



Federation of Malysia



EDICT OF GOVERNMENT

In order to promote public education and public safety, equal justice for all, a better informed citizenry, the rule of law, world trade and world peace, this legal document is hereby made available on a noncommercial basis, as it is the right of all humans to know and speak the laws that govern them.

MS 459 (1976) (English): Specification for Fresh Bananas



BLANK PAGE



MALAYSIAN STANDARD

MS 459 : 1976

**SPECIFICATION FOR
FRESH BANANAS**



SIRIM

STANDARDS & INDUSTRIAL RESEARCH INSTITUTE OF MALAYSIA

© Copyright

SPECIFICATION FOR FRESH BANANAS

MS3.61:1976

© Copyright

Standards and Industrial Research Institute of Malaysia

LOT 10810, PHASE 3, FEDERAL HIGHWAY,

P.O. BOX 35, SHAH ALAM,

SELANGOR, MALAYSIA.

Telegrams: SIRIMSEC SHAH ALAM Telephone: 362601—4

MS3.61 : 1976

This Malaysian Standard, which had been approved by the Agricultural Industry Standards Committee and endorsed by the Council of the Standards and Industrial Research Institute of Malaysia (SIRIM) was published under the authority of the SIRIM Council in December, 1976.

SIRIM wishes to draw attention to the fact that this Malaysian Standard does not purport to include all the necessary provisions of a contract.

The Malaysian Standards are subject to periodical review to keep abreast of progress in the industries concerned. Suggestions for improvements will be recorded and in due course brought to the notice of the Committees charged with the revision of the standards to which they refer.

The following references relate to the work on this standard:

Committee reference : SIM/I/3/001 Vol.7

Draft for comment : D78(ISC3)

CONTENTS

		Page
	Committee representation ...	4
	Foreword ...	6
1	Scope ...	7
2	Definitions ...	7
3	Types ...	9
4	General requirements ...	10
5	Minimum requirements for size of fruit	11
6	Grade requirements ...	11
7	Allowance for grade variations ...	12
8	Packing and marking ...	13
9	Sampling ...	14
10	Compliance with the specification ...	14
Tables		
1	Minimum size requirements, according to cultivar ...	11
2	Grades for bananas ...	12
A1	Colour chart for Pisang Embon ...	17
A2	Colour chart for Pisang Rastali ...	19
A3	Colour chart for Pisang Berangan ...	21

MS3.61 : 1976

	Page
A4 Colour chart for Pisang Emas Kechil	23
A5 Colour chart for Pisang Emas Besar	25
Appendix A Standard ripeness index of bananas	15

Committee representation

The Agricultural Industry Standards Committee under whose supervision this Malaysian Standard was prepared, comprises representatives from the following Government Ministries, trade, commerce and manufacturer associations and scientific and professional bodies.

Federal Agricultural Marketing Authority
 Federal Land Development Authority
 Federation of Malaysian Manufacturers
 Malay Timber Industry Association
 Malayan Edible Oil Manufacturers' Association
 Malayan Tobacco Manufacturers Association
 Malaysian Agricultural Research and Development Institute
 Malaysian International Chamber of Commerce and Industry
 Malaysian Medical Association
 Malaysian Pineapple Industry Board
 Malaysian Plywood Manufacturers' Association
 Malaysian Scientific Association
 Ministry of Agriculture and Rural Development
 (Department of Agriculture)
 (Department of Fisheries)
 (Department of Food Technology)
 Ministry of Education (College of Agriculture Malaysia)
 Ministry of Primary Industry (Forest Research Institute)
 Ministry of Science, Technology and Environment
 (Department of Chemistry)
 Ministry of Trade and Industry
 Oil Palm Growers' Council of Malaysia
 Rubber Producers' Council of Malaysia
 Rubber Research Institute of Malaysia
 Timber Trade Federation of Malaysia
 University of Malaya

The Technical Committee on Fruits and Vegetables which prepared this Malaysian Standard consists of representatives from the following organizations:

Consumer Association
 Malayan Agri-Horticultural Association
 Malayan Pineapple Industry Board
 Malaysian International Chamber of Commerce and Industry
 Ministry of Agriculture and Rural Development
 (Federal Agricultural Marketing Authority)
 Ministry of Agriculture and Rural Development
 (Department of Agriculture)
 Ministry of Agriculture and Rural Development
 (Department of Food Technology)
 Ministry of Agriculture and Rural Development
 (Malaysian Agricultural Research and Development Institute -
 MARDI)
 Ministry of Defence
 Ministry of Health (Institute for Medical Research)
 Ministry of Trade and Industry
 (Federal Industrial Development Authority - FIDA)
 National Farmers' Association
 Universiti Pertanian Malaysia
 University of Malaya

FOREWORD

This Malaysian Standard Specification was prepared by the Technical Committee on Fruits and Vegetables under the authority of the Agricultural Industry Standards Committee.

It is envisaged that by the adoption of suitable grades for Malaysian bananas, an improvement in marketable quality as well as an increased uniformity of 'size' of fruit may be achieved. By achieving reasonable uniformity in fruit-size, packing, transport and marketing procedures would then be greatly facilitated.

In the preparation of this Malaysian Standard, reference was made to the following:

- (1) PTS 051-03.00 1970 Philippine Trade Standard Specification for Bananas - (2nd revision);
- (2) Y-B-91d. Bananas Fresh - Federal Specification (1965) Amendment - 2 (1966), USA;
- (3) Queensland Banana Grade Standards - 1964. Department of Primary Industries, Brisbane.

Acknowledgement is made to Agricultural Products Utilization Unit of MARDI for the preparation of the 'Standard Colour Index Numbers for Banana Ripening Colour Charts'.

SPECIFICATION

1. SCOPE

- 1.1 This standard specification prescribes the requirements of the grades, size, maturity and packing for fresh bananas (*Musa paradisiaca* sub - spp. *M. Sapientum*).

2. DEFINITIONS

- 2.1 For the purpose of this standard specification, the following definitions shall apply:
- 2.1.1 *Circumference.* The greatest circumference of an individual fruit, measured at right angles to the longitudinal axis.
- 2.1.2 *Length.* Means the length measured along the outside of the curve from the basal end of an individual fruit to the apex.
- 2.1.3 *Finger.* An individual banana fruit.
- 2.1.4 *Hand.* The full complement of fingers found attached to the one section of the peduncle.
- 2.1.5 *Cluster.* A sub-division of a hand, containing several fingers.

MS3.61 : 1976

- 2.1.6 *Mature*. Having reached the stage of full development which will ensure a proper completion of the ripening process.
- 2.1.7 *On the turn*. Bananas having the description given in stages 2 and 3 of the Standard Ripeness Index (appendix A).
- 2.1.8 *Ripe*. Bananas having the description given in stages 4, 5 and 6 of the Standard Ripeness Index (appendix A).
- 2.1.4 *Fully ripe*. Bananas where the pulp is soft and atomatic.
- 2.1.10 *Overripe*. Bananas at the stage of ripeness comparable to 8 of the Standard Ripeness Index (appendix A) or where the pulp is excessively soft or discoloured and passed its commercial utility.
- 2.1.11 *Blemishes*. Extraneously induced superficial spotting and/or pitting on the peel which will not affect the eating or shipping qualities of the fruit.
- 2.1.12 *Blemished fruit*. Fruit with more than 5% of its surface area covered with blemishes.
- 2.1.13 *Bruises*. Any mechanical injury that causes the peel of the individual banana to become soft and/or discoloured.

- 2.1.14 *Damage* Any defect or injury which materially affects the appearance, eating, or shipping qualities of the banana.
- 2.1.15 *Growth cracks*. Breaks in the peel, resulting from splitting or tearing.
- 2.1.16 *Clean*. Free of dirt, stains, other foreign materials and odours.
- 2.1.17 *Off-size fruit*. Fruit failing to meet with the minimum size requirements for the variety.
- 2.1.18 *Cultivar*. A cultivated variety of banana.

3. TYPES

3.1 This specification covers the following cultivars of bananas:

- (a) *Embon*;
- (b) *Rastali*;
- (c) *Berangan*;
- (d) *Emas kecil*;
- (e) *Emas besar*.

MS3.61 : 1976

4. GENERAL REQUIREMENTS

- 4.1 Bananas shall constitute sound, clean, well-formed, mature but not fully ripe or overripe fruit, and shall be reasonably free from growth cracks, damage blemishes and bruises.
- 4.2 The fruit shall be free from disease, dead and living insects, fungal contamination and storage-disorders.
- 4.3 Bananas shall be in cut-hands or clusters.
- 4.4 Bananas in hands or clusters shall show a smooth cut where detached from the stalk and shall be free from portions of stalk.
- 4.5 Minimum maturity requirement
 - 4.5.1 Bananas shall not be below the named stage of ripeness at harvesting, unless agreed to otherwise:

Stage 1(a) of Standard Ripeness Index

- 4.5.2 The minimum maturity requirement for retail presentation/display is as follows:

Stage 3 of Standard Ripeness Index

5. MINIMUM REQUIREMENTS FOR SIZE OF FRUIT

- 5.1 The following shall be the minimum size requirements for bananas, according to the variety, and which shall be decided for individual hands/clusters, by the average size of three fingers taken from the middle of the hand or cluster:

Table 1. Minimum size requirements,
according to cultivar

Cultivar (1)	Minimum size requirements*	
	Circumference (cm) (2)	Length (cm) (3)
Embon	10.0 cm	15.0 cm
Rastali	9.5 cm	11.0 cm
Berangan	9.0 cm	13.0 cm
Emas kecil	7.5 cm	8.5 cm
Emas besar	10.0 cm	11.0 cm

6. GRADE REQUIREMENTS

- 6.1 There shall be two grades for bananas for local retail display/presentation, Grade 1 and Grade 2.

* Figures subject to further review.

MS3.61 : 1976

- 6.2 Bananas shall be graded in accordance with the requirements of table 2 below:

Table 2. Grades for bananas

Factor (1)	Tolerance permitted per hand/cluster (2)	
	(a) Grade 1 (satu)	(b) Grade 2 (dua)
Blemished fruit, % max. by number	5.0	10.0
Damaged bananas as % max. by number	Nil	5.0
Off-size fruit, % max. by number	5	10

- 6.3 Bananas not graded to the minimum grade requirements set in table 2 above, shall be categorised:

'Unclassified bananas'

7. ALLOWANCE FOR GRADE VARIATIONS

- 7.1 Not more than 2% by count of clusters/hands, in any one batch or consignment, shall fail to comply with the designated grade, including

therein, not more than 1% failing to meet with the minimum maturity requirements which seriously affects edible quality.

- 7.2 Not more than 5% by count, of the clusters/hands in the batch or consignment shall fail to meet the requirements for trimming of fruit.

8. PACKING AND MARKING

8.1 Packaging

- 8.1.1 Where packaging is necessary, bananas shall be packed in the following way:

In clusters, hands or in combinations of both, packed in containers of suitable material such as corrugated paper (or equivalent) of minimum 12 kg nett weight each.

- 8.1.2 No pack shall consist of bananas of more than one grade.

- 8.2 Each individual pack shall be marked to give the following information:

- (a) name of the cultivar;
- (b) name and address of the producer (and/or exporter);

MS3.61 : 1976

(c) nett weight in kg;

(d) grade: ____ .

9. SAMPLING

- 9.1 Sampling shall be carried out in accordance with the procedures laid down in MS3.8 : 1973 'Method of sampling fresh fruits'.

10. COMPLIANCE WITH THE SPECIFICATION

- 10.1 When found to conform with the requirements specified in this Malaysian Standard Specification, the lot, batch, or consignment from which the samples have been drawn, shall be deemed to comply with this Malaysian Standard Specification.

Appendix A

Standard ripeness index for bananas
(One table is given to each variety)

- A1. The tables (A1 to A5) give the colour changes that take place in the peel. For convenience the progression from hard green to over-ripe has been divided into eight stages, numbered from 1 to 8.

Stage (1)	Peel colour (2)	Remarks (3)
1	Green	Hard, rigid; no ripening
1(a) Sprung	Green	Bends slightly, ripening started
2	Green; trace of yellow	} Fruit on the turn
3	More green than yellow	
4	More yellow than green	
5	Yellow; with green tip	
6	Full yellow	Peels readily; firm ripe
7	Yellow; lightly flecked with brown	Fully ripe; aromatic
8	Yellow with increasing brown areas	Over-ripe; pulp very soft and darkening, highly aromatic

- A2. These colour standards are for bananas that have not been chilled and have been ripened under optimum conditions.

MS3.61 : 1976

Standard colour index numbers for Banana ripening
Pisang Embun

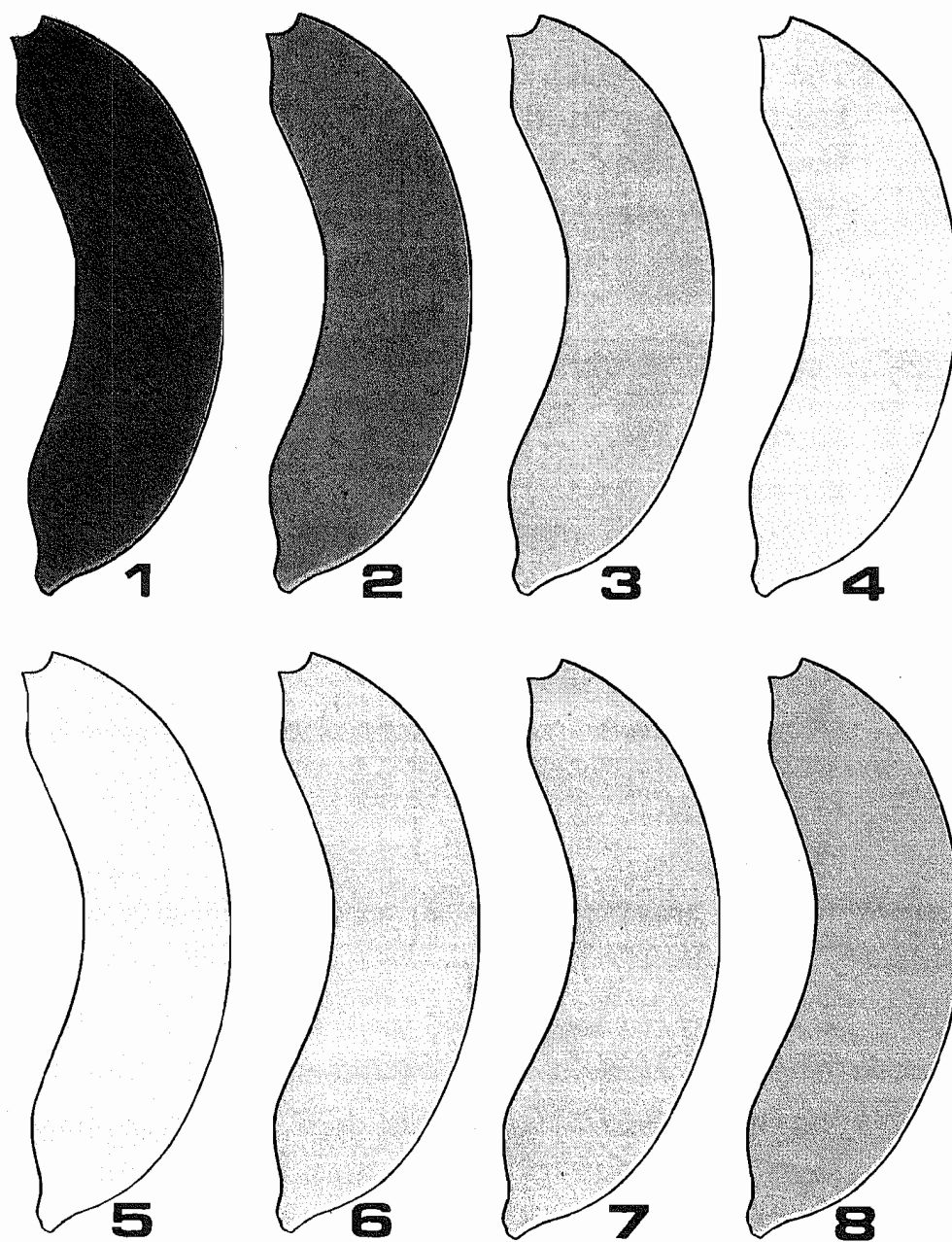


Table A1. Colour chart for Pisang Embun

Colour index number	Peel colour	Horticultural colour chart*	Remarks
1.	All green	Scheeles green 860/1, Page 115	Hard, rigid, no
2.	Green with trace of yellow	Pod green 061, Page 120	Fruit on the turn
3.	More green than yellow	Uranium green 63/2, Page 63	
4.	More yellow than green	Empire yellow 603/1, Page 66	
5.	Yellow with green tip	Empire yellow 603/1, Page 66	
6.	All yellow	Empire yellow 603/1, Page 66	Peels easily, firm ripe
7.	Yellow slightly flecked with brown	Empire yellow 603/1, Page 66	Fully ripe, aromatic
8.	Yellow with increasing brown	Maize yellow 607/1, Page 69	Over-ripe pulp, very soft and darkening, highly aromatic

* The British Colour Council in collaboration with the Royal Horticultural Society, Horticultural Colour Chart, Volumes I and II.

MS3.61 : 1976

Standard colour index numbers for Banana ripening
Pisang Rastali

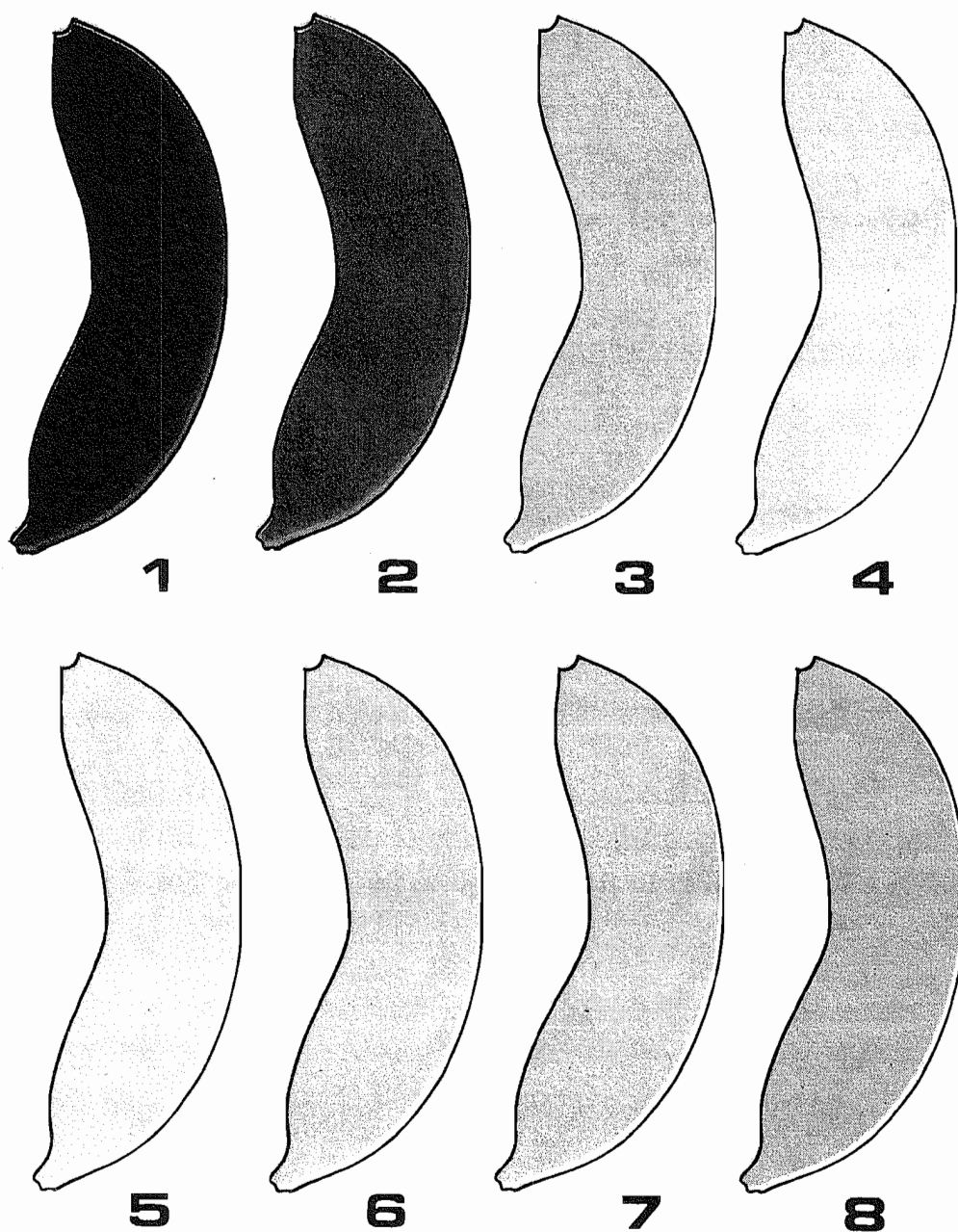


Table A2. Colour chart for Pisang Rastali

Colour index number	Peel colour	Horticultural colour chart*	Remarks
1.	All green	Scheeles green 860/1, Page 175	Hard, rigid, no ripening
2.	Green with trace of yellow	Scheeles green 860/3, Page 157	Fruit on the turn
3.	More green than yellow	Uranium green 63/1, Page 63	
4.	More yellow than green	Lemon yellow 4/2, Page 4	
5.	Yellow with green tip	Lemon yellow 4/1, Page 4	
6.	All yellow	Lemon yellow 4/1, Page 4	Peels readily, firm ripe
7.	Yellow slightly flecked with brown	Buttercup yellow 5/1, Page 5	Fully ripe, aromatic
8.	Yellow with increasing brown	Buttercup yellow 5, Page 5	Over-ripe, pulp very soft and darkening, highly aromatic

* The British Colour Council in collaboration with the Royal Horticultural Society, Horticultural Colour Chart, Volumes I and II.

MS3.61 : 1976

Standard colour index numbers for Banana ripening
Pisang Berangan

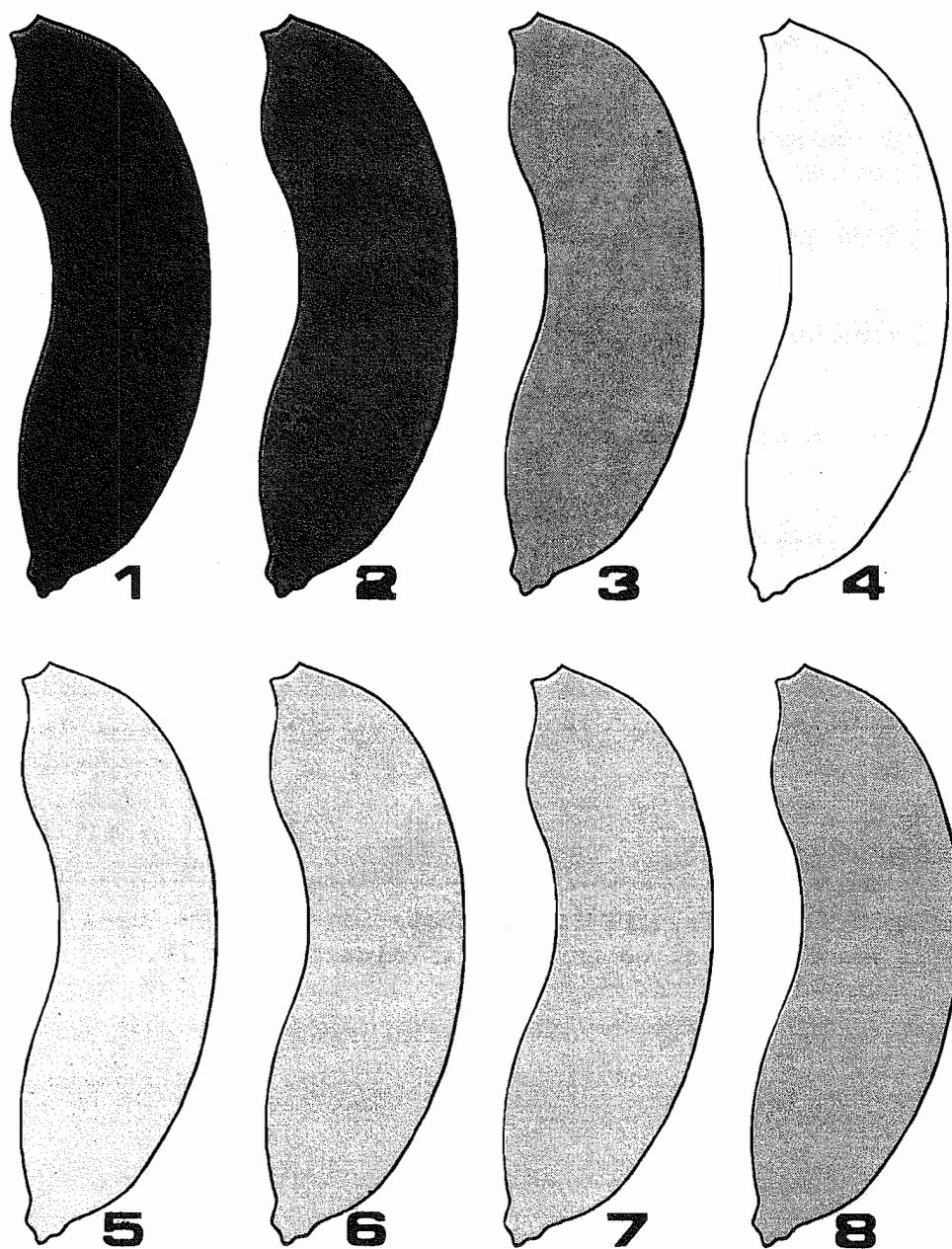


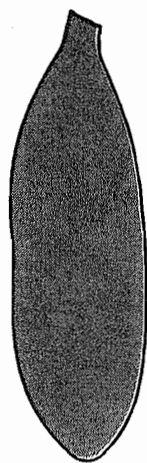
Table A5. Colour chart for Pisang Emas Besar

Colour index number	Peel colour	Horticultural colour chart*	Remarks
1.	All green	Scheeles green 860/2, Page 175	Hard, rigid, no ripening
2.	Green with trace of yellow	Pod green 061, Page 120	Fruit on the turn
3.	More green than yellow	Uranium green 632, Page 63	
4.	More yellow than green	Barium yellow 503, Page 131	
5.	Yellow with green tip	Chrome yellow 605, Page 144	
6.	All yellow	Indian yellow 6/2, Page 6	Peels readily, firm ripe
7.	Yellow slightly flecked with brown	Indian yellow 6/2, Page 6	Fully ripe, aromatic
8.	Yellow with increasing brown	Indian yellow 6/2, Page 6	Over-ripe, pulp very soft and darkening, highly aromatic

* The British Colour Council in collaboration with the Royal Horticultural Society, Horticultural Colour Chart, Volumes I and II.

MS3.61 : 1976

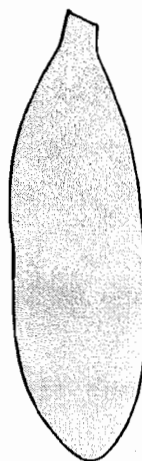
Standard colour index numbers for Banana ripening
Pisang Emas Kecil



1



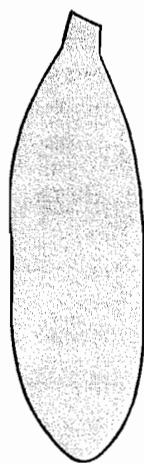
2



3



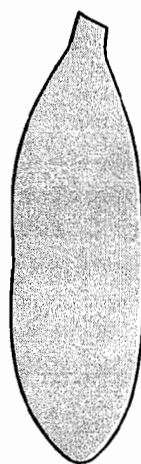
4



5



6



7



8

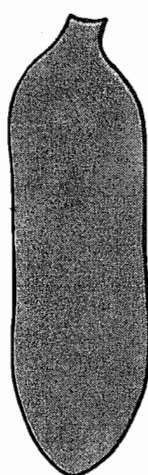
Table A4. Colour chart for Pisang Emas Kecil

Colour index number	Peel colour	Horticultural colour chart*	Remarks
1.	All green	Scheeles green 860/2, Page 175	Hard, rigid, no ripening
2.	Green with trace of yellow	Pod green 061/1, Page 120	Fruit on the turn
3.	More green than yellow	Uranium green 63/2, Page 63	
4.	More yellow than green	Aureolin 3/2, Page 3	
5.	Yellow with green tip	Lemon yellow 4/2, Page 4	
6.	All yellow	Buttercup yellow 5/2, Page 5	Peels readily, firm ripe
7.	Yellow slightly flecked with brown	Indian yellow 6/2, Page 6	Fully ripe, aromatic
8.	Yellow with increasing brown	Empire yellow 603/1, Page 66	Over-ripe, pulp very soft and darkening highly aromatic

* The British Colour Council in collaboration with the Royal Horticultural Society, Horticultural Colour Chart, Volumes I and II.

MS3.61 : 1976

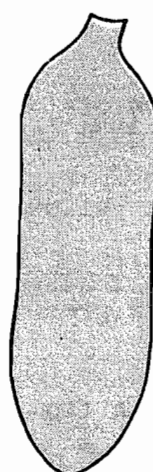
Standard colour index number for Banana ripening
Pisang Emas Besar



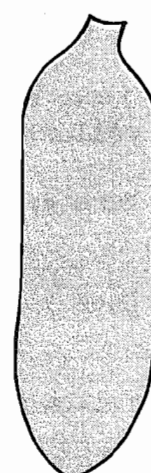
1



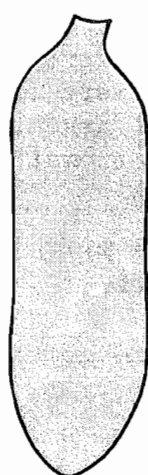
2



3



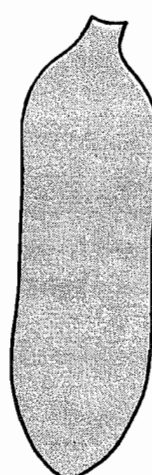
4



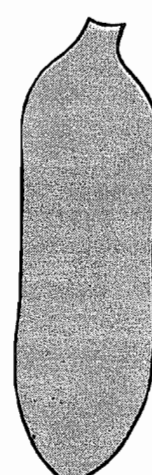
5



6



7



8

Table A3. Colour chart for Pisang Berangan

Colour index number	Peel colour	Horticultural colour chart*	Remarks
1.	All green	Scheeles green 860/1, Page 175	Hard, rigid, no ripening
2.	Green with trace of yellow	Scheeles green 860/2, Page 175 } Pea green 61/1, Page 61	Fruit on the turn
3.	More green than yellow		
4.	More yellow than green		
5.	Yellow with green tip	Lemon yellow 4/2, Page 4	
6.	All yellow	Chrome yellow 605/1, Page 144	Peels readily, firm ripe
7.	Yellow slightly flecked with brown	Chinese yellow 606/1, Page 68	Fully ripe, aromatic
8.	Yellow with increasing brown	Maize yellow 607/1, Page 69	Over-ripe, pulp very soft and darkening, highly aromatic

* The British Colour Council in collaboration with the Royal Horticultural Society, Horticultural Colour Chart, Volumes I and II.

TANDA-TANDA STANDARD SIRIM

Tanda-tanda Standard SIRIM seperti yang tertera di bawah adalah tanda-tanda pengesahan dagangan berdaftar. Tanda-tanda ini hanya boleh digunakan oleh mereka yang dilesenkan di bawah skim tanda pengesahan yang dijalankan oleh SIRIM mengikut nombor Standard Malaysia yang berkaitan. Kewujudan tanda-tanda ini pada atau berkaitan dengan sesuatu barangan adalah sebagai jaminan bahawa barangan tersebut telah dikeluarkan melalui satu sistem penyeliaan, kawalan dan ujian, yang dijalankan semasa pengeluaran. Ini termasuk pemeriksaan berkala kerja-kerja pengeluaran menurut skim tanda pengesahan SIRIM yang dibentuk untuk menentukan bahawa barangan tersebut menepati Standard Malaysia.

Keterangan-keterangan lanjut mengenai syarat-syarat lesen boleh didapati dari:

Ketua Pengarah,
Institut Standard dan Penyelidikan Perindustrian Malaysia,
Persiaran Dato' Menteri, Seksyen 2, Peti Surat 7035,
40911 Shah Alam,
Selangor .



SIRIM STANDARD MARKS

The SIRIM Standard Marks shown above are registered certification trade marks. They may be used only by those licensed under the certification marking scheme operated by SIRIM and in conjunction with the relevant Malaysian Standard number. The presence of these Marks on or in relation to a product is an assurance that the goods have been produced under a system of supervision, control and testing, operated during production, and including periodical inspection of the producer's works in accordance with the certification marking scheme of SIRIM designed to ensure compliance with a Malaysian Standard.

Further particulars of the terms of licence may be obtained from:

Director-General,
Standards and Industrial Research Institute of Malaysia,
Persiaran Dato' Menteri, Section 2, P.O. Box 7035,
40911 Shah Alam,
Selangor .

INSTITUT STANDARD DAN PENYELIDIKAN PERINDUSTRIAN MALAYSIA

Institut Standard dan Penyelidikan Perindustrian Malaysia (SIRIM) telah ditubuhkan hasil dari cantuman Institut Piawaian Malaysia (SIM) dengan Institut Negara bagi Penyelidikan Sains dan Perusahaan (NISIR) di bawah Undang-Undang Malaysia Akta 157 pada 16hb. September, 1975: Akta Institut Standard dan Penyelidikan Perindustrian Malaysia (Perbadanan) 1975. Institut ini diletakkan dengan kuasa untuk memaju dan menjalankan penyelidikan perindustrian dan untuk menyedia dan memajukan standard-standard bagi barangan-barangan, proses-proses, amalan-amalan dan perkhidmatan-perkhidmatan; dan bagi mengadakan peruntukan bagi perkara-perkara yang bersampingan atau berkaitan dengan maksud-maksud itu.

Satu daripada tugas-tugas Institut ini adalah menyediakan Standard-Standard Malaysia dalam bentuk penentuan-penentuan bagi bahan-bahan, keluaran-keluaran, keadaan-keadaan ujian, kod-kod amalan yang sempurna dan selamat, sistem penamaan, dll. Standard-Standard Malaysia disediakan oleh jawatankuasa-jawatankuasa perwakilan yang menyelaras keupayaan pengilangan dan kecekapan pengeluaran dengan kehendak-kehendak yang munasabah dari pengguna. Ia menuju ke arah mencapai kesesuaian bagi maksud, memudahkan pengeluaran dan pengedaran, kebolehsalingtukaran gantian dan pelbagai pilihan yang mencukupi tanpa pembaziran.

Standard-Standard Malaysia disediakan hanya setelah penyiasatan yang lengkap menunjukkan bahawa sesuatu projek itu disahkan sebagai yang dikehendaki dan berpadanan dengan usaha yang terlibat. Hasil ini berasaskan persetujuan sukarela, dan memberi pertimbangan kepada kepentingan pengeluar dan pengguna. Standard-Standard Malaysia adalah sukarela kecuali ia dimestikan oleh badan-badan berkuasa melalui peraturan-peraturan, undang-undang persekutuan dan tempatan atau cara-cara lain yang sebegini.

Institut ini beroperasi semata-mata berasaskan tanpa keuntungan. Ia adalah satu badan yang menerima bantuan kewangan dari Kerajaan, kumpulan wang dari bayaran keahlian, hasil dari jualan Standard-Standard dan terbitan-terbitan lain, bayaran-bayaran ujian dan bayaran-bayaran lesen untuk mengguna Tanda Pengesahan SIRIM dan kegiatan-kegiatan lain yang berhubung dengan Penstandardan, Penyelidikan Perindustrian dan Khidmat Perunding.

STANDARDS AND INDUSTRIAL RESEARCH INSTITUTE OF MALAYSIA

The Standards and Industrial Research Institute of Malaysia (SIRIM) is established with the merger of the Standards Institution of Malaysia (SIM) and the National Institute for Scientific and Industrial Research (NISIR) under the Laws of Malaysia Act 157 on 16th September, 1975: Standards and Industrial Research Institute of Malaysia (Incorporation) Act 1975. The Institute is vested with the power to provide for the promotion and undertaking of industrial research and for the preparation and promotion of standards for commodities, processes, practices and services; and to provide for matters incidental to or connected with those purposes.

One of the functions of the Institute is to prepare Malaysian Standards in the form of specifications for materials and products, methods of testing, codes of sound and safe practice, nomenclature, etc. Malaysian Standards are prepared by representative committees which co-ordinate manufacturing capacity and production efficiency with the user's reasonable needs. They seek to achieve fitness for purpose, simplified production and distribution, replacement interchangeability, and adequate variety of choice without wasteful diversity.

Malaysian Standards are prepared only after a full enquiry has shown that the project is endorsed as a desirable one and worth the effort involved. The work is based on voluntary agreement, and recognition of the community of interest of producer and consumer. The use of Malaysian Standards is voluntary except in so far as they are made mandatory by statutory authorities by means of regulations, federal and local by-laws or any other similar ways.

The Institute operates entirely on a non-profit basis. It is a grant aided body receiving financial aid from the Government, funds from membership subscriptions and proceeds from sales of Standards and other publications, testing fees and licence fees for the use of SIRIM Certification Mark and other activities associated with Standardization, Industrial Research and Consultancy Services.