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ICS 67.120.30

DRAFT ZANZIBAR NATIONAL STANDARD

Egg powder—Specification

ZANZIBAR BUREAU OF STANDARDS

First edition

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.

Technical Committee Representatives

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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Ministry of Agriculture, irrigation, Natural Resources and Livestock - Department of Livestock
The State University of Zanzibar (SUZA)
Zanzibar exporter
Zanzibar Food and Drugs Agency (ZFDA)
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AFRICAN STANDARD

ARS 1205

First Edition 2023

Egg powder— Specification

Reference No. ARS 1205:2023 (E)
ICS 67.120.30

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Foreword

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This African Standard was prepared by **ARSO/TC 07, *Meat, poultry, eggs and related products***.

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Egg powder— Specification

1 Scope

This African Standard specifies the safety and quality requirements, sampling and test methods for egg powder.

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. To be updated

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

ISO 936:1998, Meat and meat products— *Determination of total ash*

ISO 1736 [IDF 9], Dried milk and dried milk products— *Determination of fat content— Gravimetric method (Reference method)*

ISO 1737 [IDF 13], Evaporated milk and sweetened condensed milk— *Determination of fat content— Gravimetric method (Reference method)*

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 4833-2, Microbiology of the food chain— *Horizontal method for the enumeration of microorganisms— Part 2: Colony count at 30 °C by the surface plating technique*

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

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 8156 [IDF 129], Dried milk and dried milk products— *Determination of insolubility index*

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 21528-2, Microbiology of the food chain— *Horizontal method for the detection and enumeration of Enterobacteriaceae— Part 2: Colony-count technique*

ISO 23776*, Meat and meat products— Determination of total phosphorous content*

3 Terms and definitions

For the purpose of this standard the following terms and definitions shall apply:

egg powder

The product prepared under hygienic conditions from the liquid contents of sound, wholesome, hens' eggs by any recognized method of spray drying and it may be dehydrated whole egg yolk, egg whites

4 Requirements

4.1 General requirements

4.1.1 The egg powder shall have a uniform yellow or orange-yellow colour and a smooth and uniform texture, and shall be free from lumps and gritty material.

4.1.2 Egg powder shall retain the original properties of fresh egg, like solubility of protein, aerating capacity, binding power and palatability. Egg powder shall reconstitute readily and quickly when it is mixed with three times its mass of lukewarm water (about 40 °C), after a preliminary mixing to form a smooth paste. On reconstitution, the egg powder shall be free from unpleasant off-flavours.

4.1.3 Egg powder may contain added carotene and riboflavin.

4.1.4 Egg powder shall be free from discoloration, added preservatives, artificial colouring matter and pathogenic micro-organisms, and other extraneous matter.

4.2 Specific Requirements

The product shall also comply with the specific requirements given in Table 1.

Table 1 — Specific requirements for egg powder (whole egg)

S/No.	Characteristic	Requirement	Method of test
(1)	(2)	(3)	(4)
i)	Moisture content, % by mass, Max	2.0	Annex A
ii)	Protein (N × 6.68), % by mass, Min	45.0	ISO 9390
iii)	Lecithin and fat, % by mass, Min	40.0	Annex B ISO 1736/1737
iv)	Solubility	85.0	Annex C ISO 8156
v)	Boric acid	Absent	
vi)	Organic phosphorus pentoxide (P_2O_5), % by mass, Min	1.25	ISO 13730
vii)	Total ash, % by mass, Max	3.6	ISO 936
viii)	Ash insoluble in hydrochloric acid, % by mass, Max	0.1	ISO 5985
ix)	Oxygen content, % by mass, Max	2.0	Annex D

5 Hygiene

5.1 egg powder shall be prepared and handled under strict hygienic conditions in accordance with ARS 53 or CXX57

5.2 egg powder shall comply with microbiological limits given in table 2 when tested in accordance with the methods given therein.

Table 2: Microbiological limits for egg powder

S/No.	Characteristic	Requirement	Method of test
i.	Total plate count, per gram, cfu/g	$.10^6$	ISO 4833-(1/2)
ii.	Yeast and mould count, per gram, max	50	ISO 21527-2
iii.	Salmonella in 25 gm	Absent	ISO 6579-1
iv.	Enterobacteriaceae cfu/g max	100	ISO 21528-2
v.	E.Coli cfu/g max	10	ISO 16649-2

6 Contaminants

6.1 Veterinary drugs residues

Egg powder shall comply with the maximum residue limits as specified in CAC/MRL 2.

6.2 Pesticide residues

Egg powder shall have maximum pesticide residues limit as in accordance with codex Alimentarius standards.

7 Packing and labelling

7.1 Packing

7.1.1 Egg powder shall be gas packed in nitrogen (or nitrogen and carbon dioxide) in food grade tinplate or flexible containers.

7.1.2 Packing in containers

The containers shall be packed in suitable containers.

7.1.3 Labelling

In addition to the requirements of ARS 56 the following information shall be labelled:

a) Name of the product as egg powder along with brand name, if any;

b) Name and physical address of the manufacturer;

c) Net mass of the contents;

d) Batch number or code number;

e) Names of the ingredients;

f) storage conditions;

g) best before date;

h) country of origin;

h) Each lot may also be marked with a Certification Mark if required;

8 Sampling

8.1 sampling shall be done as prescribed in Annex E.

Annex A
(normative)

Determination of moisture content

A.1 Apparatus

A.1.1 Flat-bottom dishes— of glass or aluminium and with cover. Dishes should not be affected by boiling water. They may b: 7 to 8 cm in diameter and not more than 2.5 cm deep. They should be provided with short glass stirring rods having a widening flat end.

A.1.2 Well-ventilated oven— maintained at 100± 2 °C.

A-2 Procedure

A.2.1 Weigh accurately about 5 g of the sample, into a flat-bottom glass or aluminium dish (with a cover) previously dried and weighed. Heat the dish containing the material after uncovering in an oven maintained at 100± 2 °C for about 5 hours. Cool in a desiccator and weigh with the cover on. Repeat the process of drying, cooling and weighing at half hourly intervals, until the difference between two consecutive weighings is less than 2 mg. Record the lowest mass.

A.3 Calculation

$$\text{Moisture content, percent by mass} = \frac{100(M_1 - M_2)}{(M_1 - M)}$$

where
M_1 = mass in g of sample with the dish,
M_2 = mass in g of dried sample with the dish, and
M = mass in g of empty dish.

Annex B
(normative)

Determination of lecithin and fat

B.1 Apparatus

Soxhlet extractor

B.2 Reagent

Chloroform

B.3 Procedure

Weigh accurately about 2 g of the sample into the folds of a filter paper (Whatman No. 4 or equivalent) and extract with chloroform for 16 hours in a Soxhlet extractor. Disconnect the tared Soxhlet flask, distil off the chloroform completely and weigh the flask with the residue (lecithin and fat).

B.4 Calculation

Lecithin and fat, percent by mass = $\frac{100(M_2 - M)}{M_1}$

where
M_2 = mass in g of the residue with Soxhlet flask
M = mass in g of empty Soxhlet flask, and
M_1 = mass in g of sample.

Annex C
(normative)

Determination of solubility

C.1 Procedure

C.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. Close the tube with a rubber stopper and shake gently for 1 minute to dispense the powder. Set aside for 15 minutes and invert ten times. 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. Open the top of the tube momentarily, close again and remove the tube from solution and wipe the outside of the tube. Transfer a drop of the liquid to the refractometer and read off the refractive index.

C.1.2 Determine the solubility index of the egg powder by refractometer (Haenni value) as follows:

Haenni value = (X - □) × 1000

where
X = refractive index of the sample solution,
and□= refractive index of the solvent.

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.

C.1.3 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

Annex D
(normative)

Determination of oxygen content of containers

D.1 Apparatus

A diagrammatic sketch of the recommended apparatus, as assembled, is shown in Figure 1.

D.2 Reagent

Pyrogallol or 1,2,4-Triacetoxybenzene— Either of these two absorption reagents may be used.

D.2.1. Alkaline pyrogallol is prepared by mixing equal volumes of solutions of 25 g of pyrogallol in water to 100 ml and 100 g of potassium hydroxide in water to 100 ml, and kept in a well-stoppered bottle.

D-2.2 Alkaline 1,2,4-triacetoxybenzene is prepared by dissolving 10 g of 1,2,4-triacetoxybenzene by gentle warming with a solution of 13.5 g of potassium hydroxide in 100 ml of water.

D.3 Procedure

With the sampling tool resting on but not piercing the can or container, and with stopcock *B* closed and stopcock *N* open, evaluate the sampling line to 5 mmHg or less, as indicated on the manometer; close stopcock *N,* and if there is no leak in the sampling line the manometer level does not change. (If the level changes, indicating a leak, this is rectified and the line is re-evacuated.) With *N* closed, pierce the can or container when the mercury in the manometer flows back with a click. Keeping stopcock *G* open and reservoir *H* on the lowest hook, turn stopcock B to allow gas from the sampling line and can or container to flow into *C* until one or both bulbs are full of gas. Close stopcock B, stir the water in the jacket and note its temperature (*T* °C). Bring the level of mercury in *C* to the appropriate index mark by closing *G* and operating the screw clip. Then take the manometer reading (S_1). Hang reservoir *H* on the topmost hook, open stopcock *G* and turn stopcock B to pass the gas into the absorption chamber. By raising and lowering *H*, the gas is passed to and fro the requisite number of times. When absorption is complete bring the reagent level to the mark, approximately by moving reservoir H, then exactly by closing *G* and operating the screw clip. Close stopcock *B*, open stopcock *G*, and adjust the mercury level in the measuring bulb to the appropriate mark as before. Note the manometer reading (S_2), and read the thermometer. (There shall be no temperature change during. the estimation; any change will cause serious errors if not allowed for in the calculation.) Finally discharge, the gas remaining in the measuring bulbs *C* by raising *H*, opening *G*, and turning *B* to allow the gas to flow out through the sampling line, following up with mercury until the upper bore of *B* is full.

D.4 Calculation

$$\text{Oxygen, percent by mass} = \frac{S_1 - S_2}{B - W - P + S_1} \times 100$$

where
S_1 = manometer reading with sample at index mark before absorption,
S_2 = manometer reading with sample at index mark after absorption,
B = barometric pressure,
W = aqueous vapour pressure at water jacket temperature (*T*°*C*), and
P = manometer reading corresponding to index mark at atmospheric pressure (P_1 or P_2 as appropriate).

NOTE If the oxygen content is low (under 5 percent), the barometric pressure may be assumed to be 76.0 cmHg and *W* to be 1.5 (corresponding to 18 °C), If in addition S_1 is about the same as *P* + 0.2 cmHg, the denominator may be assumed to be 75.0 in all cases without affecting the accuracy of the result to the first decimal place. Then the expression becomes:

Oxygen, percent by mass = $(S_1 - S_2) \times 100 = 4/3(S_1 - S_2)$

75

which gives sufficient accuracy for factory control purposes.

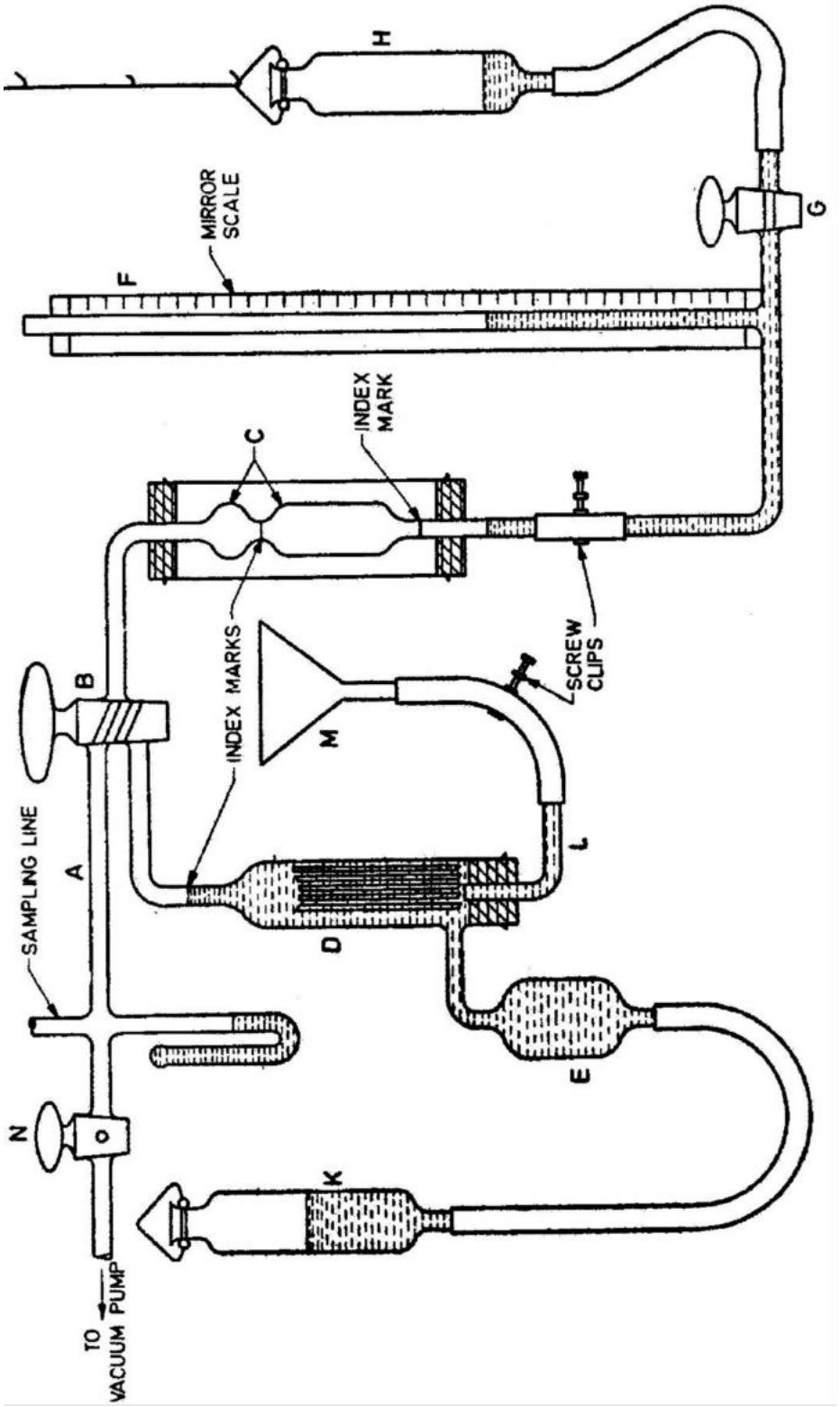

Figure D.1— Diagrammatic sketch of oxygen analysis apparatus

Annex E
(normative)

Sampling of egg powder

E.1 General requirements

In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed.

E.1.1 Samples shall be taken in a protected place not exposed to damp air, dust, or soot.

E.1.2 The sampling instrument shall be clean and dry when used. When taking samples for bacteriological examination it shall be sterile.

E.1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument, and the containers for sample from adventitious contamination.

E.1.4 The samples shall be placed in clean and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample. The sample containers shall, in addition, be sterile when they are used for samples for bacteriological examination.

E.1.5 Each container shall be sealed airtight after filling and marked with full details of sampling, batch or code number, name of the manufacturer and other important particulars of the consignment.

E.1.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

E.2 Scale of sampling

E.2.1 Lot— All the containers in a single consignment of one type of material drawn from a single batch of manufacture shall constitute a lot. If the consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the group of containers in each batch shall constitute separate lots.

E.2.1.1 Sample shall be tested from each lot for ascertaining its conformity to the requirements of this standard.

E.2.2 The number of containers to be selected from the lot shall depend on the size of the lot and shall be as given in Table E.1.

E.2.3 The containers shall be chosen at random from the lot and for this purpose a random number table as agreed between the purchaser and the supplier shall be used. If such table is not available, the following procedure shall be adopted.

Starting from any container, in the lot, count them as 1, 2, 3, ..., up to *r* in a systematic manner, where *r* is equal to the integral part of *N*/*n*, *N* being the total number of containers in the lot, and *n* 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.

Table E.1— Number of containers to be selected for sampling

Lot size	Sample size (for tests other than microbiological)	Sub-sample size (for microbiological tests)
(1)	(2)	(3)
2 to 25	2	1
26 to 100	3	1
101 to 300	5	2
301 to 500	7	3
501 and above	9	4

E.3 Test samples and referee samples

E.3.1 Preparation of individual sample

Draw with a suitable sampling instrument approximately equal quantities of the material from different parts of the container till the quantity collected is about 500 g and divide it into three equal parts. Each part so obtained shall constitute a sample representing the container and shall be transferred immediately to thoroughly clean and dry containers sealed airtight with particulars given under E.1.5. The individual sample so obtained shall be divided into three sets in such a way that each set has a sample, representing each selected container. One of these shall be marked for the purchaser, another for the vendor and the third for the referee.

E.3.2 Preparation of composite sample

From the material from each selected container, remaining after the individual sample has been taken, approximately equal quantities of the material shall be taken and mixed together so as to form a composite sample weighing about 600 g. This composite sample shall be divided into three equal parts and transferred to clean and dry containers sealed airtight and labelled with the particulars given in E.1.5. One of these composite samples shall be for the purchaser, another for the vendor and the third for the referee.

E.3.3 Preparation of Samples for microbiological examination

From the selected container select a sub-sample according to col 3 of Table 2. Draw with a suitable sampling instrument, which is sterile, at least 100 g of the material and mix thoroughly under aseptic conditions to form a sample for microbiological examination. Divide the sample (taking care not to bring in microbiological contamination in the material) into three equal parts. Each part so obtained shall constitute a sample representing the parts. Each part so obtained shall constitute a sample representing the container and shall be transferred to sterile glass containers sealed, airtight and labelled with particulars given in E.1.5. They shall be marked, in addition, with the words 'For Microbiological Examination'. The samples so obtained shall be divided into three sets in such a way that each set has a sample representing each selected container. One of these sets shall be marked for the purchaser, another for the vendor and the third for the reference.

E.3.4 Referee samples

Referee samples shall consist of a set of individual samples (E.3.1) and a composite sample (E.3.2) and set of samples for microbiological examination (E.3.3) marked for this purpose and shall bear the seals of the purchaser and the vendor. These shall be kept at a place as agreed between the two.

E.4 Number of tests

E.4.1 Tests for description, moisture, protein, lecithin and fat, boric acid, organic P_2O_5, ash insoluble in hydrochloric acid, total ash and shall be conducted on each of the samples constituting a set of individual samples.

E.4.2 Tests for bacterial count, yeast and mould count, coliform count and *Salmonella* shall be conducted on each of the samples meant for 'microbiological examination'.

E.4.3 Test for oxygen content shall be conducted on the composite sample.

E.5 Criteria for conformity

E.5.1 The lot shall be declared as conforming to all the requirements of this specification when E.5.1.1 to E.5.1.3 are satisfied.

E.5.1.1 The test results on each of the individual samples for description, moisture, protein, lecithin and fat, boric acid, organic P_2O_5, ash insoluble in hydrochloric acid total ash, and solubility shall satisfy the corresponding requirement given in 4.3.1 to 4.3.4 and in Table 1.

E.5.1.2 The test results for bacterial count, yeast and mould count, coliform count and *Salmonella* shall satisfy the corresponding requirement as given in Table 1.

E.5.1.3 The test results on the composite sample for the characteristic mentioned in E.4.3 shall satisfy the corresponding requirement as specified in Table 1.

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