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Poultry and poultry products — Pickled eggs — Specification



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PUBLIC REVIEW DRAFT

Foreword

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

- (a) a member of International Organisation for Standardisation (ISO) and
- (b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and
- (c) the National Enquiry Point on Technical Barriers to Trade (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 committee responsible for this document is Technical Committee UNBS/TC 214, Poultry and poultry products.

PUBLIC REVIEW DRAFT

Introduction

Pickling is a traditional method of food preservation applied to fruits, vegetables, and foods of animal origin such as meats and eggs. Due to the shifts in consumer preference away from commercially processed and artificially preserved foods, pickling has re-emerged as an attractive processing alternative in an effort to produce “all natural” or “minimally processed” foods. There is an increase in the production of eggs that are consumed as table eggs, processed egg products while others are used as hatching eggs. Some of the shelled eggs are further processed and used by the food industry as ingredients in other foodstuffs.

Hard-cooked pickled eggs are processed as quick food or snacks offering a different way of eating, flavouring, and preserving eggs. Consumers accept both homemade and commercial hard-cooked pickled eggs. The preparation of pickled eggs starts with cooking and peeling eggs, followed by packaging in acidic brine that may contain water, acidulants, vegetables, preservatives, colouring agents, spices, and other ingredients. Although different avian species (Chicken, Duck, Turkey, Goose, Quail, Pheasant, Emu, Ostrich and Guinea fowl), can be used to obtain the eggs, the final taste and sensory properties of pickled eggs largely depend on the brine composition. After the eggs are hard-boiled, the shell is removed and they are submerged in a solution of vinegar, salt, spices, and other seasonings. Recipes vary from the traditional brine solution for pickles, to other solutions, which can impart a sweet or spicy taste.

Commercial production of pickled eggs requires a thorough understanding of acidity and pH. The microbiological safety of hard-cooked eggs pickled in vinegar brine is dependent on the product pH. The pH of a pickled product for control of pathogenic microorganisms, particularly *Clostridium botulinum*, which produces a lethal toxin causing botulism. Thermal processing provides additional safety and stability; the acidity of the product also influences the shelf life of pickled eggs because the acidic environment controls many spoilage microorganisms. Thus, processors have a vested interest in measuring and maintaining a specified acidity in their products.

Whereas all hard-cooked pickled egg production involves the acidification of eggs, processes may vary depending on ingredients, storage temperature requirements, and available equipment. The quality of the eggs, for preparation as pickled eggs, was found to be dependent upon the interior shell egg quality. A brown discoloration of hard-cooked egg albumen was found to be associated with the loss of interior shell egg quality. The ease of peeling the eggshell and the smoothness of the albumen surface improved with the age and/or increase in the pH of the egg. The delay between peeling the hard-cooked egg and using it in a food product or as a food allows for growth of microorganisms. Bacterial counts of peeled eggs held at 25°C for four days increased the process of microorganisms in the pickled eggs.

This standard is presently being formulated to ensure the production of quality pickled eggs that are acceptable to the consumer and feasible for manufacture.

Poultry and poultry products — Pickled eggs — Specification

1 Scope

This Draft Uganda Standard specifies the requirements, sampling and test methods for pickled eggs for direct human consumption, including for catering purposes or for repackaging if required.

2 Normative references

The following documents are 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.

AOAC 942.17, *Arsenic in food. Molybdenum blue method*;

AOAC 999.11, *Lead, Cadmium, Copper, Iron, and zinc in foods. Atomic absorption spectrophotometry after dry ashing*;

US 28 EAS 39, *Code of practice for hygiene in the food and drink manufacturing industry*;

US 45, *General standard for food additives*;

US 738, *General standard for contaminants and toxins in food and feed*;

US 1659, *Materials in contact with food — Requirements for packaging materials*;

US 1682, *Edible eggs in shell — Specification*;

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 12, *Potable water — Specification*;

US EAS 35, *Fortified food grade salt — Specification*;

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

US EAS 123, *Distilled water — Specification (2nd Edition)*;

US EAS 147-1, *Vinegar - Specification Part 1: Vinegar from natural sources*;

US EAS 147-2, *Vinegar - Specification Part 2: Vinegar from artificial sources*;

US EAS 321, *Edible fats and oils — Specification*;

US EAS 803, *Nutrition labelling — Requirements*;

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

US ISO 948, *Spices and condiments — sampling*;

US 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*;

US ISO 6579-1, *Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of Salmonella — Part 1: Detection of Salmonella spp.*;

US ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*;

US ISO 7937, *Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of Clostridium perfringens - Colony-count technique*;

US ISO 11290-2, *Microbiology of food and animal feeding stuffs - Horizontal method for the detection and enumeration of Listeria monocytogenes -- Part 2: Enumeration method*;

ISO 16649-1, *Microbiology of the food chain — Horizontal method for the enumeration of beta-glucuronidase-positive Escherichia coli — Part 1: Colony-count technique at 44 degrees C using membranes and 5-bromo-4-chloro-3-indolyl beta-D-glucuronide*;

US 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*;

US 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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 Pickled Eggs
product prepared under hygienic conditions from peeled hard-boiled, sound and wholesome poultry eggs immersed in a solution, of vinegar and spice, which imparts a different flavour to the eggs.

3.2 Eggs
female reproductive primary cell, the ovum.

3.3 Hard-boiled eggs
eggs cooked with their shells unbroken, usually by immersion in boiling water so that the egg white and egg yolk both solidify

3.4 extraneous matter
any foreign matter in the pickled eggs associated with objectionable conditions or practices in production, storage, or distribution; included are filth, decomposed material due to microorganisms, and miscellaneous matter such as sand and soil, glass, rust, or other foreign substance.

3.5**Yolk**

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

3.6**Flock**

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

3.7**Eggshell**

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

3.8**Pickles**

edible products, such as eggs, that have been preserved and flavoured in a solution of brine or vinegar and other spices

3.9**Peeled eggs**

Eggs having the entire eggshell removed after hard-boiling

4 Description

Pickling is a process of preserving perishable food in vinegar and/or oil with added spices, salt and condiments in the form of a ready to eat product. Egg pickle is a comparatively new product. Egg pickle can be prepared from chicken, duck or quail eggs, depending on their availability and acceptability. Egg pickle is novel food product having a relatively long shelf life at ambient temperature.

Egg pickling is the process of preserving hard cooked egg in vinegar and/oil with added spices, salt and condiments in the form of ready to eat product. The egg pickle has advantage over other methods of eggs preservation as it does not require refrigeration or freezing conditions during storage and its spicy sensory characteristics make it desirable to the consumers.

Pickles occupy an important place among the traditional food processed in a number of countries in the world. With the increasing popularity of eggs and egg products, there is a good scope for the utilisation of eggs in the form of pickle

Technological details pertaining to the process of pickled eggs have been worked out with a view to offer such nutritious, ready-to-eat product to the consumers.

5 Types and forms of presentation

5.1 Pickled eggs may be presented in the following types:

- a) Vinegar-based egg pickle in accordance with Annex A
- b) Oil-based egg pickle in accordance with Annex A.

5.2 Pickled eggs may also be presented in the following forms:

- a) Brine based egg pickle
- b) Sweet and sour based egg pickle
- c) Spiced based Pickled Eggs

- d) Any other forms of presentation as long as the quality requirements are in accordance to the standard.

6 Requirements

6.1 General requirements

6.1.1 Ingredients

Pickled eggs shall be a product derived from sound, wholesome eggs. Substances that may be added to pickled eggs include spices, brine, vegetables, edible oil, vinegar, sugar, edible salt, food additives and water in accordance with the relevant standards.

6.1.2 Quality requirements

Pickled eggs shall meet the following characteristic:

- a) pickled eggs shall be made from hard-cooked eggs from clean and sound-shelled edible eggs of different avian species, such as Chicken, Duck, Turkey, Goose, Quail, Pheasant, Emu, Ostrich and Guinea fowl in accordance with US 1682;
- b) the shell does not break during cooking, peels off easily and does not adhere to the coagulated albumen in accordance with US CAC/RCP 15;
- c) the yolk is centred and free of dark rings by rapidly cooling the hard-cooked eggs by rinsing in cold water;
- d) 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 in accordance with US 1682;
- e) All equipment coming in contact with raw materials or products in the course of processing shall be kept clean. An ample supply of steam and water, hoses, brushes and other equipment necessary for proper cleaning of machinery and equipment shall be available. The equipment may be sterilized by immersion in or swabbing with hypochlorite solution or other suitable chlorine solution in accordance with US 28 EAS 39;
- f) Quality of water used for processing shall be in accordance with to US EAS 12 and US EAS 123;
- g) Salt used shall be in accordance with to US EAS 35;
- h) Only pure, wholesome, edible vegetable oil complying with US EAS 321 and other relevant Standards shall be used for frying of spices and condiments;
- i) Spices and condiments shall be clean, sound, fit for human consumption in accordance with US ISO 948 and other relevant standards;
- j) The material shall be prepared and handled under strict hygienic conditions by persons free from contagious and infectious diseases and only in premises maintained in a thoroughly clean and hygienic conditions and having adequate and safe water supply in accordance with US 28 EAS 39;
- k) The egg pickles shall possess a good uniform colour, appearance, good texture and normal characteristic taste and flavour typical of the type;
- l) The product shall be free from pieces of egg shell, feathers, hairs, dirt, insects or any other extraneous matter;

- m) The product shall not be unduly hard or rubbery and shall be devoid of any objectionable taste, smell or odour;
- n) Peeled eggs that are not pickled within 2 hours of cooking shall be kept refrigerated at 5°C (41°F) or below until use and for no longer than 1 week;
- o) pickled eggs shall not be left at room temperature other than during the period for serving (2 hours or less);
- p) Jars and lids in which pickling will occur shall be sterilized;
- q) An adequate acidification to a pH below 4.6 shall be guaranteed;
- r) Refrigeration at 4°C (39°F) during pickling is advisable and Once opened, hard-cooked pickled eggs shall be kept refrigerated; and
- s) Pricking, poking holes, or otherwise handling whole eggs in a manner that might allow spores or bacteria into the yolk shall be avoided.

6.1.3 Specific requirements

Pickled eggs shall comply with the following requirements when tested with the specified test methods in Table 1

Table 1 — requirements for pickled eggs

S.No	Characteristic	Requirements		Method of test
		Vinegar-based	Oil-based	
i.	Acidity as percent acetic acid, Min	0.8	0.6	Annex D
ii.	Sodium chloride in brine, % (w/v),max	3.0	6.0	Annex C
iii.	pH of the pickling medium	3.2-4.6	3.6-4.6	Annex D

7 Food additives

Food additives used shall be in accordance with US 45.

8 Contaminants

The pickled eggs shall comply with the maximum levels for contaminants and toxins according to US 738.

8.1 Veterinary Drug Residues

Edible eggs in shell used in the processing of pickled eggs shall have a maximum residual limit for veterinary drugs in accordance with US CAC/MRL-2.

8.2 Heavy metals

Pickled eggs shall not exceed the limits of heavy metal Contaminants as in Table 2

Table 2 — Requirements for heavy metal in pickled eggs

S.No	Characteristic	Requirements		Method of test
		Vinegar-based	Oil-based	
i.	Arsenic, (As),max	1.0	1.0	AOAC 942.17
ii.	Lead, (Pb),max	0.3	0.3	AOAC 999.11
iii.	Cadmium, (Cd),max	0.3	0.3	

8.3 Hygiene.

8.3.1 Pickled eggs shall be processed, packaged and transported following hygienic practices in accordance with US 28 EAS 39.

8.3.2 Pickled eggs shall comply with the microbiological limits given in Table 3 when tested in accordance with the test methods specified there in.

Table 3 — Microbiological requirements for pickled eggs

S.No	Microorganism	Limit		Method of test
		Vinegar-based	Oil-based	
i.	Total plate count, cfu/g, max	10 ³	10 ³	US ISO 4833-1
ii.	Yeast and mould count, cfu/g, max	Absent	Absent	US ISO 21527-2 US ISO 21527-1
iii.	E.coli cfu/ml, max.	Absent	Absent	ISO 16649-1
iv.	L. monocytogenes cfu/ml, max.	Absent	Absent	US ISO 11290-2
v.	Staphylococcus aureus cfu/g, max.	Absent	Absent	US ISO 6888-1
vi.	Salmonella, 25 g, max	Absent	Absent	US ISO 6579-1
vii.	Clostridia, cfu/g, max	Absent	Absent	US ISO 7937

9 Weights and measures.

The weight of the package of the product shall comply with the Weights and Measures Act

10 Packaging.

Pickled eggs shall be packaged in food grade packaging materials in accordance with US 1659

11 labelling.

11.1 General.

11.1.1. In addition to the requirements in US EAS 38, the following specific labelling requirements shall apply and shall be legibly and indelibly marked:

- a) name of the product as “ X pickled eggs”, where “X” is replaced by the specific type of product
- b) statement ‘Food for Human Consumption’ shall appear on the package’
- c) storage conditions and instructions as “Store in a cool dry place away from any contaminants’
- d) list of ingredients in descending order
- e) instructions for use
- f) Warranty given by the processor to be not less than 6 calendar months in case of vinegar-pickled
- g) Pickled eggs not less than 4 calendar months in case of oil-based egg pickle stored at an ambient temperature below 37 °C and relative humidity 85 percent

11.1.2 When labelling non-retail packages, information for non-retail packages shall be given either on the packages or in enclosed documents, except that the name of the produce, lot identification and the name and address of the processor or packer shall appear on the package.

11.2 Nutrition declaration.

Any added essential nutrients declaration shall be labelled in accordance with US EAS 803, US EAS 804 and US EAS 805.

12 sampling

Sampling shall be done in accordance with the relevant methods.

Annex A (normative)

Pickled Egg Production

A.1 General

Whereas all hard-cooked pickled egg production involves the acidification of eggs, processes may vary depending on ingredients, storage temperature requirements, and available equipment.

The quality of the eggs, for preparation as pickled eggs, was found to be dependent upon the interior shell egg quality. A brown discoloration of hard-cooked egg albumen was found to be associated with the loss of interior shell egg quality. The ease of peeling the eggshell and the smoothness of the albumen surface improved with the age and/or increase in the pH of the egg. The delay between peeling the hard-cooked egg and using it in a food product or as a food allows for growth of microorganisms.

A.2 Preparation

A.2.1 Vinegar-based pickled eggs

For preparation of vinegar-based pickled eggs, the steps given below shall be followed:

A.2.1.1 Fresh eggs shall be stored at ambient temperature for at least 24 hours prior to hard cooking in water containing 2 percent (w/v) common salt, for about 10 min at simmering temperature. Cover the eggs completely with cold water and bring quickly to near boiling;

A.2.1.2 After boiling, the eggs shall be cooled immediately in running tap water and peeled off manually. There shall be no pieces of egg shell or shell membrane adhering over the peeled eggs. Peeled eggs showing torn or rugged-looking albumen surface shall not be used for pickling;

A.2.1.3 Pickling solution shall consist of vinegar and water (50: 50 v/v), 8 percent (w/v) common salt, and 2 percent (w/v) each spice mixture, onion (fresh and chopped), garlic and ginger. The solution shall be boiled for 10 minutes and then filtered using clean muslin cloth;

A.2.1.4 Pickling solution shall be heated to 70 ± 2 °C and poured onto the peeled eggs. The average proportion of peeled eggs to pickle solution shall be in the ratio of 1: 1.25 (w/v); and

A.2.1.5 The pickled eggs shall be aged for 48 hours at ambient temperature in pre-sterilized glass container.

A.2.2 Oil-based pickled eggs

For preparation of oil-based pickled eggs, the steps shall be followed;

A.2.2.1 For preparation of oil-based pickled eggs, the steps given in 2.1.1 to 2.1.2 shall be followed in preparation of the hard-boiled eggs;

A.2.2.2 for preparation of oil-based pickled eggs, frying spices, condiments and common salt in edible vegetable oil in a suitable proportion shall be used to prepare the pickle gravy;

A.2.2.3 Peeled eggs shall be fried in edible vegetable fat/oil to make their colour golden brown. Peeled eggs, gravy and acetic acid at the rate of 2 percent to the weight of peeled eggs shall be mixed;

A.2.2.4 The proportion of eggs to gravy shall be in the ratio of 70: 30 with tolerance of ± 1 % when tested according to the method prescribed in Annex B; and

A.2.2.5 Pickled eggs shall be aged for 48 hours in pre-sterilized glass containers.

A.2.3 Brine -based pickled eggs

For preparation of brine-based pickled eggs, the steps shall be followed:

A.2.3.1 For preparation of brine-based pickled eggs, the steps given in 2.1.1 to 2.1.2 shall be followed in preparation of the hard-boiled eggs;

A.2.3.2 For preparation of brine-based pickling solution, Heat the vinegar, water, sugar and salt in a saucepan over medium heat. Stir the mixture occasionally until the salt and sugar have completely melted. Remove the pan from the heat and let it cool completely;

A.2.3.3 The proportion of eggs to pickling solution shall be in the ratio of 60: 40 with tolerance of ± 1 % when tested according to the method prescribed in Annex B; and

A.2.3.4 Pickled eggs shall be aged for 48 hours in pre-sterilized glass containers.

A.2.4 Sweet and sour based pickled eggs

For preparation of sweet and sour-based pickled eggs, the steps shall be followed:

A.2.4.1 For preparation of sweet and sour-based pickled eggs, the steps given in 2.1.1 to 2.1.2 shall be followed in preparation of the hard-boiled eggs;

A.2.4.2 For preparation of sweet and sour-based pickling solution, Heat the vinegar, water, sugar and salt in a saucepan over medium heat. Stir the mixture occasionally until the salt and sugar have completely melted. Remove the pan from the heat and let it cool completely;

A.2.4.3 Pickling solution shall be heated to 70 ± 2 °C and poured onto the peeled eggs. The average proportion of peeled eggs to pickle solution shall be in the ratio of 1: 1.25 (w/v); and

A.2.4.4 Pickled eggs shall be aged for 48 hours in pre-sterilized glass containers. .

A.2.5 spicy based pickled eggs

A.2.5.1 For preparation of sweet and sour-based pickled eggs, the steps given in 2.1.1 to 2.1.2 shall be followed in preparation of the hard-boiled eggs;

A.2.5.2 for spicy based pickled eggs, in preparation of the pickling solution, the desired spices are added to the vinegar solution and boiled.

A.2.5.3 pour the boiled spiced vinegar brine into the jar with the eggs; and

A.2.5.4 Pickled eggs shall be aged for 48 hours in pre-sterilized glass containers.

A.2.6 Finished product

A.2.6.1 The egg pickles shall possess a good uniform colour and appearance. It shall possess a good texture and normal characteristic taste and flavour typical of the type

A.2.6.2 The product shall be free from pieces of eggshell, feathers, hairs, dirt, insects or any other extraneous matter.

A.2.6.3 The product shall not be unduly hard or rubbery and shall be devoid of any objectionable taste, smell or odour.

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Annex B (normative)

Determination of the proportion of egg to gravy

B.1 Procedure

- B.1.1 Note down the weight of the pouch containing eggs (X).
- B.1.2 Open the pouch and drain over 16 mm sieve.
- B.1.3 Wash the empty pouch with hot water and pour it over the eggs.
- B.1.4 Dry and weigh the empty pouch (Y)
- B.1.5 Pour hot water over the eggs three or four times to remove all adhering condiments and oil.
- B.1.6 Ensure that the eggs are free from all adhering matter; if necessary, repeat washing with hot water
- B.1.7 Allow the eggs to be completely drained of water.
- B.1.8 Place the eggs in the empty pouch and weigh (Z).
- B.1.9 The ratio of Z-Y: X-Z shall be 70: 30.

Annex C (normative)

Determination of sodium chloride

C.1 Reagents

- C.1.1 Standard silver solution**, 0.1 N, standardized against 0.1 N sodium chloride solution
- C.1.2 Dilute nitric acid**, 1:4.
- C.1.3 Ferric ammonium indicator solution**, a saturated solution of ferric alum, $[\text{Fe}(\text{NH}_4)(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}]$.
- C.1.4 Standard potassium thiocyanate solution**, 0.1N

C.2 Procedure

C.2.1 Wash the emptied can thoroughly with water and wash the residue on the sieve at least thrice with cold water. Collect the drained liquid and all the washings together in a 1 000 ml graduated flask and make up the volume. Centrifuge the made-up liquid for at least 5 min at 1 000 rev/min.

C.2.2 Take a suitable aliquot of a clear supernatant solution, add a known volume of the standard silver nitrate solution in slight excess and then add 20 ml of dilute nitric acid. Boil gently on a hotplate or a sandbath until all solids except silver chloride dissolve (usually 15 min). Cool, add 50 ml of water and 5ml of the ferric alum indicator solution and titrate with the standard ammonium thiocyanate solution until permanent light brown colour appears.

C.3 Calculation

C.3.1 Sodium chloride in the brine, per cent by weight

$$= 5.85 \frac{(V_1 N_1 - V_2 N_2)}{W}$$

where,

V_1 = volume of the standard silver nitrate solution;

V_2 = volume of the standard potassium thiocyanate;

N_1 = normality of the standard silver nitrate solution;

N_2 = normality of the standard potassium thiocyanate; and

W = weight, in g, of the dried product taken for the test.

NOTE: the total weight of brine is obtained by finding the difference between the net weight and the drained weight of the contents of the can.

The number of containers to be chosen (see Table E.1). Every r th container thus counted shall be separated until the requisite number of containers is obtained from the lot to give samples for test.

Annex D (normative)

Determination of acidity

D.1 Reagents

D.1.1 Standard sodium hydroxide solution, 0.1 N.

D.1.2 Phenolphthalein indicator solution, prepared by dissolving 0.1 g in 100 ml of rectified spirit.

D.2 Procedure

D.2.1 Weigh accurately about 5 g of the egg material and blend it with 25 ml of distilled water in a waring blender to ensure uniform suspension.

D.2.2 Transfer it into an Erlenmeyer flask.

D.2.3 Rinse the bowl of the blender at least thrice with distilled water and add to the suspension.

D.2.4 Add one or two drops of phenolphthalein indicator solution and titrate with the standard sodium hydroxide solution.

D.2.5 Note the volume of sodium hydroxide solution used.

D.3 Calculation

Acidity, as percent acetic acid =

$$\frac{0.006xV}{W} x 100$$

Where,

V = Volume of 0.1 N standard sodium hydroxide solution, and

W = Weight in g of the material.

Annex E (normative)

Determination of solubility

E.1 Procedure

- E.1.1** Weigh accurately 1.0 ± 0.1 g of the sample in an ordinary test tube and add exactly 5 ml of 5 percent (m/v) sodium chloride.
- E.1.2** Close the tube with a rubber stopper and shake gently for 1 minute to disperse the powder.
- E.1.3** Set aside for 15 minutes and invert ten times.
- E.1.4** After 5 minutes, close with the index finger, the top of the convenient length of glass tubing (approx 2 mm bore) and invert the tubing under the top of the liquid rotated thoroughly.
- E.1.5** Open the top of the tube momentarily, close again and remove the tube from solution and wipe the outside of the tube.
- E.1.6** A drop of the liquid to the refractometer and read off the refractive index.

E.2 Calculation

- E.2.1** Determine the solubility index of the egg powder by refractometer (Haenni value) as follows:

$$\text{Haenni value} = (X - \gamma) \times 1000$$

Where,

X = refractive index of the sample solution, and

γ = refractive index of the solvent.

- E.2.2** Calculate the solubility percentage from the Haenni value as follows:

$$\text{Log}_{10} Y = 0.445 + 0.01x$$

Where,

y = Haenni value, and

x = percentage solubility in sodium chloride.

- E.2.3** For the sake of convenience, the following table may be referred to for conversion of Haenni value to the solubility percentage

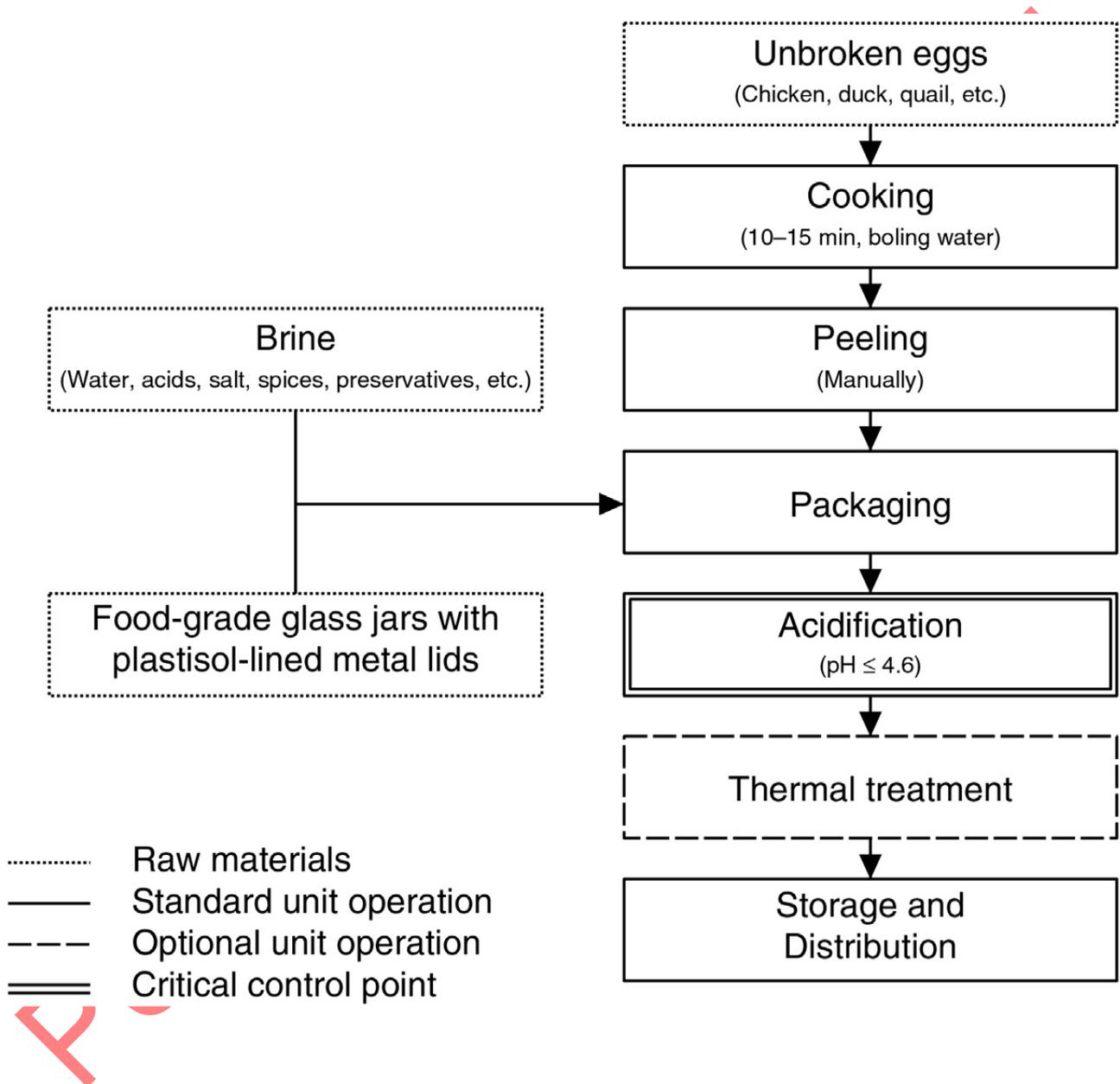
Haenni Value	Solubility Percentage
17	78.55
18	81.03
19	83.36
20	85.60
21	87.72
22	90.00
23	91.67
24	93.52
25	95.29
26	97.00
27	98.64
28	100.00

E.2.4 In order to ensure the randomness, a random table shall be used. If such a table is not available, the following procedure shall be adopted.

Starting from any pouch, in a lot, count them as 1, 2, 3 upto r in a systematic manner, where r is equal to the integral part of N/n , N being the total number of pouches in the lot, and n the number of pouches to be selected. Every r th pouch thus counted shall be separated until the requisite number of pouches is obtained from the lot to give samples for test.

Annex F
(informative)

Schematic depiction of the general process for hard-cooked pickled egg production



Bibliography

- [1] KS 2545:2014, pickled *quail eggs* — *Specification*
- [2] IS 12561:1988, Poultry Products - Pickled Quail Eggs [FAD 18: Slaughter House and Meat Industry]
- [3] Pickled Egg Production: Effect of Brine Acetic Acid Concentration and Packing Conditions on Acidification Rate, OSCAR ACOSTA, XIAOFAN GAO, ELIZABETH K. SULLIVAN, AND OLGA I. PADILLA-ZAKOUR* Department of Food Science, New York State Agricultural Experiment Station, Cornell University, 630 West North Street, Geneva, New York 14456, USA
- [4] Egg innovations and strategies for improvement, chapter 38, pickling eggs, Jessie Usaga*, Oscar Acosta*, Elizabeth K. Sullivan** and Olga I. Padilla-Zakour***National Center of Food Science and Technology, University of Costa Rica, San José, Costa Rica **Department of Food Science, Cornell University, Geneva, NY, United States
- [5] Proximate and sensory analysis of chicken egg pickle SANDEEPPAL KAUR BRAR1 , RAVNEET SINGH2 & S. S THIND3 pg. 174

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