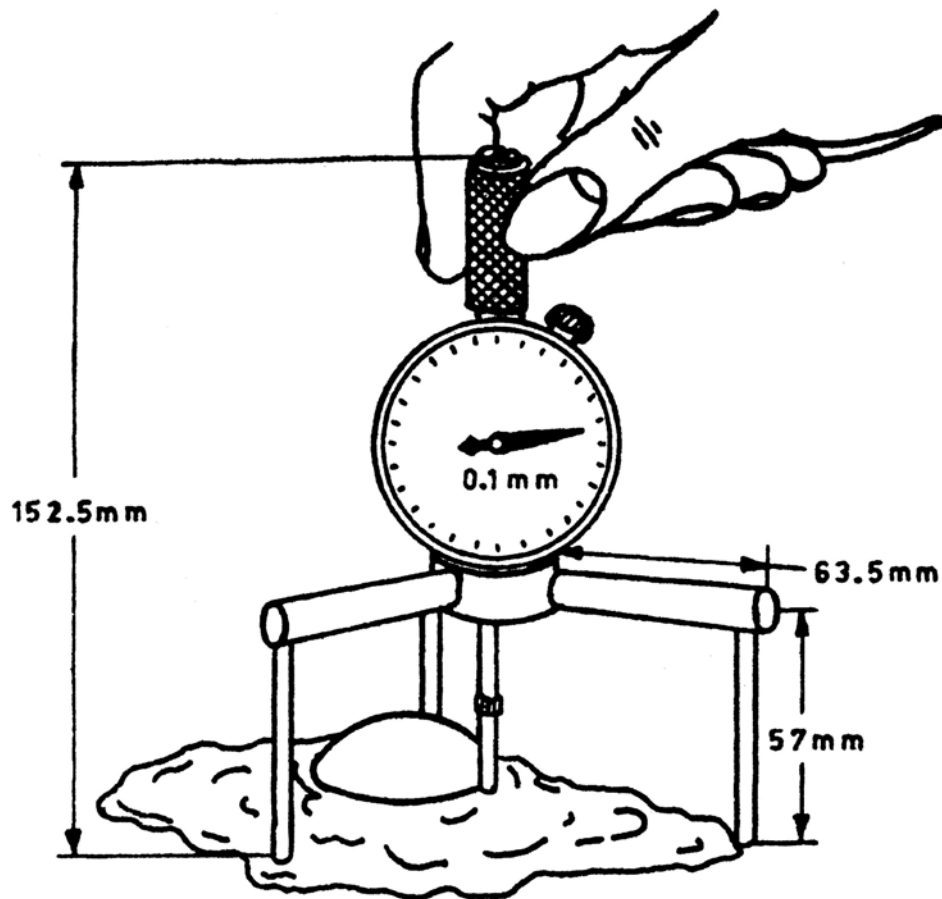


Figure 1 — Gauge for egg quality

The HU can then be calculated from the following equation:

$$HU = 100 \log_{10} H + 7.57 - 1.7 M$$

where

HU = Haugh units of interior quality whose numerical value equals the quality value of the egg;

H = height, mm; and

M = mass, g.

NOTE An alignment chart for finding Haugh units without having to make calculation from the above formula is given in Figure 2.

4.6 Albumen Index

Albumen index can be determined by measuring the height of the thick albumen by spherometer or micrometer and average width of the thick albumen by using vernier calipers:

$$\text{Albumen index} = \frac{\text{Height of thick albumen in mm}}{\text{Average width of thick albumen in mm}}$$

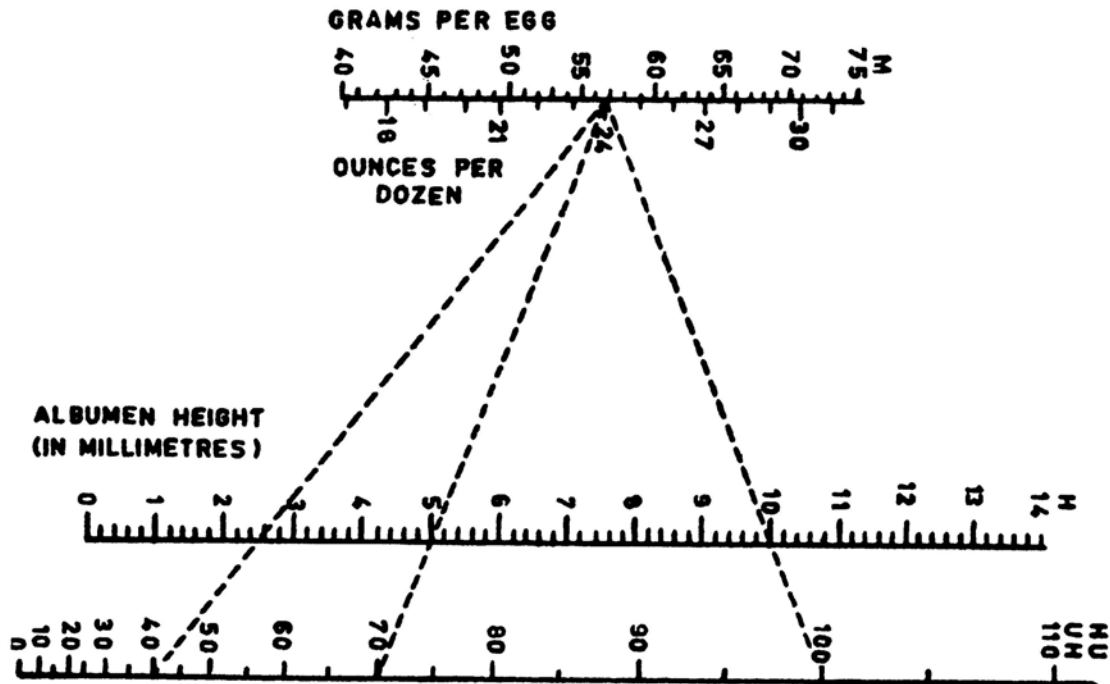


Figure 2 — Alignment chart

4.7 Yolk Index

Yolk index can be determined by measuring the height or width of the yolk after it has been separated from the albumen or of the yolk in its natural position when the egg is broken out on a flat surface.

$$\text{Yolk index} = \frac{\text{Height of yolk in mm}}{\text{Average diameter of yolk in mm}}$$

Draft for comments only — Not to be cited

Standard

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