THAI AGRICULTURAL STANDARD
TAS 21-2013

SUGAR APPLE

National Bureau of Agricultural Commodity and Food Standards
Ministry of Agriculture and Cooperatives

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Thailand has the potential to produce good quality sugar apple which is favourable among consumers. The establishment of standard for sugar apple is important to the development of its quality and safety in order to gain more recognition in domestic and international trade. Thus, the Agricultural Standards Committee deems it necessary to establish the Thai Agricultural Standard for Sugar Apple.

This Standard is based on the following document:

NOTIFICATION OF THE MINISTRY OF AGRICULTURE AND COOPERATIVES
SUBJECT: THAI AGRICULTURAL STANDARD: SUGAR APPLE
UNDER THE AGRICULTURAL STANDARDS ACT B.E. 2551 (2008)

Whereas the Agricultural Standards Committee, by the decision of the fourth
session of B.E. 2556 (2013) on 28 August B.E. 2556 (2013), deems it necessary to establish
an agricultural standard for sugar apple as a voluntary standard in accordance with the
Agricultural Standards Act B.E. 2551 (2008) to promote such agricultural commodity to meet
its standard on quality and safety.

By virtue of Section 5, Section 15 and Section 16 of the Agricultural
Standards Act B.E. 2551(2008), the Minister of Agriculture and Cooperatives hereby issues
this Notification on the Establishment of Thai Agricultural Standard: Sugar Apple (TAS 21-
2013) as a voluntary standard, details of which are attached herewith.

Notified on 16 October B.E. 2556 (2013)

(Mr. Yukol Limlamthong)
Minister of Agriculture and Cooperatives
THAI AGRICULTURAL STANDARD

SUGAR APPLE

1. SCOPE

1.1 This standard applies to commercial varieties of sugar apple grown from *Annona squamosa* L., and hybrids between *A. cherimola* Mill. and *A. squamosa* L. of the Annonaceae family for fresh consumption.

1.2 This standard does not apply to sugar apple for industrial processing.

2. QUALITY

2.1 Minimum requirements

2.1.1 In all classes, subject to the special provisions for each class and the tolerances allowed, the sugar apple shall be as follows:

(1) Whole, with or without peduncle intact. In case the peduncle is intact, its length shall not be longer than 1.5 cm;

(2) characteristic of the variety;

(3) fresh;

(4) free of abrasion and bruising marks rendering it unfit for consumption, no deterioration or rotting;

(5) clean, practically free from any visible foreign matter;

(6) free of crack;

(7) practically free of pest affecting the external appearance of sugar apple;

(8) free of damage caused by pests affecting flesh quality;

(9) free of abnormal external moisture, excluding condensation following removal from cold storage;

(10) free of damage caused by low and/or high temperature;

(11) free of any foreign smell and/or taste.

2.1.2 Sugar apple shall be at the appropriate harvesting period depending on variety, season and planting location, being carefully handled on postharvest, packing and transporting in order to reach the place of destination in a satisfactory condition.
2.2 Classification

Sugar apple is classified into 3 classes as follows:

2.2.1 Extra Class

Sugar apples in this class shall be of superior quality with peduncle, free of abnormality in shape, free of skin defects with the exception of very slight superficial defects provided that these do not affect the external appearance, the flesh quality, the keeping quality and presentation in the package.

2.2.2 Class I

Sugar apple in this class shall be of good quality. The following defects may be allowed:

(1) slight defect in shape;

(2) slight skin defects due to scratch, shallow scars and damage caused by pests provided that the total skin defect area shall not exceed 5% of the fruit surface.

The defects in Section 2.2.2(1) or 2.2.2(2) shall not affect the external appearance, the flesh quality, the keeping quality and presentation in the package.

2.2.3 Class II

This class includes sugar apple which does not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified in Section 2.1. The following defects may be allowed:

(1) defect in shape;

(2) skin defects due to scratch, shallow scars and damage caused by pest provided that the total skin defect area shall not exceed 10% of the fruit surface.

The defects in Section 2.2.3(1) or 2.2.3(2) shall not affect the external appearance, the flesh quality, the keeping quality and presentation in the package.

3. SIZE

Sugar apple sizes are determined by weight as shown in Table1:
Table 1 Sizes of Sugar Apple$^{1/}$

<table>
<thead>
<tr>
<th>Size code</th>
<th>Weight per fruit (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt; 650</td>
</tr>
<tr>
<td>2</td>
<td>&gt; 550 to 650</td>
</tr>
<tr>
<td>3</td>
<td>&gt; 450 to 550</td>
</tr>
<tr>
<td>4</td>
<td>&gt; 350 to 450</td>
</tr>
<tr>
<td>5</td>
<td>&gt; 250 to 350</td>
</tr>
<tr>
<td>6</td>
<td>&gt; 200 to 250</td>
</tr>
<tr>
<td>7</td>
<td>&gt; 150 to 200</td>
</tr>
<tr>
<td>8</td>
<td>100 to 150</td>
</tr>
</tbody>
</table>

Note: Quality classification and sizes are jointly determined by terms of trade. Trading partners may identify classes differently depending on their requirements or seasonal limitation.

4. TOLERANCES

Tolerances according to unsatisfied quality and size shall be allowed in each package as follows:

4.1 Quality tolerances

4.1.1 Extra Class

Five percent by number or weight not satisfying the requirements of the Extra Class (Section 2.2.1), but meeting those of Class I (Section 2.2.2) or, exceptionally, coming within the tolerances of Class I (Section 4.1.2).

4.1.2 Class I

Ten percent by number or weight not satisfying the requirements of Class I (Section 2.2.2), but meeting those of Class II (Section 2.2.3) or, exceptionally, coming within the tolerances of Class II (Section 4.1.3).

$^{1/}$ Data are obtained from producers, traders, exporters and a collaborative project with Kasetsart University, Kamphaeng Saen Campus on Indices of Important Characteristics for Quality Identifying Criteria, Classification and Sizing of Sugar Apple (B.E. 2555) of National Bureau of Agricultural Commodity and Food.
4.1.3 Class II

Ten percent by number or weight satisfying neither the requirements of Class II (Section 2.2.3), nor the minimum requirements (Section 2.1), with the exception of produce affected by bruised mark, rotting or other deterioration rendering it unfit for consumption.

4.2 Size tolerances

For all size codes, ten percent by number or weight corresponding to the size code immediately above or below that indicated on the package.

5. PACKAGING

5.1 Package

The package shall meet the quality grades, be hygienic and free of any foreign material and smell. It shall be able to protect sugar apple from damage to its quality. The materials used inside the package shall be clean and of good quality. The use of such materials, particularly of paper or stamps bearing trade specifications is allowed, provided that the printing or labelling has been done with non-toxic ink or glue.

5.2 Uniformity

The contents of each package shall be uniform and contain only sugar apple of the same variety, quality, size and colour. The visible part of the content of the package shall represent the entire package.

6. MARKING AND LABELLING

6.1 Consumer packages

The information shall appear on the package, wrapping material, fastening material, tag or on the fruit in a manner that is legible, clear, and indelible without false or deception as follows:

(1) Name of the produce

To be labelled as “sugar apple” and/or “name of the variety”

(2) Net weight;

(3) Class;

(4) Size code and/or size;

(5) Information of producer and/or importer and/or distributor

Indicate the name and address of producer or re-packer or distributor. Name and address of the head office of producer or re-packer may be given. If the produce is imported, importer’s name and address shall be indicated.

(6) Origin of produce

Indicate country of origin, except for domestic market.
(7) Language

Label of produce for domestic market shall be in Thai, however, foreign language may also be added. Label of produce for export can be in foreign language.

6.2 Non-retail containers

The information shall be shown on the accompanied documents of the shipment, on the label, or on the container in a manner that is legible, indelible without false or deception as follows:

1. Name of the produce;
   To be labelled as “sugar apple” and/or “name of the variety”
2. Net weight;
3. Class;
4. Size code and/or size;
5. Information of producer and/or importer and/or distributor
   Indicate the name and address of producer or re-packer or distributor. Name and address of the head office of producer or re-packer may be given. If the produce is imported, importer’s name and address shall be indicated.
6. Origin of produce
   Indicate country of origin, except for domestic market.

(7) Language

Label of produce for domestic market shall be in Thai, however, foreign language may also be added. Label of produce for export can be in foreign language.

6.3 Certification mark

The use of certification mark shall be complied with the Ministerial Regulation of B.E.2553 (2010) on Provisions Concerning Characteristics of Mark, Application and Display, issued under the Agricultural Standards Act B.E.2551 (2008), and the related Notifications of National Bureau of Agricultural Commodity and Food Standards.

7. CONTAMINANTS

Type and maximum level of contaminants in sugar apple shall be in compliance with the relevant laws and regulations\(^2\).

\(^2\) Ministerial Notification of Ministry of Public Health entitled Standards of Contaminants in Foods.
8. **PESTICIDE RESIDUES**

Type and maximum residue limit in pesticide residues in sugar apple shall be in compliance with the related laws and regulations[^2] and the requirements under the Thai Agricultural Standards on Pesticide Residues: Maximum Residue Limits (TAS 9002) and Pesticide Residues: Extraneous Maximum Residue Limits (TAS 9003).

9. **HYGIENE**

Sugar apple shall be produced under good hygienic practices in accordance with related standard on Good Agricultural Practices (GAP) or other equivalent standards.

10. **METHODS OF ANALYSIS AND SAMPLING**

10.1 Analytical methods are shown in Table 2:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Analytical methods</th>
<th>Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quality : minimum requirements</td>
<td>Visual inspection</td>
<td>-</td>
</tr>
<tr>
<td>(Section 2.1.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Defect in shape</td>
<td>Visual inspection</td>
<td>-</td>
</tr>
<tr>
<td>(Section 2.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Skin defects</td>
<td>Visual inspection</td>
<td>-</td>
</tr>
<tr>
<td>(Section 2.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Size</td>
<td>Weighing</td>
<td>Gravimetry</td>
</tr>
<tr>
<td>(Section 3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10.2 Sampling method

Sampling method shall be in accordance with the related laws, and provisions of the Agricultural Standard related to method of sampling.

[^2]: Ministerial Notification of Ministry of Public Health on Pesticide Residues in Foods
Appendix A
Photos of Sugar Apple

(a) Fai\(^2\) variety: spherical or heart shape

(b) Nang\(^2\) variety: spherical or heart shape

(c) Phet Pakchong\(^2\) variety: spherical or heart shape

Figure A.1 Examples of commercial sugar apple varieties (Section 1.1)

\(^2\) Fruit peel with deep grooves between aggregated fruits, loose ripe flesh
\(^2\) Fruit peel with shallow grooves between aggregated fruits, chewy ripe flesh, peel easily separated from flesh
\(^2\) Fruit peel with shallow grooves between aggregated fruits, chewy ripe flesh, peel easily separated from flesh
(a) Crack (Section 2.1.1 (6))

(b) Pest affecting external appearance (Section 2.1.1 (7))

(c) Damage caused by pests (Section 2.1.1 (8))

Figure A.2 Examples of sugar apples that do not meet the minimum requirements
Figure A.3 Examples of sugar apple fruit shape (Section 2.2.1 – 2.2.3)