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DRAFT ZANZIBAR NATIONAL STANDARD

Hen egg products—Specification

ZANZIBAR BUREAU OF STANDARDS

National Foreword

This Draft Zanzibar National Standard has been prepared by the Meat, Poultry, Eggs and related products Technical Committee. In accordance with the Zanzibar Bureau of Standards general procedures, this draft is here by presented to the public in order to receive any technical comment concerns.

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This draft Zanzibar National Standard was prepared by the Meat, Poultry, Eggs and related products Technical Committee which consists of representatives from the following organizations:

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Table of contents

1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Requirements	4
4.2	General requirements	4
4.2	Specific requirements	4
5.	Food additives	5
6.	Contaminants	5
6.1	Heavy metal contaminants	5
6.2	Veterinary drugs residues.....	5
7.	Hygiene	6
7.3.	Microbiological requirements.....	6
8	Labelling	6
8.1	Labelling of packages	6
8.2.	Labelling of bulk containers	7
9	Packaging, storage and transport	8
A.1	Purchaser-specified requirements.....	9
A.1.1	Source materials	9
A.1.2	Product type	9
A.1.3	Physical and chemical indicators of conventional egg products.....	10
A.1.4	Processing of egg products	10
A.1.5	Product history	11
D.1	Definition of the code	27
D.2	Example	27

Foreword

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Hens egg products— Specification

1 Scope

This African Standard specifies quality and safety requirements, sampling and test methods for products made from eggs obtained from hens of the species *Gallus gallus* intended for use in the manufacture of food for human consumption.

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 952.13, *Arsenic in food. Silver diethyldithiocarbamate*

AOAC 971.21, *Mercury in food. Flameless atomic absorptions*

AOAC 972.25, *Lead in food. Atomic absorption spectrophotometry*

AOAC 973.34, *Cadmium in food. Atomic absorption spectrophotometry*

ARS 56:2016, *Pre-packaged foods— Labelling*

CAC/RCP 15, *Code of Hygienic Practice for Eggs and Egg Products*

CODEX STAN 192 *General standard for food additives*

ISO 16649-2, *Microbiology of food and animal feeding stuffs— Horizontal method for the enumeration of beta-glucuronidase-positive Escherichia coli— Part 2: Colony-count technique at 44 degrees C using 5-bromo-4-chloro-3-indolyl beta-D-glucuronide*

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 *Microbiology of the food chain— Horizontal method for the detection, enumeration and serotyping of Salmonella— Part 1: Detection of Salmonella spp*

ISO 6888-1 *Microbiology of the food chain— Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species)— Part 1: Method using Baird-Parker agar medium*

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply:

3.1

acidified egg product

egg product obtained by introducing additives intended to lower the product's pH level

3.2

blended egg product

egg product prepared in such a way that the proportion of the constituents of broken-out hen eggs-in-shell is altered in comparison with the whole egg, egg yolk and egg albumen

3.3

commodity lot

quantity of egg product produced between planned breaks in production

3.4

concentrated (condensed) egg product

egg product with a higher solids content than the equivalent liquid or frozen product obtained by the removal of water

3.5

contaminated egg

processed egg containing a chemical, drug, food additive, heavy metal, industrial pollutant, ingredient, medicament, microbe, pesticide, poison, toxin or any other substance not permitted by, or in an amount in excess of limits prescribed in food regulations

3.6

conventional (natural) egg product

an egg product obtained using conventional methods without the use of special procedures to alter the egg's properties and/or composition

3.8

dried egg

whole egg, egg yolk or albumen in dried form

3.9

dried egg mix

dried whole egg mix or dried yolk mix

3.10

dried egg product

product obtained from a liquid egg product from which water has been removed by a drying process to give a product in powder or granulated form

3.11

dried whole egg mix

dried whole egg that contains salt or a sweetening agent, or both, in an amount not exceeding 32 per cent of the mix by weight

3.12

dried yolk mix

dried yolk that contains salt or a sweetening agent, or both, in an amount not exceeding 22 per cent of the mix by weight

3.13

egg albumen¹

the homogeneous product obtained from the separation of the egg albumen of broken-out hen eggs-in-shell, in accordance with good manufacturing practice

3.14

egg product

a dried, frozen or liquid food that contains at least 50 per cent by weight of frozen egg, frozen egg mix, liquid egg, liquid egg mix, dried egg or dried egg mix

3.15

egg products

¹ Except for egg albumen obtained by the centrifugal separation of broken-out hen eggs.

all, or a portion of, the contents found inside eggs separated from the shell, with or without added ingredients, intended for human consumption

3.16

egg solid

egg yolk or albumen that contains, or egg yolk and albumen that contain, no shell or water

3.17

egg yolk

the homogeneous product produced from the separation of the yolk of broken-out hen eggs-in-shell, in accordance with good manufacturing practices

3.18

fermented egg product

an egg product obtained through the action of fermentation agents, which are used to alter its properties (example foamability, emulsification and desugar)

3.19

food ingredients

the constituent elements of foodstuffs specified in their composition

3.20

food additives

substance not normally consumed as a food by itself and not normally used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result, (directly or indirectly) in it or its by-products becoming a component of or otherwise affecting the characteristics of such foods. The term does not include “contaminants” or substances added to food for maintaining or improving nutritional qualities

3.21

food raw materials for production of egg products

raw materials of plant, animal, microbiological, mineral or artificial origin and water used to produce foodstuffs, excluding food and biologically active additives

3.22

frozen egg product

product obtained from a liquid egg product which has been subjected to a freezing process, including deep freezing, and maintained in its frozen state

3.23

heat-treated egg albumen

dried egg albumen which has been subjected, in accordance with good manufacturing practice, to a high temperature for a specific period of time to enhance its foaming properties

3.24

inedible egg

egg that is not suitable for human consumption

3.25

inedible processed egg

processed egg that contains any inedible egg or that is otherwise not suitable for human consumption

3.26

ingredient

individual unit of food, including an ovum, that is combined with one or more other individual units of food to form an integral unit of food

3.27

liquid egg product

product obtained from whole eggs without shell (melange), egg albumen and egg yolk without adding or removing water

3.28

modified egg product

egg product whose properties have been altered using special procedures which are consistent with good manufacturing practice

3.29

salted or sugared egg product

egg product obtained by adding salt or sugar in quantities prescribed by good manufacturing practice

3.30

sanitizing agent

substance that destroys bacteria in eggs and has a strength of between 100 and 200 parts per million of available chlorine or its equivalent

3.31

stabilized egg product

egg product obtained by desugaring with the use of special procedures (such as fermentation or ultrafiltration)

3.32

whole egg without shell (melange)

homogeneous product obtained from the complete contents of broken-out hen eggs-in-shell, in accordance with good manufacturing practice

4 Requirements

4.1 All types of egg product shall be made with Class B and Class A eggs obtained from farmed hens of the species *Gallus gallus* and produced in establishments regularly operated under the food safety and inspection regulations in force.

4.2 General requirements

4.2.1 Egg products shall be:

- a) Fit for use in the production of foodstuffs
- b) Free from shell fragments and in accordance with tolerances for extraneous matter given in Annex A
- c) free from any odour or flavour foreign to a normal egg from which the shell has been removed;
- d) be free from any odour or flavour foreign to a normal egg from which the shell has been removed;

4.2.2 The taste, colour and odour of egg products shall be natural and characteristic of each product; dried egg products shall be easily reconstituted.

4.2 Specific requirements

4.2.1 Frozen egg, frozen egg mix, liquid egg or liquid egg mix shall, in addition to meeting the requirements set out in 4.1,

Table 1 — Specific requirements for hen egg products

S/N	Property	Product						
		Whole egg		Egg yolk		Albumen		
		Liquid and frozen	Dried	Liquid and frozen	Dried	Liquid and frozen	Dried	
Pan-	Spray-							
	1	2	3	4	5	6	7	8
i.	Minimum solids matter content (%)	22.0	95.0	40.0	95.0	10.5	84.0	92.0
ii.	Minimum fat content (%)	9.8	39.0	25.0	55.0	0.05 ²	0.5 ⁷	
iii.	Minimum protein content (%)	10.5	45.0	15.0	33.0	10.0	71.0	75.0
iv.	Extraneous matter	No particles over 1 mm in 100 g and should not exceed 100 mg/kg						
v.	Minimum concentration of hydrogen ions (pH)	7.0	7.5	5.9	6.0	8.5	4.0	
vi.	Maximum beta-hydroxybutyric acid ³ (mg/kg)	10	10	10	10	10	10	
vii.	Maximum lactic acid (mg/kg)	1 000	-	1 000	-	1 000	-	
viii.	Maximum succinic acid (mg/kg) ⁴	25		25		25		
NOTE For dried egg products, the weight ratio of fat and egg albumen matter is calculated as solids matter.								

5. Food additives

An egg product may contain food ingredients and food additives intended to give them certain characteristics and/or to preserve their quality. Additives should be permitted as edible in accordance with CODEX STAN 192.

6. Contaminants

6.1 Heavy metal contaminants

The product shall comply with the maximum residue limits as specified in CAC/MRL 2.

6.2 Veterinary drugs residues

The product shall comply with the maximum residue limits as specified in CAC/MRL 2.

7. Hygiene

7.1 The hygiene requirements for the manufacture of egg products and the premises, equipment and personnel manufacturing or participating in the manufacture should be as specified in the Code of Hygienic Practice for Eggs and Egg Products CXC-15 1976

7.2 In addition, egg products shall satisfy the appropriate tests specified in Clause 4 of the present standard.

7.3. Microbiological requirements

S/No	Microorganism	Maximum limits	Test method
i.	<i>Salmonella spp</i> , per 25g	Absent	ISO 6579
ii.	Total plate count, cfu/g	25.000 - 50.000 cfu/g	ISO 4833-1
iii.	Staphylococcus. aureus:	Absent/g	ISO 6888-1

8 Labelling

8.1 Labelling of packages

8.1.1 In addition to the requirements of ARS 56. The following labelling requirements shall apply and shall be legibly and indelibly labelled:

a) Product description as follows:

- Liquid whole egg
- Frozen whole egg
- Dried whole egg (powder or granules)–

Liquid egg yolk

- Frozen egg yolk
- Dried egg yolk (powder or granules)–

Liquid egg albumen

- Frozen egg albumen
- Pan-dried egg albumen (powder or granules)–

Spray-dried egg albumen (powder or granules)–

Liquid blended egg

- Frozen blended egg
- Dried blended egg (powder or granules)–

Concentrated whole egg

- Concentrated egg albumen

b) Indications as follows:

- The indication “heat-treated” where the egg albumen has been heat-treated
- The indication “stabilized” where the product has been desugared

- The indication “acidified” where the product has been so treated
- c) **where appropriate they shall bear the relevant quality mark** A list of ingredients, including water and food additives present, in descending order by weight.
- d) Name, or trade mark, and address of manufacturer, and/or of packer, distributor, exporter, importer.
- e) Identification number of the egg product processing establishment and commodity lot number, each lot being allocated a sequential number.
- f) Country of origin of the eggs and the egg product.
- g) Net weight in either SI (*Système international*) units, or avoirdupois.
- h) Date of manufacture or “use-by date”.
- i) Consignments of egg products, destined not for retail but for use as an ingredient in the manufacture of another product, shall have a label giving the temperature at which the egg products shall be maintained and the period during which conservation may thus be assured.
- j) For liquid egg, the label shall also bear the words “non-pasteurised liquid egg— to be treated at place of destination” and indicate the date and hour of breaking.

8.1.2 Packages containing egg products shall be labelled in accordance with the importing country legislation.

8.2. Labelling of bulk containers

8.2.1 Where liquid egg products are marketed in a tanker churn or other suitable bulk container, the information specified in (a) to (e) and in (h) above may be provided in accompanying documents. The information provided for in (f) and in (i), (j) and (k), however, shall appear on the container.

8.2.2 Every container of processed egg prepared pursuant to this standard, other than a container that is an integral part of a vehicle, shall be marked with the information required on a label of a food under the ARS 56.

8.2.3 Every pre-packaged product prepared pursuant to this standard shall be marked, in official languages, with the information required on the label of a pre-packaged product under ARS 56.

8.2.4 Every container to which 5.2.1 and 5.2.2 apply shall be marked with the following additional information:

- a) the lot number;

where the processed egg is dried egg, some of which was imported from another country, the word “Product of” followed by the name of the country of origin concerned and the name of the exporting country; and

- b) if the processed egg is dried albumen, the words “pan-dried” or “spray-dried”, as the case may be;
- c) where the processed egg is imported, the words “Product of” followed by the name of the country of origin;
- d) where the processed egg is dried egg, some of which was imported from another country, the words “Product of” followed by the name “Kenya” and the name of the other country; and
- e) if beta-carotene has been added, the words “contains colour” or “colour added”.

8.2.5 The common name and the registration number shall be shown.

9 Packaging, storage and transport

9.1 Packaging, storage and transport shall conform to the corresponding provisions of the Codex Code of Hygienic Practice for Eggs and Egg Products.

9.2 Every container of processed egg shall (a) be clean and free from discolouration and objectionable odours; (b) be strong enough to protect the processed egg; (c) if made of corrugated fibreboard, be new; (d) have a new liner where a liner is used; and (e) contain only processed egg that has the same common name.

9.3 Egg products shall be packed in such a manner as to protect them adequately, in accordance with the relevant requirements, and to also prevent contamination. The packaging material shall not impart any extraneous taste, odour or colour to the egg products and shall be in accordance with legislation of the importing country.

9.4 Storage conditions prior to dispatch and the equipment used for transport shall be appropriate to the physical condition of the egg products and shall be in accordance with the requirements of the importing country.

Annex A (normative)

Purchaser-specified requirements

A.1 Purchaser-specified requirements

The following subsections define the requirements that can be specified by the purchaser together with the codes to be used in the coding system.

Additional purchaser-specified requirements, which are either not accounted for in the code (e.g. if code 9 “other” is used) or which provide additional clarification to the product or packing description, shall be agreed between buyer and seller and be documented appropriately.

A.1.1 Source materials

Egg products shall be prepared from eggs that

- a) are edible;
- b) are not leakers, except in the case of eggs that become leakers while being transferred to the egg breaking equipment and that are prepared in a manner to prevent the contamination of processed egg;
- c) are free from dirt and other foreign matter; and
- d) have content that is not separated from its shell by means of centrifugal separation.

Source material code (data field 2)	Category/Description
0	Not specified
1	Class A eggs
2	Class B eggs
3	Class B eggs with cracked shells but undamaged membranes
4	Egg products
5-8	Codes not used
9	Other

A.1.2 Product type

Product code (data field 3)	Category/description
00	Not specified
01	Liquid whole egg
02	Concentrated whole egg
03	Dried whole egg in powder form
04	Granulated dried whole egg
05-09	Codes not used
10	Liquid blended egg product
11	Concentrated blended egg product
12	Dried blended egg product in powder form
13	Granulated dried blended egg product
14-19	Codes not used
20	Liquid yolk
21	Dried yolk in powder form
22	Granulated dried yolk

Product (data field 3)	code	Category/description
23-29		Codes not used
30		Liquid egg albumen
31		Concentrated egg albumen
32		Spray-dried egg albumen in powder form
33		Granulated spray-dried egg albumen
34		Pan-dried egg albumen in powder form
35		Granulated pan-dried egg albumen
36-98		Codes not used
99		Other

A.1.3 Physical and chemical indicators of conventional egg products

Liquid, frozen or dried egg products from whole eggs, egg yolks and egg albumen obtained using conventional technologies and not special procedures designed to change the product's properties and/or composition shall meet the requirements set out in the table in Annex A. Any method of analyses used shall be internationally approved, for example by the Association of Official Analytical Chemists (AOAC)⁵. The percentage expression of the weight ratio of the components of the egg product shall be established with regard to the egg part only of the given product. Quality parameters and testing methods different from those in Annex B can be agreed between the buyer and the seller.

A.1.4 Processing of egg products

Egg products shall be processed in accordance with the Joint FAO/WHO Codex Alimentarius Commission Code of Hygienic Practice for Eggs and Egg Products CXC-15 1976. The egg products shall be treated in an establishment approved by the relevant official agency having jurisdiction.

A.1.4.1 Pasteurization

The results of pasteurization processes shall be verified using proper testing procedures.

Pasteurization code (data field 4)	Category/description
0	Not specified
1	Pasteurization
2-8	Codes not used
9	Other

A.1.4.2 Special procedures

To modify egg products and/or enhance their positive characteristics, special procedures may be used, in accordance with good manufacturing practice, including fermentation, stabilization (desugaring) and regulation of acidity (acidification). Application of such procedures shall be permitted for use by the importing country.

(i) Fermentation

Fermentation code (data field 5)	Category/description
0	Not specified
1	Fermentation
2-8	Codes not used
9	Other

(ii) Stabilization (desugaring)

Stabilization code (data field 6)	Category/description
-----------------------------------	----------------------

⁵ Association of Official Analytical Chemists (AOAC). Official Methods of Analysis, 18th edition. Revision 2, 2007 (updates can be found at: www.aocac.org).

0	Not specified
1	Stabilization
2-8	Codes not used
9	Other

(iii) Regulation of acidity (acidification)

Regulation of acidity (acidification) code (data field 7)	Category/description
0	Not specified
1	Regulation of acidity (acidification)
2-8	Codes not used
9	Other

(iv) Heat treatment of egg albumen

Code for heat treatment of egg albumen (data field 8)	Category/description
0	Not specified
1	Heat treatment of egg albumen
2-8	Codes not used
9	Other

(v) Ionizing radiation⁶

Ionizing radiation code (data field 9)	Category/description
0	Not specified
1	Ionizing radiation
2-8	Codes not used
9	Other

(vi) UV radiation⁵

UV radiation code (data field 10)	Category/description
0	Not specified
1	UV radiation
2-8	Codes not used
9	Other

A.1.5 Product history**A.1.5.1 Traceability**

The requirements concerning production history by the specified purchaser require that a Hazard Analysis and Critical Control Point (HACCP) programme, including traceability systems, be in place. Traceability requires a verifiable method for identifying products or commodity lots at all relevant stages of production. Traceability records shall be able to substantiate the claims being made, and the procedures used to certify conformity shall be in accordance with the provisions concerning conformity-assessment requirements of 4.2.11.

A.1.5.2 Refrigeration

The purchaser may specify the use of refrigeration for egg products, which shall be consistent with the legislation of the importing country. Where no such legislation exists, the legislation of the exporting country shall be used.

⁶ Egg products and/or additives processed with ionizing or UV-radiation are supplied in accordance with legislation in force in the importing country. In the case of fermented products, these indicators are registered prior to the fermentation process.

Refrigeration code (data field 11)	Category	Description
0	Not specified	
1	Chilled	Internal product temperature maintained at $\geq 0^{\circ}\text{C}$ and $\leq +4^{\circ}\text{C}$ at all times following packing and subsequent refrigeration
2	Frozen	Internal product temperature maintained at $\leq -12^{\circ}\text{C}$ at all times following packing and subsequent freezing
3	Deep-frozen	Internal product temperature maintained at $\leq -18^{\circ}\text{C}$ at all times following freezing
4-8	Codes not used	
9	Other	Can be used to describe any other refrigeration agreed between buyer and seller

A.1.5.3 Functional properties

The purchaser may specify functional properties for the egg product which shall be consistent with the legislation of the importing country. In the absence of such legislation, the functional properties of egg products shall be agreed between buyer and seller.

Functional properties code (data field 12)	Category/description
0	Not specified
1	Conventional (natural)
2	Enhanced foamability
3	Enhanced emulsification
4	Enhanced gelatinization
5-8	Codes not used
9	Can be used to describe any other enhanced function agreed between buyer and seller

Annex B

(normative)

Methods of analysis and sampling

B.1 Preparation of the sample

B.1.1 General

- (a) Samples shall be collected in an aseptic manner from homogeneous products. When practical, sealed primary containers should be collected and properly submitted to the laboratory for analyses. Storage of samples awaiting shipment to a laboratory shall be under conditions appropriate for the type of product.
- (b) The sample shall be made homogeneous prior to analysis and kept in a hermetically sealed jar in a cool place.
- (c) For all frozen samples, the sample is allowed to thaw, or is warmed in a water bath of temperature less than 50 °C, homogenized and treated as for liquid samples in all analyses.
- (d) For all dried samples, the sample is prepared for analysis by being passed three times through a sieve with a mesh of approximately 1 mm² to thoroughly break up any lumps.

B.1.2 Analysis

- (a) Samples shall be analyzed for:
 - Dry matter (Total solids)
 - Total fat content
 - Alpha-amylase assay
 - pH (hydrogen ion concentration)
 - Beta-hydroxybutyric acid
- (b) The methods of analysis used shall be the latest approved methods by the Association of Official Analytical Chemists or by the Codex Code of Hygienic Practices for Egg Products.
- (c) The precision and accuracy of measurement and analytical equipment/methods shall meet the International Standards Organization (ISO) 5725-5:1998.
- (d) Correctness testing (including repeatability of test results, calibration and use of standards) shall meet ISO17025:2005.

B.1.3 Expression of results

The result shall not contain more significant figures than are justified by the precision of the method of analysis used.

B.1.4 Test report

The test report shall contain all the information necessary for the complete identification of the sample.

B.1.5 Repeatability

The difference between the results of two determinations carried out simultaneously or in rapid succession by the same analyst on the same sample shall not exceed 0.1 g dry matter per 100 g of sample.

B.2 Methods

B.2.1 Method 1: Determination of fat content

B.2.1.1 Field of application

The method allows the determination of fat in:

Liquid whole egg product

Liquid yolk product

Frozen whole egg product

Frozen yolk product

Dried whole egg product

Dried yolk product

Liquid blended/concentrated egg product

Frozen blended/concentrated egg product

Dried blended/concentrated egg product.

B.2.1.2 Definition

Fat content of egg products: the fat content as determined by the method specified below.

B.2.1.3 Principle

(a) The sample is hydrolysed by hydrochloric acid and the fat released is extracted by petroleum ether, recovered and calculated as a percentage by weight of the original sample.

(b) Samples containing added salt and sugar are further extracted using a Soxhlet extraction of the acid hydrolysis residues.

B.2.1.4 Reagents

Hydrochloric acid, concentrated (assay 36.5-38% HCl)

Diethyl ether

Petroleum ether, with any boiling range between 30 °C and 60 °C.

B.2.1.5 Apparatus

Mojonnier extraction tube

Water bath capable of being thermostatically controlled over the range 70-100 °C

Oven capable of being thermostatically controlled at 100 ± 1 °C

Soxhlet apparatus with suitable thimbles

Analytical balance.

B.2.1.6 Procedure

(a) Accurately weigh approximately 2 g liquid or frozen yolk product, 3 g of liquid or frozen whole egg product or 1 g dried yolk or whole egg product into a Mojonnier fat-extraction tube. Slowly add while vigorously shaking 10 ml of hydrochloric acid and, in the case of dried products, about 2 ml water, washing down any egg particles adhering to the sides of the tube.

(b) Put the tube with sample in water bath set at 70° C, bring to a boil and continue heating at boiling point for 30 minutes. Carefully shake the tube every 5 minutes during this time. After 30 minutes remove the tube, add water to nearly fill the lower bulb of the tube and cool to room temperature.

(c) Add 25 ml of diethyl ether to the tube containing the sample and mix. Then add 25 ml of petroleum ether, mix and allow to stand until the solvent layer has cleared.

(d) Draw off as much as possible of the ether-fat solution into a previously weighed flask containing anti-bumping granules. Before weighing the flask, dry it and a similar flask as counterpoise in an oven at 100° C and allow to stand in air until constant weight is obtained.

(e) Re-extract the liquid remaining in the tube twice, using 15 ml of ether each time. Thoroughly shake on each addition of ether. Allow solutions to clear and draw off ether-fat solution into flask as previously.

(f) Slowly evaporate the ether from the flask by carefully placing on a boiling water bath. Dry the fat by placing the flask in the oven at 100° C until constant weight is reached (probably after about 90 min.). Remove flask and counterpoise from the oven and allow to cool to constant weight at ambient temperature (note: owing to the size of the flask and the nature of the material under test, there is less error by cooling in air than by cooling in a desiccator). Correct the weight obtained by a blank determination on the reagents used.

B.2.1.7 Expression of results

(a) Formula and method of calculation

Fat content, as a percentage by mass of the sample, is given by:

$m_1/m_o \times 100$,
where:

m_o is the mass, in g, of the fat obtained after extraction and blank correction,

m_1 is the mass, in g, of the test portion of the egg product sample.

(b) Repeatability

The difference between the results of two determinations carried out simultaneously or in rapid succession by the same analyst on the same sample shall not exceed 0.3 g fat per 100 g of sample.

B.2.1.8 Notes

(a) The fat content of an egg product containing salt and sugar is obtained using the above procedure, except that the fat is further extracted from the acid solution obtained after the third extraction by the following procedure:

(i) Filter the aqueous layer remaining after extraction through a filter paper and wash filter paper with hot water until the washings do not affect the colour of blue litmus paper. Place the filter paper on a watch glass or Petri dish and dry for 1 hour in an oven at 100° C. Allow to cool and then insert into an extraction thimble of a Soxhlet apparatus using tongs to handle the filter paper. Remove any traces of fat from the watch glass or Petri dish with cotton wool moistened with petroleum ether extraction solvent and then place cotton wool in the thimble. Place the thimble in the extraction tube;

(ii) Add extraction solvent to the Soxhlet apparatus and extract for 4 hours by placing the extraction flask in a sand bath or water bath or some such similar apparatus. After extraction, remove the solvent from the extraction flask and treat as in paragraph 21;

(iii) Add the weight of fat obtained by the method described in subparagraph (b) to the weight obtained by the method described in paragraph 21 to give a corrected weight m_o , which is the mass, in g, of the fat obtained after extraction.

(b) This method is the same in principle as that described in the eighteenth edition of the Official Methods of Analysis of the Association of Official Analytical Chemists, section 31.4.02.

(c) The further Soxhlet extraction procedure is the same in principle as that described in the Codex Recommended Methods of Analysis and Sampling, CODEX STAN 234-1999, as amended in 2007.

B.3 Method 2: Alpha-amylase test

B.3.1 Field of application

The efficiency of pasteurization is determined in:

Liquid whole egg product

Liquid yolk product

Frozen whole egg product

Frozen yolk product

Dried whole egg product

Dried yolk product

Liquid blended/concentrated egg product

Frozen blended/concentrated egg product

Dried blended/concentrated egg product.

B.3.2 Definition

Efficiency of pasteurization: the absence/presence of active alpha-amylase by the method specified below.

B.3.3 Principle

The presence of any active alpha-amylase (present in unpasteurized or insufficiently pasteurized egg product) is indicated by its ability to break down added starch, thereby preventing the formation of a starch-iodide complex on subsequent addition of an iodine solution.

B.3.4 Reagents, apparatus, procedure and interpretation

The method to be employed should be from the most recent edition of the *Official Methods of Analysis* of the Association of Official Analytical Chemists.

B.4 Method 3: Determination of extraneous matter⁷

B.4.1 In order to determine the presence of shell residues or other extraneous matter, place 100 g of the substance under examination in a graduated cylinder of 1,000-ml capacity, add distilled water up to the 1,000-ml mark, mix carefully and pass through a sieve with perforations 1 mm in diameter. After sieving there should be no residue on the sieve.

B.4.2 For dried egg products, the test should be carried out on the reconstituted product.

B.5 Method 4: Determination of lactic acid

⁷ This method has been tentatively accepted by the Specialized Section pending the development of a method which will detect particles of a size smaller than 1 mm.

AOAC Official Method 944.05, Lactic Acid in Eggs, Colorimetric Method. Association of Official Analytical Chemists, *Official Methods of Analysis* (17th ed., Rev. 2, Official Method 944.05).

B.6 Method 5: Determination of succinic acid

AOAC Official Method 948.14, Succinic Acid in Eggs, Ether Extraction Method. Association of Official Analytical Chemists, *Official Methods of Analysis* (17th ed., Rev. 2, Official Method 948.14).

B.7 Method 6: Determination of beta-hydroxybutyric, lactic and succinic acid

AOAC Official Method 970.31, Beta-Hydroxybutyric, Lactic and Succinic Acid in Eggs, Gas Chromatographic Method. Association of Official Analytical Chemists, *Official Methods of Analysis* (17th ed., Rev. 2, Official Method 970.31).

Annex C
(informative)

**Requirements for operation and maintenance of premises for
processing egg products**

C.1 Registration of processing premises

C.1.1 An application for the registration of a processed egg station shall be made to the relevant Regulatory Authority Having Jurisdiction (hereafter Regulatory Authority).

C.1.2 An application referred to in C.1.1 shall have annexed thereto

- (a) detailed plans and specifications for the processed egg station, including
 - (i) the dimensions and intended uses of the rooms and the positions of doors, windows, stairways and drains,
 - (ii) descriptions of the lighting, refrigeration, ventilation and plumbing systems,
 - (iii) descriptions of the types and location of equipment to be used in the processed egg station,
 - (iv) descriptions of the materials used in the construction of equipment, floors, walls, ceilings and openings, and
 - (v) descriptions of the location of the processed egg station in relation to adjacent buildings, roads, railways, waterways and public utilities;
- (b) a copy of a sanitation program for the processed egg station, including
 - (i) the name of the person responsible for carrying out the program,
 - (ii) the equipment and chemical agents to be used to bring about and maintain clean and sanitary conditions, and
 - (iii) the measures proposed to be taken to ensure clean and sanitary conditions; and
- (c) a copy of a quality assurance program for the processed egg station, including
 - (i) the name of the person responsible for carrying out the program,
 - (ii) the name and address of the laboratory to be used for the analysis of processed egg samples,
 - (iii) the number of processed egg samples to be taken and analyzed, and the frequency of sampling, to ensure that the processed egg meets the requirements and standards set out in Clause 4, and
 - (iv) the recall procedures for processed egg that does not meet the requirements and standards set out in Clause 4.

C.1.3 Where a processed egg station in respect of which an application referred to in C.1.1 is made meets the conditions set out in C.4, the Regulatory Authority shall

- (a) register the processed egg station by entering its name in the register of registered processed egg stations of the Regulatory Authority and by assigning it a registration number; and

(b) issue to the operator of the processed egg station a Certificate of Registration.

C.1.4 The operator shall post and keep posted the Certificate of Registration issued to the operator under C.1.3 in a conspicuous place in the registered processed egg station for the period during which the Certificate remains in force.

C.1.5 The operator shall not assign or transfer the Certificate of Registration issued in respect of that processed egg station.

C.1.6 The registration of a registered processed egg station shall lapse if no eggs are processed therein for a period of 12 consecutive months.

C.2 Suspension of registration

C.2.1 The Regulatory Authority may suspend the registration of a registered processed egg station

(a) where

(i) the processed egg station does not meet the requirements of this standard or other public health regulations,

(ii) the operator does not comply with the provisions of the relevant legislation(s), or

(iii) it is reasonable to believe that public health will be endangered if the processed egg station is allowed to continue operating; and

(b) where the operator has failed or is unable to take immediate corrective measures to remedy any situation referred to in (a) above.

C.2.2 No registration shall be suspended under C.2.1 unless

(a) an inspector has, at the time of the inspection, notified the operator of the existence of grounds for suspension under C.2.1;

(b) an inspector has prepared an inspection report setting out the reasons for the suspension, the length of the suspension and the corrective measures required, and has forwarded a copy of that report to the operator; and

(c) a notice of suspension of registration is delivered to the operator.

C.2.3 A suspension of registration under C.2.1 shall remain in effect

(a) until the required corrective measures have been taken and have been verified by an inspector;

(b) where a cancellation procedure has been commenced under C.3, until the resolution of the cancellation issue; or

(c) where a cancellation procedure has not been commenced under C.3, until a period of 90 days has elapsed.

C.3 Cancellation of registration

C.3.1 The Regulatory Authority may cancel the registration of a registered processed egg station where

(a) the processed egg station does not meet the provisions of this standard or relevant legislation(s); or

(b) the operator does not comply with the provisions of this standard or relevant legislation(s).

C.3.2 No registration shall be cancelled under C.3.1 unless

- (a) an inspector has, at the time of the inspection, notified the operator of the existence of grounds for cancellation under C.3.1;
- (b) a copy of the inspection report is delivered to the operator
- (i) identifying the provision of this standard or relevant legislation(s) that has not been complied with,
- (ii) specifying the period for compliance with that provision of this standard or relevant legislation(s) in order to prevent the cancellation of the registration, and
- (iii) stating that the operator may be given an opportunity to be heard in respect of the cancellation;
- (c) the operator has been given an opportunity to be heard in respect of the cancellation; and
- (d) a notice of cancellation of registration is delivered to the operator.

C.4 Conditions respecting registered processed egg stations

C.4.1 Every registered processed egg station shall be situated on land that

- (a) is free from debris and refuse;
- (b) provides or permits good drainage; and
- (c) is not in such proximity to any source of pollution or any place that harbours insects, birds, rodents or other vermin that are likely to contaminate processed egg in the processed egg station.

C.4.2 Every registered processed egg station shall

- (a) be of sound construction and in good repair;
- (b) be constructed of material that is durable and free from any noxious constituent;
- (c) be separate from and have no direct access to living quarters, retail outlets and areas in which operations are incompatible with the handling of processed egg;
- (d) be protected against the entry of insects, birds, rodents or other vermin or anything that is likely to contaminate processed egg;
- (e) have no room that opens onto premises used for the manufacture or storage of anything likely to emit an odour that could affect the flavour of processed egg;
- (f) have, where processed egg is prepared, floors, walls and ceilings that are
 - (i) of a hard finish that is suitable for cleaning,
 - (ii) smooth,
 - (iii) impervious to moisture,
 - (iv) free from pitting, indentations, cracks, crevices and ledges, and
 - (v) in the case of floors, sloped for adequate drainage;
- (g) be equipped with doors to the processing room that have self-closing devices;

- (h) have rooms and areas that have adequate lighting, ventilation and plumbing to meet the requirements of the operations carried out therein and constructed so as to facilitate their cleaning and disinfection of those rooms and areas;
- (i) be equipped, in those areas in which eggs, processed egg, food additives, ingredients or packing materials are exposed, with light bulbs and fixtures that are of a type that will not cause product contamination in the event of breakage;
- (j) in respect of air flow,
 - (i) have every room that is used for processing and packing ventilated by a positive flow of filtered air drawn directly from the outside,
 - (ii) not use recycled air unless it is refiltered and permission to do so is given by the Regulatory Authority, and
 - (iii) have every transfer room, inedible room, shell room and refuse room ventilated by a negative flow of air directly to the outside;
- (k) have a sufficient number of rooms to accommodate the separation of incompatible operations and, where requested by the Regulatory Authority, provide a separate room for,
 - (i) receiving eggs,
 - (ii) holding eggs,
 - (iii) storing eggs,
 - (iv) washing and candling eggs and transferring eggs to the processing equipment,
 - (v) breaking eggs and filtering, blending, mixing and heat-treating liquid processed egg,
 - (vi) packing liquid processed egg,
 - (vii) storing liquid processed egg,
 - (viii) freezing liquid processed egg,
 - (ix) drying liquid processed egg,
 - (x) packing dried processed egg,
 - (xi) heat-treating dried albumen,
 - (xii) storing dried processed egg,
 - (xiii) handling ova,
 - (xiv) heat-treating of eggs in the shell and the preparation of deshelled eggs,
 - (xv) storing deshelled eggs,
 - (xvi) storing ingredients and food additives,
 - (xvii) storing detergents, sanitizing agents and other chemical agents,
 - (xviii) washing, cleaning and sanitizing of containers,
 - (xix) any other processing, and

ARS 1203:2023

- (xx) the inspecting of processed egg by an inspector;
- (l) have dressing rooms, lunch rooms and lavatories that are
 - (i) capable of being kept in a clean and sanitary condition,
 - (ii) adequate in size and equipment for the number of people using them,
 - (iii) well lighted and well ventilated,
- (iv) separate from and not leading directly into any room that is used for preparing processed egg, and
- (v) in the case of lavatories, ventilated directly to the outside;
- (m) subject to C.4.3, be supplied with potable hot and cold water that is protected against contamination and that is adequate in quantity and pressure to serve the water needs of the processed egg station;
- (n) have adequate means of waste removal and disposal;
- (o) have drainage and sewage systems that are
 - (i) in accordance with the plumbing code of the province in which the processed egg station is located,
 - (ii) adequate to handle all wastes,
 - (iii) equipped with traps and vents,
 - (iv) designed and constructed so that there is no cross-connection between the effluent of human wastes and any other wastes, and
 - (v) designed and constructed in a manner that prevents the contamination of eggs and processed egg;
- (p) have, for the preparation of processed egg, equipment that is
 - (i) constructed of corrosion-resistant material, free from any noxious constituent and capable of being cleaned,
 - (ii) accessible for cleaning, maintenance and inspection or easily disassembled for those purposes, and
 - (iii) effective for the purpose for which it is intended;
- (q) have food contact surfaces that are
 - (i) non-toxic,
 - (ii) smooth,
 - (iii) free from pitting, crevices and loose scale,
 - (iv) unaffected by food,
 - (v) capable of withstanding repeated exposure to normal cleaning, and
 - (vi) non-absorbent;

- (r) have adequate facilities and means for the thorough washing, cleaning and sanitizing of equipment and containers;
- (s) be equipped with adequate means of setting, maintaining and verifying the temperature and humidity of egg storing rooms;
- (t) have refrigeration equipment that, where used for the processing or storing of processed egg, is suitable for cooling and storing processed egg;
- (u) have, in every processing room,
 - (i) readily accessible equipment for cleaning hands, including odourless soap and disposable towels, and
 - (ii) receptacles in which to place rejected eggs or rejected liquid processed egg;
- (v) have, in the case of a processed egg station that dries liquid processed egg, an egg dryer that is
 - (i) designed to prevent the accumulation of dried egg, and
 - (ii) equipped with efficient air filters for the removal of dust, dirt, foreign matter and other airborne contaminants that may enter the drying chamber;
- (w) in the case of a processed egg station that heat-treats liquid processed egg, have heat-treating equipment;
- (x) in the case of a processed egg station that prepares dried albumen, have a heat-treating room;
- (y) have adequate processing and handling equipment and proper cooling facilities in the ova processing room;
- (z) have facilities, that can be locked by an inspector, for holding samples of processed egg; and
- (za) have an office equipped for the use of inspection staff.

C.4.3 A registered processed egg station may use water other than potable water referred to in C.4.2(m) where it is used solely for fire protection, boilers or auxiliary services and there is no connection between the system for that water and the system for potable water.

C.5 Operation and maintenance of registered processed egg stations

C.5.1 Every operator shall operate and maintain the registered processed egg station in accordance with this section and C.6 and C.7.

C.5.2 The building, equipment, utensils and all other physical facilities of a registered processed egg station shall be maintained in a sanitary condition.

C.5.3 Every registered processed egg station shall be operated in accordance with the sanitation program referred to in C.1.2(b) and with the quality assurance program referred to in paragraph C.1.2(c).

C.5.4 Operations in relation to the preparation of processed egg in a registered processed egg station shall be carried out under stringent sanitary control.

C.5.5 Where dried processed egg is prepared in a processing room of a registered processed egg station, no other processing shall be conducted in the processing room at the same time, unless otherwise permitted by the Regulatory Authority.

C.5.6 A registered processed egg station shall have notices posted in prominent places instructing employees engaged in the preparation of processed egg to clean their hands immediately after using toilet facilities and that smoking is prohibited.

C.5.7 In a registered processed egg station, no material or coating shall be used in repairing the floors, walls, ceilings, doors, windows and other parts of any room or area in which processed egg is prepared unless the material or coating is durable and free from any noxious constituent.

C.5.8 Egg-breaking and processed egg preparation areas in a registered processed egg station shall have a minimum illumination of 540 lx.

C.5.9 A registered processed egg station shall have, for the disposal of egg shells, receptacles and equipment that are clean and sanitary.

C.5.10 Egg shells shall be removed continuously from the processing room in a registered processed egg station.

C.5.11 Refuse shall be removed at least once daily from within a registered processed egg station.

C.5.12 All lavatories, sinks and drains in a registered processed egg station shall be maintained in a manner that prevents any odours or fumes therefrom from pervading any room where processed egg is prepared.

C.5.13 Subject to C.5.15, nothing that is likely to emit an odour that could affect the flavour of processed egg shall be kept in a registered processed egg station.

C.5.14 The operator shall maintain an effective and safe rodent and insect control program and shall exclude any animal from the registered processed egg station.

C.5.15 Any detergent, sanitizing agent or other chemical agent in a registered processed egg station shall be properly labelled and shall be stored and used in a manner that prevents the contamination of processed egg or any processed egg contact surface.

C.5.16 Equipment that is used for the processing of eggs or the inspection or packing of processed egg shall be

(a) sanitized before use each day;

(b) cleaned and sanitized at the end of each day's operations and, in the case of egg breakers or any other equipment designated by the inspector, after every four hours of use and at the end of each day's operations; and

(c) drained and dried at the end of each day's operations.

C.5.17 Low- and high-pressure lines and pumps, homogenizers and heat-treating equipment in a registered processed egg station shall be cleaned and sanitized after use.

C.5.18 The spraying equipment in a registered processed egg station shall be cleaned immediately after use.

C.5.19 The main drying chamber of the egg dryer in a registered processed egg station shall be examined at the beginning and at the end of each continuous operation to determine whether the processed egg is thoroughly dry and whether it is scorched.

C.5.20 Egg dryer conveyors, drying chambers, collector bags, sifters and packing equipment in a registered processed egg station shall be cleaned whenever moisture or foreign matter is present therein, or on the request of an inspector.

C.5.21 Openings into an egg dryer in a registered processed egg station shall be closed except during cleaning.

C.5.22 Pans, trays and other apparatus that are used in drying liquid processed egg in a registered processed egg station shall be clean and any oils and waxes that are applied to the drying apparatus shall be edible.

C.5.23 Equipment and areas in a registered processed egg station that have been used in the preparation of inedible processed egg or any food other than processed egg shall be thoroughly cleaned and sanitized.

C.5.24 No utensil or other equipment that comes into contact with inedible eggs shall be used in processing eggs or packing processed egg in a registered processed egg station unless it is cleaned and sanitized.

C.5.25 The operator shall ensure that equipment that is used for the preparation of processed egg in a registered processed egg station is effective for the purpose for which it is intended.

C.6.1 All processed egg that is prepared in a registered processed egg station and that meets the requirements and standards set out in Clause 4 shall be marked with an inspection legend, except in the case of processed egg that is packed in a container that is an integral part of a vehicle.

C.6.2 No processed egg shall be received at a registered processed egg station unless it has been prepared in accordance with these Regulations.

C.6.3 No processed egg or ingredient used in the preparation of processed egg in a registered processed egg station shall be exposed to any source of contamination.

C.6.4 In a registered processed egg station, eggs that have not been washed in a registered egg station shall be washed continuously in clean water until they are about to be processed, and the water shall

- (a) be maintained at not less than 43°C and be at least 11°C warmer than the eggs;
- (b) contain an effective cleaning compound;
- (c) be changed at least every four hours and at the end of each shift; and
- (d) be maintained at a level that permits a continuous overflow.

C.6.5 No eggs in a registered processed egg station shall be washed in a room that is used for processing eggs.

C.6.6 Eggs in a registered processed egg station shall, before being processed, be spray-rinsed with a sanitizing agent.

C.6.7 Only processed egg or eggs that are in clean containers may be received in a registered processed egg station.

C.6.8 Every container in a registered processed egg station, before being packed with processed egg, shall

- (a) in the case of a new container, be sanitized and drained;
- (b) in the case of a re-used container, be washed, rinsed, sanitized and drained; and
- (c) in the case of a container nested within another container, be sanitized and drained, or be lined with a new sanitary plastic or equivalent liner immediately prior to packing.

C.6.9 In a registered processed egg station, every reused container, other than a container constructed of corrosion-resistant material, shall

ARS 1203:2023

(a) where the capacity of the container is less than 25 kg, be lined with a new sanitary plastic or equivalent liner, or

(b) where the capacity of the container is 25 kg or more, be lined with two new sanitary plastic or equivalent liners of a type approved by the Regulatory Authority.

C.6.10 No container in a registered processed egg station shall, either before or after being packed with processed egg, be placed on the floor.

C.7 Health of workers

C.7.1 No person who suffers from or is a known carrier of a communicable disease or who has an infected lesion that is open or exposed shall work in any area of a registered processed egg station where there is a danger of contaminating processed egg or a processed egg contact surface with pathogenic micro-organisms.

C.7.2 Every establishment shall document a health certificate for each labour working inside the establishment specially in the processing areas and these documents have to be submitted to the competent authority annually

C.7.3 Every person engaged in the preparation of processed egg in a registered processed egg station shall wash their hands thoroughly immediately after using toilet facilities and as frequently as is necessary to prevent the contamination of processed egg.

C.7.4 Every person handling processed egg in a registered processed egg station shall wash their hands and rinse them thoroughly in a non-irritating disinfectant solution

(a) each time on entering the processing room; and

(b) immediately after handling inedible egg or inedible processed egg.

C.7.5 In a registered processed egg station, appropriate sanitary clothing and hair covering shall be worn by every person in a room in which processed egg is prepared and, where gloves are worn, they shall be made of an impermeable material and be in a good, clean and sanitary condition.

C.7.6 No person shall use tobacco in any form, chew gum or consume food of any kind, except water dispensed from a drinking fountain, in any part of a registered processed egg station in which processed egg is prepared.

C.7.7 No person engaged in the preparation of processed egg in a registered processed egg station shall wear an object or use a substance that might fall into or otherwise contaminate the processed egg.

C.7.8 The Regulatory Authority shall be notified of any proposed major modification to the registered processed egg station and, where requested by the Regulatory Authority, detailed plans and specifications for the modification shall be submitted to the Regulatory Authority.

C.7.9 The data recorded by the heat-treating equipment shall be retained and shall, at the request of the Regulatory Authority and in respect of any period designated by the Regulatory Authority, be furnished to the Regulatory Authority, signed or initialled by the operator, so that the Regulatory Authority may examine, make copies of or take extracts from the data.

Annex D (informative)

Code for purchaser requirements for egg products

D.1 Definition of the code

The code for purchaser requirements for egg products has 17 fields and 20 digits (2 digits unused) and is a combination of the codes defined in 4.2.

No.	Name	Chapter	Code range
1	Egg product	Introduction	00-99
2	Source material	4.2.1	0-9
3	Product type	4.2.2	00-99
4	Pasteurization	4.2.4.1	0-9
5	Fermentation	4.2.4.2 (i)	0-9
6	Stabilization (desugaring)	4.2.4.2 (ii)	0-9
7	Regulation of acidity (acidification)	4.2.4.2 (iii)	0-9
8	Heat treatment of egg albumen	4.2.4.2 (iv)	0-9
9	Ionizing radiation	4.2.4.2 (v)	0-9
10	UV radiation	4.2.4.2 (vi)	0-9
11	Refrigeration	4.2.8.2	0-9
12	Functional properties	4.2.8.3	0-9
13	Use of additives and ingredients	4.2.8.4	00-99
14	Quality level	4.2.9	0-9
15	Field not used	—	0-9
16	Field not used	—	0-9
17	Conformity assessment	4.2.11	0-9

D.2 Example

D.2.1 The following table describes a dried whole egg product in powder form, manufactured from Class B hen eggs. The product is pasteurized and stabilized through fermentation. It is produced without acidification, temperature control or ionizing or UV radiation and has no additives. The product has conventional functional properties and meets the quality level. It is not refrigerated during the period following packing. Conformity with the specified standard should be certified by the company nominated by the purchaser.

D.2.2 This item has the following egg product code:

90 2 03 1 1 1 0 0 0 0 0 1 00 1 0 0 1.

Data field No.	Name	Requirement	Code value
1	Egg product	Egg product	90
2	Source material	Class B hen eggs	2
3	Product type	Dried whole egg in powder form	03
4	Pasteurization	Pasteurized	1
5	Fermentation	Fermented	1
6	Stabilization (desugaring)	Stabilized	1
7	Regulation of acidity (acidification)	Not acidified	0
8	Heat treatment of egg albumen	Not heat treated	0
9	Ionizing radiation	Not treated with ionizing radiation	0
10	UV radiation	Not treated with UV radiation	0
11	Refrigeration	Not refrigerated	0

ARS 1203:2023

12	Functional properties	Conventional (natural)	1
13	Use of additives and ingredients	Without additives	00
14	Quality level	Quality level	1
15	Field not used	-	0
16	Field not used	-	0
17	Conformity assessment	Quality assessment according to specified standard	1

Bibliography

- [1] *Regulations Governing the Voluntary Grading of Shell Eggs*, 7 CFR Part 56, Effective March 30, 2008
- [2] *United States Standards, Grades, and Weight Classes for Shell Eggs*, AMS 56, Effective July 20, 2000
- [3] *UNECE EP 63:1986/1994, Hens egg products for use in the food industry*
- [4] *Codex Alimentarius website: http://www.codexalimentarius.net/mrls/vetdrugs/jsp/vetd_q-e.jsp*
- [5] *USDA Foreign Agricultural Service website: <http://www.mrlatabase.com>*
- [6] *USDA Agricultural Marketing Service website: <http://www.ams.usda.gov/AMSV1.0/Standards>*
- [7] *European Union: http://ec.europa.eu/enterprise/sectors/pharmaceuticals/veterinary-use/maximum-residue-limits/index_en.htm*

