DRAFT CARICOM REGIONAL STANDARD

Specification for ketchup

DCS/CRS 42: 20XX

Regional Technical Sub-Committee: Ketchup
Member State: Jamaica
Date of submission: (Revised Draft) 23 December 2014

AMENDMENTS ISSUED SINCE PUBLICATION

AMENDMENT NO.	DATE OF ISSUE	TEXT AFFECTED

Committee representation

This CARICOM Regional Standard was developed under the supervision of the Regional Technical Committee (RTC 3) for Foods by Sub-Committee for Ketchup (hosted by the CARICOM Member State, Jamaica) which at the time comprised the following members:

Members	Representing
Ms L HooFung (Chairperson)	ICENS, University of the West Indies, Mona Campus
Ms D Bromfield (Vice Chairperson)	Southern Fruits and Food Processors Ltd.
Mr S Christie	Ministry of Agriculture
Mr Pash Fuller	Consumer Affairs Commission
Mrs L Gooden	Rural Agricultural Development Authority
Ms S Harvey	Ministry of Agriculture
Ms S Lewis	Tourism Product Development Company
Mrs L Lowe	Grace Food Processors
Ms J McFarlane	Exotic Products Jamaica Ltd
Mrs M Miller	Scientific Research Council
Ms A Morris	Caribbean Food and Nutrition Institute
Mrs D Perkins	Jamaica Agro Processors Association
Mrs J Pullen	Jamaica Agricultural Society
Ms L Richards	Caribbean Food and Nutrition Institute
Mr R Rowe	Consumer Affairs Commission
Mr H Smith	Ministry of Agriculture
Mr L Stone	Magnacorp Investment Ltd
Ms E Wright	Virginia Dare
Ms S Budall	Bureau of Standards Jamaica
Ms A Rose	Bureau of Standards Jamaica
Mrs P Lumsden (Technical Secretary)	Bureau of Standards Jamaica
Ms. S. Budall (Technical Secretary)	Bureau of Standards Jamaica
Mr A Blake (Facilitator)	Bureau of Standards Jamaica
Mrs V Nurse (Facilitator)	Bureau of Standards Jamaica

Contents

Page

Foreword

This Standard has been prepared through the CARICOM Regional Organization for Standards and Quality (CROSQ) in order to outline the specifications for Ketchup offered for sale in CARICOM territories.

This standard stipulates general and detailed requirements not only for traditional ketchup made from tomato, but also for ketchup made from other fruits and vegetables.

It was approved by the Council from Trade and Economic Development (COTED) on …….

In preparing this standard, reference was made to the following:

a) JS 88: 1984 - Jamaican Standard Specification for ketchup
NOTE. Including references therein.

b) United States Department of Agriculture - United States Standards for Grades of Tomato Catsup.
c) U.S. Food and Drug Administration – Defect levels handbook

1 Scope

This standard prescribes the requirements for ketchup, catsup, catchup hereinafter referred to as ketchup.

2 Normative references

The following referenced documents are indispensable for the application of this document. The latest edition of the referenced documents (including any amendments) applies.

CARICOM Regional Standard, CRS 5, *Labelling standard for pre-packaged foods*

CARICOM Regional Standard Code of Practice*, CRS 6, General principles of food hygiene*

ISO 2859 Sampling procedures and tables for inspection by attributes

3 Terms and definitions

For the purpose of this standard the following definitions apply:

3.1
defects
3.1.1
absence of defects
the degree of freedom from defects such as seeds, peel, core material, dark specks; this shall be evaluated by observing a thin layer of the product on a smooth, white, flat surface

3.1.2
practically free from defects
any defects present only slightly affect the appearance or eating quality of the product

3.1.3
fairly free from defects
any defects present may be noticeable, but not so large or so numerous or of such contrasting colour as to seriously affect the appearance or eating quality of the product

3.2
colour
the colour is characteristic of ketchup made from well-ripened red or reddish tomatoes (Type 1), or other named vegetable (Type 2) or fruit material (Type 3) as defined in clause 4.1, which have been properly prepared and processed

3.3
consistency
the ability of the product to hold its liquid portion in suspension

3.4
finish
the textural characteristics of the product

3.4.1
good finish
the product has a uniform smooth texture

3.5
flavour
the taste and olfactory sensory attributes of the product

3.5.1
good flavour

the product has a pleasant, distinct characteristic flavour reflecting the use of good quality ingredients and the product shall be free from scorching of any kind

3.5.2
fairly good flavour
the flavour characteristic of the ingredients in which there may be slight traces of undesirable flavour such as scorched or bitter, but is free from objectionable or off-flavours of any kind

3.6
thickening agent
substance which increases the viscosity of a liquid/solid mixture without substantially modifying the physical and chemical properties e.g. modified starch, xanthan gum

3.7
total solids
the refractometric sucrose value of the filtrate (see Annex C)

4 Product description

Ketchup shall be the heat treated product prepared from the juice, paste, puree or any combination of these using clean, sound, ripe tomatoes of a red or reddish variety or alternatively, vegetables or fruits to which has been added salt, vinegar and or acetic acid. A sweetening agent, stabilizer (thickening agent) colour, antimicrobial chemical additive, antioxidant, spices, onions, garlic and other seasoning may be added.

5 Classification

For the purpose of this specification, ketchup shall be of the following types and grades:

5.1 Types

5.1.1 Type 1 - Tomato ketchup

Tomato ketchup shall contain no fruit or vegetable material other than tomato or tomato products except onion, garlic or other spices which may be added for flavouring purposes.

5.1.2 Type 2 - (Naming the vegetable(s) ketchup.

(Naming) the vegetable(s) ketchup, shall be prepared from vegetable material other than tomato but may contain tomato products as one of its ingredients.

5.1.3 Type 3 - (Naming the fruit(s) ketchup

(Naming) the fruit(s) ketchup shall be prepared from fruit material but may contain tomato products as one of its ingredients.

5.1.4 Type 4

Type 4 ketchup shall be prepared from a combination of tomato or tomato products and or vegetable material and fruit material.

5.1.5 Hot Ketchup

If *Capsicum* is added to type 1, type 2, type 3, or type 4 ketchup, the product shall be described as “Hot” Tomato or the (name of the vegetable or fruit) ketchup.

5.2 Grades

5.2.1 Where a grade is declared it shall be 'Fancy Grade', Choice Grade' or 'Standard Grade' as specified by 7.2.

5.2.2 Where no declaration is made, the product shall be a grade which is not less than that specified for 'Standard Grade'.

6 General requirements

6.1 Ingredients

6.1.1 All ingredients shall be clean, sound, wholesome, of good food-grade quality and safe for human consumption

6.1.2 Sweetening agent(s) shall be natural and or artificial. The type used shall be reflected in the ingredient listings.

6.1.3 Food colouring or thickener may be added, except where prohibited by law in the country of origin, provided that products containing colouring or a thickener shall not be given a grade higher than 'standard', regardless of the total score.

6.2 Processing and packaging

6.2.1 The ketchup shall be heat processed in accordance with Good Manufacturing Practices; before or after packing in hermetically sealed containers to assure preservation through the removal of microbiological hazards and the retention of its physical and chemical attributes. Products covered by the provisions of this standard shall be prepared and handled in accordance with the appropriate sections of CARICOM Regional Standard Code of Practice*, CRS 6, General principles of food hygiene.*

6.2.2 The ketchup shall occupy not less than 90% of the total capacity of the container.

6.2.3 Only packaging materials, which are not likely to impair the organoleptic or chemical characteristics of the ketchup or make them harmful to health, shall be used.

6.3 Labelling

This product shall be labelled in accordance with the CARICOM Regional Standard, CRS 5, Labelling of pre-packaged foods and/or relevant regulatory requirements.

7 Detailed requirements

7.1 Analytical requirements

The finished product shall meet the following analytical requirements:

a) *Total Solids*. The product shall have a total solid content of not less than 25%.

b) *Acidity.* Acidity shall not be less than 1.2% of acid expressed as acetic acid by weight.

c) *pH value*. The pH value shall not be greater than 4.0.

7.2 Grades

Ketchup shall be of the following grades:

7.2.1 'Fancy Grade'
Fancy grade shall be the quality of ketchup that meets the following requirements:

a) has a total solids content of not less than 33% by weight;

b) possesses a good finish;

c) has a colour characteristic of the type of ketchup;

d) is of a good consistency such that it satisfies the following:

i) shows only a slight separation of the liquid when poured on a smooth, white flat tray;

ii) is not excessively stiff; and

iii) flows no more than 7.5 cm in 30 s at 25° C (77°F) in the Bostwick consistometer.

d) has a good flavour characteristic of the type of ketchup;

e) is practically free from defects;

f) scores not less than 90 points when scored in accordance with the scoring system outlined in annex B.

7.2.2 'Choice Grade'
Choice grade shall be the quality of ketchup that meets the following requirements:

a) has a total solids content of not less than 29% by weight;

b) possesses a good finish;

c) has colour characteristic of the type of ketchup;

d) is of good consistency such that it satisfies the following:

i) shows only a slight separation of the liquid when poured on a smooth, white flat tray;

ii) is not excessively stiff; and

iii) flows no more than 7.5 cm in 30 s at 25□ C (77□F) in the Bostwick consistometer.

e) has a good flavour characteristic of the type of ketchup ;

f) is practically free from defects;

g) scores not less than 80 points when scored in accordance with the scoring system outlined in annex B.

7.2.3 'Standard Grade'
Standard grade shall be the quality of ketchup that meets the following requirements:

a) has a total solid content of not less than 25% by weight;

b) possesses a good finish;

c) has a colour characteristic of the type of ketchup;

d) is of a fairly good consistency such that it satisfies the following:

i) may show a noticeable but not excessive separation of free liquid when poured on a flat tray;

ii) is not excessively stiff; and

iii) flows not more than 9 cm in 30 s at 25° C (77°F) in the Bostwick consistometer.

has a fairly good flavour;

d) is fairly free from defects;

e) scores not less than 70 points when scored in accordance with the scoring system outlined in annex B.

~~7.2.5~~7.2.4 **'Sub-standard Grade'**
The quality of ketchup that falls below the requirements of 'Standard Grade' shall be classified as sub-standard.

8 Hygiene and Sanitation requirements

~~8.1~~ The requirements contained CARICOM Regional Standard Code of Practice, *CRS 6, General principles of food hygiene* shall apply.

9 Microbiological and microanalytical requirements

9.1 The mould count for ketchup shall not exceed 40% positive fields when tested in accordance with annex G.

9.2 Yeast cells shall be non-viable.

9.3 The ketchup shall be free of insects, insect parts and excreta; no more than 40 Drosophila fly eggs or 20 Drosophila fly eggs and 4 larvae per 200g will be allowed. The ketchup shall be free of rodent excreta and rodent parts (see annex G).

9.4 The ketchup shall be free from chemical and Physical hazards and extraneous matter such as human hair, and other material which would make the product unfit for human consumption and be indicative of poor manufacturing practices (see annex G).

9.5 There shall not be more than 500 microscopic carbonized particles per 200 g (7 oz).

10 Sampling, grading and testing

Ketchup shall be sampled, graded and tested according to the procedures outlined in the following:

Annex A Plan for sampling of ketchup

Annex B Grading of ketchup

Annex C Determination of total solids content

Annex D Determination of sodium chloride content

Annex E Determination of acidity as acetic acid

Annex F Determination of total tomato solids

Annex G Microbiological test methods for ketchup

Annex A
(normative)
Plan for sampling of ketchup

A.1 General Requirements for sampling

A.1.1 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

A.1.2 Sampling shall be done by a person agreed to between the purchaser and the vendor and if desired by any of them, in the presence of the purchaser (or his representative) and the vendor (or his representative).

A.1.3 The manufacturer shall have an internal documented sampling procedure which shall be used during the production process as a means of verifying the production protocols.

A.2 Scale of sampling

A.2.1 In any consignment, all containers of the same size containing material of the same type, and grade shall constitute a lot. Samples shall be tested from each lot for ascertaining conformity of the material to the requirements of this standard.

A.2.2 Samples shall be selected at random from the lot as described in A.2.2.2. The total number of units to be taken is determined by the amount needed for grading, analytical tests and microbiological tests.

A.2.3 In order to ensure randomness of selection, random number tables shall be used. In case such tables are not available, the following procedure may be adopted:

Starting from any container, count them as 1, 23 ….r and so on in a systematic manner. Every r th container thus counted shall be withdrawn, r being the integral part of N/n where N is the total number of containers in the lot and n the number containers to be selected, until the requisite number is obtained.

A.3 Samples for grading

Samples for grading shall be taken randomly from the lot under consideration in accordance with table A.1.

Table 1 — Sampling for grading of ketchup

Size of container	Lot Size	Sample Size	Acceptance no.
Any type of container of 340.95 mL (12 fl oz)	0-5000	3	0
	5001-10 000	6	1
Any type of container over 340.95 mL(12 fl oz) but not over 909.19 mL (32 fl oz)	0-3000	3	0
	3001-5000	6	1

A.4 Samples for analytical tests

Sampling for analytical tests shall be carried out in a random manner. The number of items to be selected shall be in accordance with table A. 2. This plan is derived from ISO 2859 using an Average Quality Level (A.Q.L) of 6.5%. Special Inspection Level S3 was chosen on the basis that all items in the lot would have

received uniform treatment. The effectiveness of sampling plans is dependent on the execution of proper quality control procedures.

Table 2 —Sampling for analytical testing of ketchup

Lot size	Sample size	Acceptance no.	Rejection no.
2-50	2	0	1
51-500	8	1	2
501-3200	13	2	3
3201-35000	20	3	4

A.5 Samples for microbiological tests

A.5.1 The sampling plan for inspection of microbiological quality is derived from ISO 2859. In this Sampling plan, the sample size is 8, acceptance number is 0 and rejection number is 1, irrespective of the lot size. It based on an A.Q.L of 1.5%. Where on first sampling and testing, a unit fails to meets the requirements; a second sample shall be taken. If on re-sampling and testing, another unit does not comply, the lot shall be deemed to have failed to meet the requirements of this specification.

A.5.2 Where more than one unit of the initial sample or one unit of the resample fails to meet the requirements, investigations to determine cause of failure and subsequent remedial action shall be necessary.

A.5.3 Special Inspection Level S3 was chosen on the basis that all items in the lot would have received uniform treatment. The effectiveness of the sampling plans is dependent on the execution of proper quality control procedures.

A.6 Criteria for acceptance

The lot, from which the sample is taken, shall be deemed to comply with the requirements of this standard if it satisfies the acceptance quality level set out in A.3, A.4 and A.5. The lot shall be rejected if it does not satisfy the appropriate requirements of A.3, A.4 and A.5.

Annex B
(normative)
Grading of ketchup

B.1 Tests

B.1.1 Absence of defects (see 2.1) and colour (see 2.2) shall be evaluated by observing a thin layer of the product on a smooth, white flat surface.

B.1.2 Consistency shall be determined using a Bostwick consistometer.

B.2 Scoring system

The factors of consistency, absence of defects and flavour are expressed numerically on a scale of 100, each given a maximum of 25 points as shown in table B.1. See clause 3 for definitions of these factors.

Table 3 —Score sheet for ketchup

Factors	Maximum points	Fancy grade	Choice grade	Standard grade	Sub-standard grade
Consistency	25	23-25	20-22	18-19	0-17
Absence of defects	25	22-25	20-21	17-19	0-16
Flavour	25	22-25	20-21	17-19	0-16
Minimum Score	-	90	80	70	Below 70

Annex C
(normative)

Determination of total solids content

C.1 Apparatus

a) A refractometer (bench type or a portable instrument)

b) Any clean muslin or suitable material giving a reasonable clear filtrate.

C.2 Preparation of sample

Shake unopened container thoroughly to incorporate any sediment. Transfer entire contents to large glass or porcelain dish. Mix thoroughly, continuing stirring for at least 1 min. Transfer well-mixed sample to glass-stoppered container and shake or stir thoroughly each time before removing portions for analysis.

C.3 Method

C.3.1 Transfer about 50 g (2 oz) of sample prepared in C.2 to a suitable covered container and adjust to 20 °C (68° F) or as near as possible taking care to avoid any evaporation or condensation which might affect the concentration of the product. Place about 15 g (0.5 oz) of the sample on a clean square of muslin, gather the ends and force the liquid through. Discard the first 4 drops. Allow 2 drops to fall on the measuring prism and take a reading, recording the temperature. If the temperature at which the reading is taken is not exactly 20 °C (68 °F) make the correction using table C.1. in the absence of instrumental temperature correction/ a temperature compensated refractometer.

C.3.2 Repeat the measurement on 2 other drops of the product. Report the total solids content in relationship to the sucrose per cent in table C.2 taken from the international Scale of Refractive Indices of sucrose solution at 20° C.

Table 4 — International temperature correction table, 1936

Temp.		Per cent Sucrose										
		0	5	10	15	20	25	30	40	50	60	70
°C	°F	Subtract from the percent sucrose										
10	50	0.50	0.54	0.58	0.61	0.64	0.66	0.68	0.72	0.74	0.76	0.79
11	51.8	0.46	0.49	0.53	0.55	0.58	0.60	0.62	0.65	0.67	0.69	0.71
12	53.6	0.42	0.45	0.48	0.50	0.52	0.54	0.56	0.58	0.60	0.61	0.63
13	55.4	0.37	0.40	0.42	0.44	0.46	0.48	0.49	0.51	0.53	0.54	0.55
14	57.2	0.33	0.35	0.37	0.39	0.40	0.41	0.42	0.44	0.45	0.46	0.48
15	59.0	0.27	0.29	0.31	0.33	0.34	0.34	0.35	0.37	0.38	0.39	0.40
16	60.8	0.22	0.24	0.25	0.26	0.27	0.28	0.28	0.30	0.30	0.30	0.32
17	62.6	0.17	0.18	0.19	0.20	0.21	0.21	0.21	0.22	0.23	0.23	0.24
18	64.4	0.12	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.16
19	66.2	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08
Add to the per cent sucrose												

21	69.8	0.06	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08
22	71.6	0.13	0.13	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.16
23	73.4	0.19	0.20	0.21	0.22	0.23	0.23	0.23	0.23	0.24	0.24	0.24
24	75.2	0.26	0.27	0.28	0.29	0.30	0.30	0.31	0.31	0.31	0.32	0.32
25	77.0	0.33	0.35	0.36	0.37	0.38	0.38	0.40	0.40	0.40	0.40	0.40
26	78.8	0.40	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.48	0.48	0.48
27	80.6	0.48	0.50	0.52	0.53	0.55	0.55	0.55	0.56	0.56	0.56	0.56
28	82.4	0.56	0.57	0.60	0.61	0.63	0.63	0.63	0.64	0.64	0.64	0.64
29	84.2	0.64	0.66	0.68	0.69	0.72	0.72	0.72	0.73	0.73	0.73	0.73
30	86.0	0.72	0.74	0.77	0.78	0.80	0.80	0.80	0.81	0.81	0.81	0.81

Table 5 — Refractive indices of sucrose solution (International scale 1936)

Refractive Index At 20 °C	Sucrose per cent	Refractive Index At 20 °C	Sucrose per cent	Refractive Index At 20 °C	Sucrose per cent	Refractive Index At 20 °C	Sucrose per cent	Refractive Index At 20 °C	Sucrose per cent
1.36384	20.0	1.3723	25.0	1.3811	30.0	1.3902	35.0	1.3997	40.0
1.36417	20.2	1.3726	25.2	1.3815	30.2	1.3906	35.2	1.4001	40.2
1.36451	20.4	1.3730	25.4	1.3818	30.4	1.3909	35.4	1.4005	40.4
1.36484	20.6	1.3733	25.6	1.3822	30.6	1.3913	35.6	1.4008	40.6
1.36518	20.8	1.3737	25.8	1.3825	30.8	1.3916	35.8	1.4012	40.8
1.36551	21.0	1.3740	26.0	1.3829	31.0	1.3920	36.0	1.4016	41.0
1.36585	21.2	1.3744	26.2	1.3833	31.2	1.3924	36.2	1.4020	41.2
1.36618	21.4	1.3747	26.4	1.3836	31.4	1.3928	36.4	1.4024	41.4

1.36652	21.6	1.3751	26.6	1.3840	31.6	1.3931	36.6	1.4028	41.6
1.36685	21.8	1.3754	26.8	1.3843	31.8	1.3935	36.8	1.4032	41.8
1.36719	22.0	1.3758	27.0	1.3847	32.0	1.3939	37.0	1.4036	42.0
1.36753	22.2	1.3761	27.2	1.3851	32.2	1.3943	37.2	1.4040	42.2
1.36787	22.4	1.3765	27.4	1.3854	32.4	1.3947	37.4	1.4044	42.4
1.36820	22.6	1.3768	27.6	1.3858	32.6	1.3950	37.6	1.4048	42.6
1.36854	22.8	1.3772	27.8	1.3861	32.8	1.3954	37.8	1.4052	42.8
1.36888	23.0	1.3775	28.0	1.3865	33.0	1.3958	38.0	1.4036	43.0
1.36922	23.2	1.3779	28.2	1.3869	33.2	1.3962	38.2	1.4040	43.2
1.36956	23.4	1.3782	28.4	1.3872	33.4	1.3966	38.4	1.4044	43.4
1.36991	23.6	1.3786	28.6	1.3876	33.6	1.3970	38.6	1.4048	43.6
1.37025	23.8	1.3789	28.8	1.3879	33.8	1.3974	38.8	1.4052	43.8
1.37059	24.0	1.3793	29.0	1.3883	34.0	1.3978	39.0	1.4076	44.0
1.3709	24.2	1.3797	29.2	1.3887	34.2	1.3982	39.2	1.4080	44.2
1.3713	24.4	1.3800	29.4	1.3891	34.4	1.3986	39.4	1.4084	44.4
1.3716	24.6	1.3804	29.6	1.3894	34.6	1.3989	39.6	1.4088	44.6
1.3720	24.8	1.3807	29.8	1.3898	34.8	1.3993	39.8	1.4092	44.8

Annex D
(normative)
Determination of sodium chloride content

D.1 Method 1

D.1.1 Reagents

a) 80% alcohol

b) Nitric acid

c) 0.1 M (0.1N) silver nitrate ($AgNO_3$) solution

d) Saturated iron (III) ammonium sulphate [$FeNH_4(SO_4)_2$] solution- ferric alum indicator

e) 0.1 M (0.1N) ammonium thiocyanate (NH_4CNS)

D.1.2 Procedure

Prepare sample as in C.2 and accurately weigh 5 g (0.18 oz) of this sample. Transfer with 80% Alcohol to 100-mL volumetric flask, adding alcohol to a volume of 50 mL. Shake well and add 1 mL nitric acid. Using pipette add a known excess 0.1 M (0.1 N) silver nitrate solution. Dilute to 100 mL with alcohol, transfer to centrifuge tube and centrifuge for 5 min at 1800 r.p.m. Pipette 50 mL of supernatant into a 300 mL Erlenmeyer flask and add 2 mL saturated iron II alum solution and 2 mL nitric acid. Titrate to a permanent light brown with ammonium thicyanate.

D.1.3 Calculation

Divide volume of 0.1 M (0.1N) $AgNO_3$ used in D.1.2 by 2 and subtract volume of NH_4CNS solution used. Multiply difference by 0.005844 to obtain NaCl present.

1mL 0.1 M (0.1N) $AgNO_3$ = 0.005844 g NaCl

% NaCl in ketchup = weight of NaCl present

$$\%NaCl = \left\{ \frac{\text{Volume of 0.1 M (0.1N) } AgNO_3}{2} - \text{Volume of } NH_4CNS \right\} \times 0.005844$$

D.2 Alternative Methods

D.2.1 An alternative method to Method 1 above is determination of sodium (Na) by flame atomic absorbtion spectrophotometry after microwave acid digestion. Sodium (Na) is to be expressed as sodium chloride (NaCl) after determination. Suggested methods include, but are not limited to methods approved and published by the AOAC International or the CODEX Alimentarius Commission Determination of acidity as acetic acid

D.2.1.1 Reagents

a) 0.1 M (0.1N) sodium hydroxide solution

b) phenolphthalein indicator

D.2.1.2 Procedure

Prepare sample as in C.2 and weigh 5g accurately. Dilute to 100 mL with neutralized H_2O and add 1 or 2 drops phenolphthalein. Titrate to end point with 0.1M (0.1N) NaOH solution.

D.2.1.3 Calculation

Report as % acetic acid

1 mL 0.1M (0.1N) NaOH = 0.0060 g acetic acid

$$\% \text{ acetic acid} = \frac{\text{Amt. NaOH used} \times 0.0060 \times 100}{\text{Amt. of sample}}$$

Annex E
(normative)
Determination of total tomato solids

E.1 Reagents

a) Pottasium stock solution. Dissolve 5.779 g potassium dihydrogen phosphate [dried for 1h at 105°C (221°F)] in water and dilute to 1L.

b) Standard dilute potassium solution. Dilute 50 mL stock potassium solution to 1L with water (100 mg/L as K_2O). Alternatively prepare by dilution from a stock solution containing 0.954g potassium chloride in 500 mL water (1000 mg/L K).

c) Conc. Hydrochloric acid

E.2 Apparatus

a) 400 mL beaker

b) Flame photometer

E.3 Procedure

F.3.1 For the direct method take 10 g of tomato ketchup and dilute with water to 500 mL. Mix, filter if necessary and dilute (e.g 10 mL/100 mL) to give a solution of suitable concentration (approx. 15 mg /L K_2O in final solution).

F.3.2 Otherwise ash a suitable quantity of sample (e.g 5 g), transfer the ash to 400 mL beaker using 100 mL water, add 10 mL conc. Hydrochloric acid and boil for several minutes. Cool, dilute with water to 500 mL and filter. Then dilute to a final concentration of solution of approximately 15 mg/L K_2O.

F.3.3 Prepare a series of solutions from the freshly prepared standard dilute potassium solution containing 10, 12, 14, 16, 18 and 20 mg/ L K_2O.

F.3.4 Using a filter to give a spectral range of 766 nm to 770 nm, set the sensitivity of the flame photometer so that the full deflection (100 divisions) is equivalent to 20 mg/L. Spray each standard solution at least three times, checking the sensitivity between each reading against the 20 mg/L solution. From the readings obtained prepare the calibration graph. Reset the instrument at full deflection with the 20 mg/L solution and spray the dilute sample solution. Estimate the amount of potassium in the original sample from the calibration graph after taking several readings (K = 0.83 x K_2O). The determination of potassium is one of the parameters used for estimating the fruit juice content of products.

Annex F
(normative)

Microbiological test method for ketchup

F.1 Estimation of mould count

F.1.1 Apparatus

a) Howard mould counting chamber and cover glass

b) Small Spatula, knife or scalpel blade

c) Compound microscope with one ocular fitted with a micrometer disc ruled in squares, each side of which is equal to one-sixth the diameter of the ocular diaphragm opening. The microscope should also have a standardized field of view of 1.382 mm diameter at 90 –125 x magnification which covers 1.5 mm^2.

F.1.2 Procedure

G.1.2.1 Mix contents of bottle by vigorous agitation. Using a small spatula, a knife or scalpel blade, transfer a small amount of the well mixed sample to the central disc of a clean Howard mould counting chamber and cover with a clean cover glass to get an even spread.

G.1.2.2 Place slide under a microscope and examine with such adjustment that each field of view covers 1.5mm^2. This area which is essential may frequently be obtained by so adjusting the draw tube that the diameter of the field becomes 1.382 mm.

G.1.2.3 Using a magnification of 90 –125 X, examine twenty-five fields for each of two mounts. The fields should be chosen in such a manner as to be representative of all sections of the mounts.

F.1.3 Interpretation of results

G.1.3.1 Record results as positive when aggregate length of $\angle$ 3 mould filaments present exceeds one-sixth the diameter of the field.

G.1.3.2 Calculate portion of positive fields from results of examination of all observed fields and report as percentage fields containing mould filaments.

G.1.4 Alternative methods

The estimation of mould count may also be conducted using the pour plate method using Potato Dextrose Agar of Malt Extract Agar (see G.2 below).

F.2 Yeast viability test

F.2.1 Apparatus

a) Sterile Petri dishes

b) Sterile 6-in cotton-tipped applicators

c) Potato dextrose agar (PDA) or malt extract agar (MEA)

d) Incubator controlled at 28 ± 2° C (82 ± 3.6°F) (room temperature) or a clean mould- free cupboard

e) Compound microscope

f) Microscope slides

F.2.2 Preparation of culture media

Both potato dextrose agar or malt extract agar can be obtained commercially and preparation instructions on the container should be followed. Alternatively they can be prepared as follows:

F.2.2.1 Potato dextrose agar

a) Ingredients

Infusion from white potatoes	200mL
Dextrose	20 g
Agar	15g
Distilled water	1.0 L

b) Procedure

Heat mixture to boiling to dissolve ingredients. Dispense in flasks or tubes and autoclave for 15 min at 121 ° C (250 °F). Cool and acidify with sterile 10% tartaric acid to pH 3.5 with sterile Petri dishes and allow to solidify. To preserve solidifying properties of agar do not heat the medium after the addition of the tartaric acid.

F.2.2.2 Malt extract agar

i) Ingredients

Maltose, technical	12.75 g
Dextrin	2.75 g
Glycerol	2.35 g
Peptone	0.78 g
Agar	15.0 g
Distilled water	1.0 L

ii) Procedure

Heat mixture to boiling to dissolve ingredients. Dispense in flasks or tubes and autoclave for 15 min at 121°C (250 °F).Cool and check final pH which should be 4.6 ± 0.2. Adjust with sterile 10% tartaric acid if necessary. Pour into sterile Petri dishes and allow to solidify.

F.2.3 Preparation of gram stain reagents

F.2.3.1 Hucker's crystal violet

i) Prepare the following:

1) Solution A

Crystal violet 2.0 g

Ethyl alcohol 20.0 mL

2) Solution B

Ammonium oxalate 0.8 g

Distilled water 80.0 mL

ii) Mix solution A and B and store for 24 h before use.

F.2.3.2 Iodine (Burke's)

i) Chemicals

Potassium iodide 2.0 g

Iodine 1.0 g

Distilled water 100.0 mL

ii) Dissolve potassium iodide in water then add iodine.

F.2.3.3 Acetone alcohol

Mix the following reagents:

Ethyl alcohol (95) 70.0 mL

Acetone 30.0 mL

F.2.3.4 Safarin - Hucker's counterstain (stock solution)

Saffranin O (certified) 2.5 g

Ethyl alcohol (95%) 100 mL

For use add 10mL of stock solution to 90.0 mL distilled water.

F.2.4 Procedure

F.2.4.1 Preparation of sample

Shake bottle vigorously to mix contents. Use the sterile cotton tipped applicator to streak a small amount of the sample unto the dry surface of a Petri dish containing PDA or MEA. Incubate plates uninverted in room temperature incubator or clean dry cupboard for seven days. Examine plate for yeast colonies after incubation period. Confirm the presence of yeast by doing gram stain on representative colonies.

F.2.4.2 Gram staining

Stain yeast colonies as follows:

i) Make smear of colony on a microscope slide in a drop of distilled water. Allow to dry and fix smear by passing through a Bunsen flame.

ii) Apply crystal violet solution for 1 min

iii) Wash with water and drain

iv) Apply iodine for 1 min

v) Flood slide with iodine and drain

vi) Wash slide with water and drain

vii) Decolourize using acetone – alcohol mixture until no more blue colour can be washed off.

viii) Wash with water and drain

ix) Counter stain with Safranin for 10 s

x) Wash with water and blot dry

xi) Examine under microscope using oil immersion

F.2.4.3 Interpretation of results

Results shall be interpreted as follows:

i) Yeast cells are stained blue

ii) If viable yeast cells are found the test is reported as being positive

iii) If no cells are found the test is reported as negative

F.3 Extraneous matters tests

F.3.1 Determination of light filth

F.3.1.1 Apparatus

i) Wildman trap flask consisting of a 2-L Erlenmeyer flask into which a close-fitting rubber stopper supported on a stiff metal rod has been inserted. The rod should have a diameter of about 5 mm threaded (No. 10-32) at the lower end and fitted with the nuts and washers to hold in the rubber stopper. The rod should extend about 10 cm above the height of the flask and the whole apparatus fitted with the suitable cover as illustrated in figure H.1.

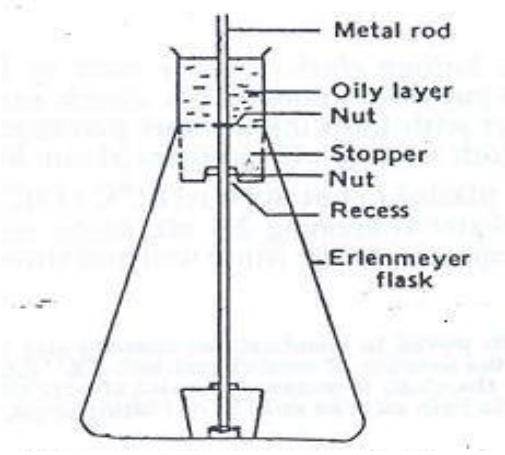

Figure 1 — Wildman trap flask

ii) Schleicher and Schuell (S and S) No. 8 filter paper ruled with lines 5 mm apart.

iii) Buchner funnel fitted to vacuum pump and suction flask.

iv) Wide field stereoscopic microscope for filth examination. Microscope should have the following minimum specification:

1) binocular body with inclined oculars

2) sliding or revolving nose-piece to accommodate three objectives

3) three parfocal objectives 1X, 3X and 6X or 7.5X

4) paired 10X and paired 15X wide field oculars mounted on base and capable of illumination by transmitted light

(e) Petri dishes to hold paper for examination.

F.3.1.2 Reagent

Castor Oil, heptane

G.3.1.1 Procedure

Place 200 g of any tomato product except paste (where 100 g is used) in a 2-L flask. Add 20 mL castor oil and mix well. Add enough hot tap water, about 70°C (158°F) to fill the flask. Stir several times to remove air bubbles which will cause tomato tissues to rise. Let stand with occasional gentle stirring for 30 min, and then trap off in a beaker. Wash neck of flask with heptane to remove adhering castor oil. Add a little more hot water to flask stir and let stand 10 min and trap off again. Filter trapped off portion. Thoroughly wash beaker, sides of funnel and paper to dissolve castor oil and speed filtration. Examine paper at 30X using stereomicroscope.

F.3.2 Determination of heavy filth

F.3.2.1 Apparatus

i) 2-L separator

ii) Heptane

iii) 10XX bolting cloth (see NOTE)

iv) Hirsch Funnel

v) Stereomicroscope

vi) Ring Stand

F.3.2.2 Procedure

Thoroughly mix sample and transfer 100 g to a 2-L separator. Add 20 mL to 25 mL heptane and sake thoroughly, releasing pressure as necessary. Fill separator with water in such a manner as to produce maximum agitation. Place separator in ring stand and let settle. At 15-min intervals during 1 h, drain 15 mL to 20 mL from separator with rotary motion to facilitate settling out of fly eggs and maggots. Filter through 10XX bolting cloth, (pre-treated and dried) in Hirsch funnel. Examine for eggs and maggots under stereomicroscope at about draining for an additional hour.

F.3.2.3 Treatment and dyeing of bolting cloth

G.3.2.3.1 Prepare discs by boiling large squares of silk before cutting into circles. Circles cut from unboiled silk shrink and become misshapen. Make rulings about 5 mm to 7mm apart with India ink or other permanent marking material using a fine pen on boiled and pressed cloth marked off in circles about 85 mm (3.3 in) in diameter.

G.3.2.3.2 When needed, dye ruled cloth by placing in hot 80^{0}C to 88^{0}C (176^{0}F to 185^{0}F) solution of 50 mg FD and C Blue No. 1 in L water containing 2.5 mL acetic acid and holding at this temperature for about 15 min with frequent stirring. Rinse well and store in the dark.

NOTE The bolting cloth is a silk cloth woven to standard size opening and thickness which is used in flour mills. The number of the silk specifies the number of mesh/linear inch. 'X', 'XX', or 'XXX' after numbers refers to the thickness of thread from which the cloth is woven. This also affects the size of openings in the cloth. Therefore follow designation exactly as to both number and 'X' or bolting cloth.

End of document