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Edible eggs in shell — Specification

DRAFT FOR PUBLIC REVIEW



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Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Trade, Industry and Cooperatives established under Cap 327, of the Laws of Uganda, as amended. UNBS is mandated to co-ordinate the elaboration of standards and is

a member of International Organisation for Standardisation (ISO) and

a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and

the National Enquiry Point on TBT Agreement of the World Trade Organisation (WTO).

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of key stakeholders including government, academia, consumer groups, private sector and other interested parties.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The Technical Committee responsible for this document is UNBS/TC 2, [Food and Agriculture], Subcommittee SC 12, [Meat, poultry and processed products].

This is the first edition (CDUS 1682:2017), which has been technically developed.

Introduction

Bird eggs are a common food and one of the most versatile ingredients used in cooking. They are important in many branches of the modern food industry.

The most commonly used bird eggs are those from the chicken, duck and goose eggs. The smaller eggs such as quail eggs, are occasionally used as a gourmet ingredient in industries. The largest bird eggs from ostriches tend to be used only as special luxury food. In some African countries, guinea fowl eggs are commonly seen in market places. Pheasant eggs and emu eggs are edible but less widely available. Sometimes they are obtainable from farmers, poulterers, or luxury grocery stores. In many countries, wild birds' eggs are protected by laws which prohibit collecting or selling them, or permit collection only during specific periods of the year.

Eggs are a very good source high quality protein. More than half the protein of an egg is found in the albumen along with vitamin B2 and lower amounts of fat and cholesterol than the yolk. The whites are rich sources of selenium, vitamin D, B6, B12 and minerals such as zinc, iron and copper. Egg yolks contain more calories and fat. They are the source of cholesterol, fat soluble vitamins A, D, E and K and lecithin.

For the purpose of this standard, the edible eggs in shell only include those from Chicken, Duck, Turkey, Goose, Quail, Pheasant, Emu, Ostrich and Guinea fowl.

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Edible eggs in shell — Specification

1 Scope

This Committee Draft Uganda Standard specifies requirements and methods of test for edible eggs-in-shell fit for human consumption and for use in the food and/or non-food industries Eggs may be from any poultry domesticated.

2 Normative references

The following referenced documents referred to in the text in such a way that some or all of their content constitutes requirements 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.

US CAC/MRL-2, *Maximum Residue Limits (MRLs) and Risk management Recommendations (RMRs) for Residues of Veterinary Drugs in food*

US CAC/RCP 15, *Code of hygienic practice for eggs and egg products*

US EAS 38, *Labelling of pre-packaged foods — General requirements*

US EAS 456, *Organic products standard*

US EAS 803, *Nutrition labelling — Requirements*

US EAS 805, *Use of nutrition and health claims — Requirements*

US ISO 6579, *Microbiology of food and animal feeds — Horizontal method for detection, enumeration and serotyping of Salmonella, Enumeration by a miniaturized most probable number technique*

US ISO 6888-1, *Microbiology of food and animal feeds — Horizontal method for enumeration of Coagulase-positive staphylococci. (Staphylococcus aureus and other species), Detection and MPN technique for low numbers*

US ISO 7251, *Microbiology of food and animal feeds — Horizontal method for detection, enumeration of presumptive Escherichia coli — Most probable number technique*

3 Terms and definitions

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

3.1

edible eggs

eggs fit and safe for human consumption

3.2

egg yolk

portion of an egg with the primary function to supply food for the development of the bird embryo

3.3

egg shell

is the outer covering of an egg, which may be soft or hard, spotted or not spotted depending on the bird in particular

3.4

egg albumen

is the clear liquid, also called the egg white contained within an egg, it can be white and solid for boiled eggs

3.5

contamination

intrusion process of undesirable compounds in the food that may be harmful for human consumption or compromise with safety, may be physical (Dust, droppings and metal powders), Chemical (antibiotics) or biological (microorganisms)

3.6

flock

number of birds of one kind feeding, resting, or traveling together

3.7

defects

is a physical, aesthetic, or functional attribute of a product or service that exhibits the product or service failed to meet any of the desired requirement

3.8

incubator eggs

eggs that have been previously put under the incubator and provided environmental controlled conditions, such as temperature and humidity for hatching but fail to hatch

3.9

poulterer

any person dealing in poultry as a business

3.10

veterinary drug residues

include the parent compounds and/or their metabolites in any edible portion of the animal product, and include residues of associated impurities of the veterinary drug concerned

4 Requirements

- a) Eggs shall come from flocks (both breeding and laying) in good health so that flock health does not adversely affect the safety and suitability of the eggs.
- b) Egg laying areas and establishments shall, to the extent practicable, be designed, constructed, maintained and used in a manner that minimizes exposure of domesticated birds or their eggs to hazards and pests.
- c) Appropriate measures shall be implemented during disposal of unsafe and unsuitable eggs to protect other eggs from contamination.
- d) Eggs shall be collected using collection equipment made of materials that are non-toxic and be designed, constructed, installed, maintained and used in a manner to facilitate good hygiene practices.
- e) Eggs shall be of the normal original taste from the bird in particular, if the egg is fortified during poultry feeding practices, this should be properly stated on the pack.
- f) Eggs which have been kept at a temperature below + 5°C during transport of not more than 24 hours or on retail premises shall not be considered as refrigerated

- g) Eggs shall be practically normal with oval shape, free from foreign matter and colour, clean and free from visible cracks

4.1 Specific requirements

4.1.1 Defects

The edible eggs in shell shall be free from the defects that compromise their quality, as listed in Table 1 below

Table 1 — Defects of Edible eggs in shell

Egg shell	Egg albumen
<ul style="list-style-type: none"> Thin, sandy, rough, ridged or too soft Abnormal colour, faded colour Mottled shell Tainting of shell 	<ul style="list-style-type: none"> Weak, thin, watery egg white Flecks in the albumen Blood and meat spots Off flavour and odours Green rot and cloudy white
Egg yolk	Egg membrane
<ul style="list-style-type: none"> Orange- pink colour Colourless yolks Double yolk Misplaced yolks Blood and meat spots Thick, pastry and rubbery yolks Off flavours and odours 	<ul style="list-style-type: none"> Too thick membrane No membrane

4.1.2 Unsafe eggs

Unsafe eggs shall not be consumed or used in industries for processing egg products. Examples of unsafe eggs include;

- Incubator eggs
- Broken/leaker eggs
- Eggs with bacterial or fungal rots
- Eggs contaminated with faecal matter
- Eggs stored for hatching for sufficient time to adversely affect the safety and suitability

5 Contaminates

5.1 Veterinary Drug Residues

Edible eggs in shell shall have a maximum residual limit for veterinary drugs in accordance with US CAC/MRL-2

6 Hygiene

The edible shelled eggs shall be handled, stored and transported following hygienic practices in accordance with US CAC/RCP 15, the personal handling eggs shall also be clean and health.

6.1 Microbiology

Edible eggs in shell shall be free from microorganisms as stated in Table 2 below;

Table 2 — Microbiological limits for edible eggs in shell

Microorganism	Limit	Test method
<i>Salmonella spp</i>	Absent	US ISO 6579
<i>Escherichia coli</i>	Absent	US ISO 7251
<i>Staphylococcus aureus</i>	10 ³ cfu/ml max.	US ISO 6888-1

7 Preservation methods

The shell of an egg normally carries a wide range of microorganisms on its surface which are mostly responsible for spoilage of eggs.

The methods below may be used in the prolonging of the shelf life of edible eggs in shell;

a) Cold storage

- A temperature of 0 °C and relative humidity of 85 % – 90 % is recommended for cold storage of eggs to preserve them for 5 to 8 months.
- For short period of preservation of 2 to 3 months, eggs can be stored at 10 °C – 12 °C or 50 °F – 55 °F with a relative humidity of 60 % – 70 %.
- Intact eggs may be held at the lowest possible temperature that will avoid freezing and bursting of the shells.
- For intact eggs, the relative humidity must not go beyond 90 % since do not freeze at temperature between -1.5 °C and -2 °C

b) Over-wrapping

- For over wrapping of eggs polyethylene, cellophane, polyvinylidene and other transparent, thin but sufficiently strong, films or food grade waxes may be used.
- These films should be impervious to gases and moisture.
- Over wrapping of eggs in different atmosphere like carbon dioxide or vacuum can be used

c) Thermostabilization

- This method is good for fertile eggs since it kills the embryos and therefore is also known as 'defertilization' method.
- Edible eggs in shell may be immersed in hot water at 54.4 °C for 30 minutes which tend to coagulate the albumin and then the egg is cooled under tap water.

- iii. Treated eggs may remain edible for 3 to 4 weeks even during dry season.
- iv. Though this method has many advantages such as stabilizing of the albumin and sterilization of the egg shell, the egg loses the property of foaming to a remarkable extent.

d) Dry packing

Eggs may be kept in an earthen pot with clean dry packing material and the pot is buried in wet sand

e) Treatment by immersing in liquid

Edible eggs in shell may be immersed in liquids such as lime and sodium chloride to prevent microorganisms also inhibit bacterial decomposition by chemicals action or by physical means such as occlusion of air passages/pore. This prevents the escape of moisture from the egg.

8 Grading

The edible eggs in shell shall be graded basing on the quality, form of presentation, sizes, weight, mode of poultry storage system and colour as in sections below;

8.1 Quality tolerance

Edible eggs in shell shall be graded according to quality aspects as stated in Table 3 below

Table 3— Quality aspects of different classes of edible shelled eggs

Grade A	Grade B
<ul style="list-style-type: none"> • Shell and cuticle: normal, clean, undamaged • Air space: height not exceeding 6 mm, stationary; however, for eggs to be marketed as "extra", it shall not exceed 4 mm • White: clear, limpid, of gelatinous consistency, free of extraneous matters of any kind • Yolk: visible on candling as a shadow only, without clearly discernible outline, not moving appreciably away from the centre of the egg on rotation, free of extraneous matter of any kind 	<ul style="list-style-type: none"> • Shell: normal and undamaged; • Air space: height not exceeding 9 mm; • White: clear, limpid, free of extraneous matter of any kind; • Yolk: visible on candling as a shadow only; this characteristic is not required of eggs preserved in lime and free of extraneous matter of any kind; • Germ cell: imperceptible development; • Odour: free of extraneous odour
Grade C	
<ul style="list-style-type: none"> • Eggs have whites that may be thinner and yolks that may be wider and flatter than eggs of higher grades. • The shells must be unbroken but may show slight stains. • This quality is seldom found in retail stores because they are usually used to make liquid, frozen, and dried egg products, as well as other egg-containing products 	

Note 1: The edible eggs in shell shall be graded basing on classes, where the letter A, B and C indicate;

Class A or 'fresh eggs'

Class B or 'second quality' or 'preserved eggs';

Class C or 'down-graded eggs' intended for approved food industry undertakings

Note 2: Grade "A" eggs shall not be treated or preserved or refrigerated in premises or plants where the temperature is artificially maintained at less than +5°C.

8.2 Forms of presentation

The edible eggs in shell may be graded depending on the form of presentation as follows;

- Chilled egg
- Boiled egg
- Frozen egg
- Waxed egg
- Fresh raw egg

8.3 Tolerance of size and weight

The edible eggs in shell shall be graded depending on size as stated in Table 4 below;

Table 4 — Recommended egg size and corresponding weight

Size	Minimum net weight per egg (grams)
Jumbo	More than 66
Extra large	59 – 66
Large	51 – 59
Medium	43 – 51
Small	33 – 43

Note 1: this size grading shall apply to chicken, turkey, guinea fowl and duck only.

Note 2: The following egg weight shall apply to the edible shelled eggs of other birds, as below stated;

- a) Quail Eggs at only 9 grams each, quail eggs are significantly smaller than the average
- b) Goose eggs are roughly equivalent to two jumbo chicken eggs and have a white shell
- c) Pheasant eggs classified as light (20.0 g – 26.0 g), medium (27.0 g – 32.0g) and heavy (33.0 g – 40.0 g)
- d) Ostrich eggs have a weight range between 1,100 g and 1,900 g
- e) Emu eggs are approximately 680g

8.4 Additional grading

Edible eggs in shell shall also be graded basing on the method in which the birds are raised as below;

- a) Standard White Eggs

These eggs come from white poultry that are typically raised in conventional housing systems. Conventional housing has been the standard for decades.

b) Standard Brown Eggs

These eggs come from brown poultry that are typically raised in conventional housing systems. Conventional housing has been the standard for decades.

c) Furnished / Enriched / Nest-Laid Eggs

These eggs come from poultry that are raised in furnished housing systems. Furnished housing provides more space (both floor space and height) for the birds to move around, while also providing a variety of enrichments, which allow the birds to express more natural behaviours. Enrichments include nesting boxes, perches, scratch pads and dust baths.

d) Free-Run Eggs

These eggs come from poultry that are raised in free-run (barn or aviary) housing systems. Free-run systems allow the birds to roam freely within an enclosed barn, while also providing a variety of enrichments such as nesting boxes and perches.

e) Free-Range Eggs

These eggs come from poultry that are raised in free-run (barn or aviary) housing systems, which also provide access to outdoor runs (when weather permits).

f) Organic Eggs

These eggs come from poultry that are raised in free-range housing systems. The birds are only provided feed that has been certified organic, which means that it only contains ingredients that were grown without pesticides, herbicides or commercial fertilizer. Look for a certified organic symbol on the egg carton. This should be in consistence with be a.US EAS 456.

g) Omega-3 Eggs

These eggs come from birds that were provided feed containing extra flax (up to 10 % -20 %). As a result, the eggs laid by these birds contain more Omega-3 fatty acids.

h) Vitamin-Enhanced Eggs

These eggs come from poultry that were provided feed that was nutritionally enhanced to include higher levels of certain vitamins (Vitamin D, vitamin A or Vitamin E). As a result, the eggs laid by these birds contain corresponding higher amounts of the particular vitamin(s).

i) Vegetarian Eggs

These eggs come from poultry that were provided feed containing only plant-based ingredients

8.5 Identification based on color

Edible eggs in shell shall be in its original natural colour depending on the bird in context as shown in Annex A

9 Packaging

Edible eggs in shell shall be packaged in food grade containers/material to ensure the safety and quality requirements specified in this standard are maintained throughout the shelf life of the product.

10 Labelling

In addition to the requirements of US EAS 38, the following labelling requirements shall apply and shall be legibly and indelibly marked.

- a) Name and physical address,
- b) Name of Food used shall be “Edible eggs in shell”
- c) Lot Identification: A form of identification is required which enables you to trace and recall the entire lot from sale where there is found to be a risk to human or animal health. A farm base, shed base, date based system (or combination of these) can help satisfy the requirements for a lot mark
- d) The food identification requirements must always be followed. If the food is being transferred within a company or group of companies, the outer packaging may contain the food identification requirements. If the required information is not on the outer package, then this information can be conveyed by separately delivered documentation.
- e) Best before date
- f) The packaging of eggs should contain a statement regarding the country of origin
- g) Number of contents, net weight or volume, weight grade, weight in metric units
- h) Egg packaging must include a Nutrition Information Panel (NIP) based on the edible portion of two average size eggs in that carton or tray. On average, 87% of an egg weight is edible
- i) Quality grading must be clearly stated on the pack in terms of weight and quality of class
- j) Date or week number of packing
- k) Particulars of storage conditions such as under refrigeration
- l) Edible eggs in shell must be well labelled if from organic farming, as in accordance with US EAS 456.

11 Nutrition and health claims

Edible eggs in shell may have health claims associated with nutrition and health. Such claims when declared shall be consistent with US EAS 805 and shall follow nutritional labelling concepts as in accordance with US EAS 803.

12 Storage

Edible eggs in shell shall be stored at room temperature and cold storage depending on if they are fresh or preserved

For the successful storage of fresh eggs, the following conditions shall be met;

- a. The eggs placed in storage must be clean; they must not be washed or wet
- b. The storage room must be free from tainting products and materials should be cleaned regularly with odourless detergent or sanitizers.
- c. The storage room must be kept at a constant temperature and humidity must be checked.
- d. There must be air circulation in the storage room.

- e. Eggs shall be stored so that they are allowed to breathe., airspace should be faced upwards
- f. As far as possible, interior quality shall be monitored; there should be a good proportion of thick white, the yolk should stand up well, and the flavour of white and yolk should be good.
- g. Edible eggs in shell shall follow a gradual adjustment to temperatures if there is a change in means of storage or transportation.

Note 1: In the tropics, eggs can deteriorate very quickly unless they are stored at low temperatures. The ideal temperature for storage in such climates is 13 °C or lower (usually between 10 °C and 13 °C). Here refrigeration is a necessity for successful commercial storage; however, it may be unavailable or the costs too high.

Note 2: during storage and transport preserved eggs that have also been chilled must be maintained at a temperature between 8 °C and 0 °C, in order to maintain their initial quality, and, in any case the eggs must not be re-chilled.

13 Transportation

The following requirements shall be observed during the transportation of the edible eggs in shell;

- a) Packs, including inner packing material must be shock resistant, dry, clean and in good repair and made of materials which protect the eggs from extraneous odour and the risk of quality deterioration and mechanical damage.
- b) Large packs, used for transporting and dispatching eggs, including inner packing material, shall not be re-used unless they are as new and meet the technical hygiene requirements
- c) Re-used large packs, must not bear any previous marking likely to lead to confusion.
- d) Small packages containing not more than 30 eggs shall not be re-used for transporting eggs
- e) Eggs in transport must be kept clean, dry and free of extraneous odour and effectively protected from shocks, weather and the effect of light.
- f) Care should be taken at all stages of handling and transport. Workers handling eggs should be instructed so that they appreciate the need for careful handling. The provision of convenient loading platforms at packing stations, loading depots and raling stations, and handling aids, such as hand trucks and lifts, are of great help.
- g) The eggs must be protected at all times against exposure to temperatures that cause deterioration in quality as well as contamination, especially tainting.

Annex A (Informative)

Images of poultry edible eggs in shell

A.1 Poultry edible eggs in shell



Figure 1: Indicates edible eggs in shell from different poultry: turkey, quail, chicken, duck, pheasant, goose, ostrich, emu and guinea fowl from left to right respectively.

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