

THAI AGRICULTURAL STANDARD
CODE OF PRACTICE ON INSPECTION AND RECEIVING OF DURIANS FOR
COLLECTING HOUSE AND PACKING HOUSE

1. SCOPE

- 1.1 This Thai agricultural standard establishes a code of practice on inspection and receiving of durians for a collecting house and a packing house to obtain the whole fruits that are mature according to the standard's requirements for the purposes of distribution, export and import.
- 1.2 This agricultural standard does not apply to:
- 1) the inspection and receiving of durians supplied for the preparation of ready-to-eat fresh pre-cut durians in accordance with the Thai Agricultural Standard on Good Manufacturing Practices for Ready-to-Eat Fresh Pre-Cut Fruits and Vegetables (TAS 9039); and
 - 2) the inspection and receiving of durians supplied for the production of quick frozen durians in accordance with the Thai Agricultural Standard on Good Manufacturing Practices for Frozen Durian (TAS 9046).

2. DEFINITIONS

For the purpose of this standard:

2.1 Collecting house

means a building or an area under the same control and management where hygienic practices can be managed for collection of durians after harvest. This involves post-harvest handlings of durians, starting from receiving, preparing, to sorting; and may or may not include packing, storage and transportation of durians prior to further distribution for sale or delivery to other packing houses or collecting houses.

2.2 Packing house

means a building or an area under the same control and management for durian packing. This involves post-harvest handlings of durians starting from receiving, preparing, sorting, peduncle trimming, packing, storage, to transportation.

2.3 Harvesting supervisor

means a person who is responsible for controlling the harvesting of durians from the trees, starting from assessing the maturity of durians, harvesting, sorting in the plantation, to transportation.

2.4 Lot

means a definite quantity of some commodity manufactured or produced under conditions, which are presumed uniform.

In this context, lot means a quantity of durians of the same variety, which is delivered at one time and has one of the following similar characteristics such as:

- production source or planting plot
- producer
- consignor

2.5 Mature durian

means a durian fruit that has attained an optimum physiological and morphological stage of development for harvest while enabling it to continue its ripening process.

3. CODES OF PRACTICE ON INSPECTION AND RECEIVING OF DURIAN FRUITS

Durians to be collected and packed shall be inspected and sorted as mature durians by the following practices:

3.1 INSPECTION AND RECEIVING OF DURIANS

Business operator of a collecting house or a packing house shall have measures in place to inspect the maturity of durians prior to further management process, as follows:

3.1.1 EXAMINATION OF EVIDENCE ON THE MANAGEMENT OF PRODUCTION SOURCE

Each lot of durians shall have information demonstrating that they come from production sources of durians where:

- 1) they have been certified or have evidence of compliance with the Thai Agricultural Standard on Good Agricultural Practices for Food Crops (TAS 9001) or have been certified with equivalent standards, or;
- 2) growers' records on the age of durians (from the full blooming date to the harvesting date) are available, or;
- 3) evidence (obtained from growers, business operators, laboratories, or government agency or private sector personnel) is available to demonstrate the results of the determination of dry matter content of durian pulp in accordance with Annex A (Section A.3) of this standard, or with the requirements for dry matter content of durian pulp according to TAS 3 (Thai Agricultural Standard on Durian).

3.1.2 INSPECTION OF EXTERNAL CHARACTERISTICS OF MATURE DURIANS

3.1.2.1 External characteristics of every single fruit in every lot shall be subject to visual inspection. Durians complying with the criteria of visual inspection of external characteristics set out in Annex A (Section A.1) are considered as mature durians.

3.1.2.2 Durians that do not comply with Section 3.1.2.1 shall be sorted out and kept separately in an area with a clear identification. These unqualified fruits are not allowed to enter into the management process. They are prohibited to be distributed

to both domestic and export markets for fresh consumption. Information on sorting and handling of such unqualified durians shall be recorded and kept as evidence.

3.1.3 DETERMINATION OF DRY MATTER CONTENT OF DURIAN PULP

The maturity of durians shall be verified by the determination of dry matter content of pulp of the fruits that have been sorted as mature durians according to Section 3.1.2.1, as follows:

3.1.3.1 Sampling and determination:

- 1) Prepare the lots for sampling according to the method provided in Annex B (Section B.2.1). At least 10 % of the total number of lots received per day shall be randomly tested for dry matter content (for example, if ten lots of durians are received per day, at least one lot shall be randomly tested). If the total number of lots received per day is less than ten, one lot shall be randomly tested. Durians from the lots that are subject to testing for dry matter content shall be sampled according to the method provided in Annex B (Section B.2.2 and B.2.3).
- 2) Determine the dry matter content according to the method provided in Annex A (Section A.2.1 or A.2.2). The determination may be carried out by business operators, government laboratories, or accredited laboratories. The test results shall be kept as evidence.

3.1.3.2 Decision criteria

The test results of dry matter content shall meet the requirements specified in Annex A (Section A.3), or the requirements of dry matter content according to TAS 3, as follows:

- 1) If the test results show that the percentage of dry matter content of the reduced sample according to Annex B (Section B.2.3.2) is greater than or equal to the specified requirements, such lot is considered as mature durians and shall be accepted for further management process.
- 2) If the test results show that the percentage of dry matter content of the reduced sample according to Annex B (Section B.2.3.2) is less than the specified requirements, one more fruit from the reduced sample previously taken according to Annex B (Section B.2.3.2) shall be determined for the percentage of dry matter content:
 - a) If the test results show that the percentage of dry matter content is less than the specified requirements, such lot shall not be accepted for further management process.
 - b) If the test results show that the percentage of dry matter content is greater than or equal to the specified requirements, durians of such lot shall be sorted once again according to Section 3.1.2. Randomly take one fruit from the re-sorted lot for the determination of dry matter content. If the test results show that the percentage of dry matter content is less than the specified requirements, the lot shall not be accepted for further management process. If the test results show that the percentage of dry matter content is greater than or equal to the specified requirements, durians of such lot are mature and shall be accepted for further management process.

The flow-chart for decision criteria is provided in Annex C (Figure C.1).

- 3.1.3.3 In case where durian varieties and their percentages of dry matter content are not specified in Annex A (Section A.3) or in TAS 3, the determination of dry matter content as outlined in Section 3.1.3.1 and Section 3.1.3.2 does not apply.

3.2 TRAINING

The business operator of a collecting house or a packing house shall provide trainings for relevant personnel as follows:

- 3.2.1 In case a harvesting supervisor is employed, that person shall have knowledge and skills and have the following evidence that he or she:
- 1) has been trained and passed a test on harvest of mature durians, or has been assessed for competency by the business operator of the collecting house or the packing house, or;
 - 2) has been trained or passed a test on harvest of mature durians conducted by relevant government agencies or entities recognized by relevant government agencies.
- 3.2.2 Personnel responsible for inspection of durian maturity shall be trained appropriately to perform their tasks accordingly. The training programs shall be organized by relevant government agencies or entities recognized by relevant government agencies. Evidence of the achievement of training is required.

Those who involve, directly or indirectly, in the inspection and receiving of durians shall be trained or coached and, shall be periodically assessed, at least once a year, for their achievement of training to ensure that they have knowledge and skills to perform their tasks properly.

In this regard, the topics of the training programs shall cover at least the following:

- 1) Techniques for visual inspection of the external characteristics of mature durians.
- 2) Techniques for the determination of dry matter content.

3.3 RECORDS FOR TRACEABILITY

Records on the inspection and receiving of durians in each lot shall be available. Such records shall be kept and be conveniently accessible for traceability.

- 3.3.1 Information shall be recorded, at least, as follows:
- 1) Date of receiving consignment (incoming durians) of a collecting house or a packing house
 - 2) Production sources (name of growers, collectors, packing houses, or consignors listed in the Approved Vendor List (AVL))
 - 3) Name of durian variety
 - 4) Quantity received of each lot of durians
 - 5) Results of the visual inspection of external characteristics of durians and the information on the sorting and handlings of durians that do not meet the criteria in Section 3.1.2.1
 - 6) Test results of dry matter content
 - 7) Training records
- 3.3.2 Records shall be kept for at least 2 years.

ANNEX A
(NORMATIVE)
EXAMINATION METHODS FOR MATURE DURIAN

The examinations of mature durian according to this standard are as follows:

A.1 VISUAL INSPECTION OF EXTERNAL CHARACTERISTICS OF MATURE DURIANS

A mature durian shall have the following characteristics:

- 1) Its peduncle is stiff, with rough touching skin and darker colour than normal. The joint area between the peduncle and the stem, so called, the “abscission layer” (or “Pling” in Thai) is swollen.
- 2) Its thorn tips are drying with brown colour and are springy when squeezed. The groove between the thorns becomes wider.
- 3) Its separation line along the middle of the husk of locule is more conspicuous, with the exception of ‘Kan Yao’ variety.
- 4) The colour of its husk will turn from bright green to brownish green or greyish green.

A.2 DETERMINATION OF DRY MATTER CONTENT OF DURIAN PULP

A.2.1 Method for determination of dry matter content using a hot air oven shall be practiced as follows:

- 1) Take the sampled fruits and cut them crosswise into pieces of 2.5 cm thick. The slices are randomly taken only from the middle part of the fruits. Cut the pulp from every locule and, again, cut them into small pieces of approximately 1 mm x 1 mm x 5 mm and mix them well. Randomly take approximately 10 g of the mixed pulp per fruit, and place it in a container.
- 2) Spread the durian pulp for an even thickness in the container. The sample is dried by using a hot air oven at 70° C for at least 48 hours until a constant weight is reached.
- 3) Calculate the percentage of dry matter content by using the following formula:

$$\text{DM (\%)} = \frac{m_2 \times 100}{m_1}$$

where,

DM	=	dry matter (%)
m ₁	=	weight of sample before drying (g)
m ₂	=	weight of sample after drying (g)

A.2.2 Determination of dry matter content using a microwave oven as an alternative method shall be practiced as follow:

- 1) Take the sampled fruits by cutting them crosswise into pieces of 2.5 cm thick. The slices are randomly taken only from the middle part of the fruits. Cut the pulp from every locule. Chop them into small pieces of approximately 1 mm x 1 mm x 5 mm or use a blender and then mix them well. Randomly take approximately 10 g of mixed pulp per fruit. (In case a paper plate is used as a container, elimination of moisture is required by drying it in a microwave-oven until its weight is constant. In case a Petri dish is used, there is no need to remove moisture).
- 2) Spread the pulp for an even thickness in the container. The sample is dried by using a microwave oven at a low heat level for 2 min to 3 min at a time. (However, microwave wattage used may vary depending on the model and manufacturer which can be checked from the manual. Therefore, the drying time also depends on the wattage used.)
- 3) Dry and weigh the sample until the dried weight is constant but the sample shall not be burnt.
- 4) Calculate the percentage of dry matter content by using the formula in Section A.2.1.

A.3 REQUIREMENTS FOR DRY MATTER CONTENT OF DURIAN PULP

Dry matter content of mature durian of each variety is as follows:

Variety	Dry matter content (%)
Monthong	not less than 32
Chanee	not less than 30
Puangmanee	not less than 30
Kradoo thong	not less than 27

Dry matter content of durians of the varieties other than those mentioned above shall be in accordance with the requirements specified in TAS 3.

ANNEX B**(NORMATIVE)****SAMPLING METHOD FOR DETERMINING THE DRY MATTER CONTENT****B.1 DEFINITIONS****B.1.1 Bulk**

means unpacked food in direct contact with the contact surface of the food transportation unit and the atmosphere.

In this context, it means durians which are transported unpacked.

Where appropriate, bulk samples of durians are obtained by combining and mixing the primary samples taken from the lot.

B.1.2 Reduced sample

means a quantity of samples obtained by reducing, the bulk sample, if necessary, and is the representative of the lot.

B.1.3 Final sample

The bulk sample should, if possible, constitute the final sample and be submitted to the laboratory for analysis. If the bulk sample is too large, the final sample may be prepared from it by a suitable method of reduction. In this process, however, individual items must not be cut or divided. National legislative needs may require that the final sample be subdivided into two or more portions for separate analysis. Each portion must be representative of the final sample.

B.1.4 Laboratory sample

means the sample finally submitted to the laboratory and will take the form of either the final sample or a representative portion of the final sample.

B.2 METHOD OF SAMPLING

Sampling should be performed by personnel trained in the techniques of collecting sample by taking the following steps:

B.2.1 PREPARATION OF THE LOT FOR SAMPLING**B.2.1.1 Preparation of the lot:**

- 1) Where a consignment (incoming durians) is comprised of several lots identified as originating from several producers, each lot shall be considered separately.
- 2) A consignment (incoming durians) may consist of one or several lots.
- 3) Where the size or boundary of each lot is not specified, each series of durians may be considered as a lot, e.g., durians in each lorry may be considered as a separate lot.

B.2.1.2 The lot shall be prepared for sampling in such a way that samples can be taken without hindrance and delay.

- B.2.1.3 The samples shall be taken by the interested parties or by responsible personnel.
- B.2.1.4 Each lot shall be sampled separately, but if any lot shows damage due to transport, the damaged portions of the lot shall be isolated and sampled separately from the sound portions.
- B.2.1.5 If the person responsible for receiving a consignment (incoming durians) at the collecting house or the packing house finds that durians received are not uniform, such lot of durians shall be divided into uniform sub-lots and each sub-lot shall be sampled as agreed between consignee and seller, unless otherwise decided.

B.2.2 SAMPLING OF DURIANS IN BULK

Samples shall be taken randomly from different spots and from different levels in the lot as primary samples. The total mass of primary samples taken shall be in accordance with Table B.1.

Table B.1 Sample size to be taken to constitute as the bulk sample

Mass of lot (kg)	Total mass of primary sample to be taken (kg)
Up to 200	10
201 to 500	20
501 to 1 000	30
1 001 to 5 000	60
Over 5 000	100 (min.)

Note: In case of large size fruits (over 2 kg per fruit), the primary samples shall consist of at least 5 fruits.

Source: Adapted from ISO 874-1980. Fresh fruits and vegetables - Sampling

B.2.3 PREPARATION OF BULK SAMPLE OR REDUCED SAMPLE

- B.2.3.1 The bulk sample is formed by assembling and mixing the primary samples.
- B.2.3.2 As the determination of dry matter content is a destructive testing, a reduced sample shall be prepared by reduction of the bulk samples. In so doing, two fruits that, by visual inspection of external characteristics as the specified method in Annex A (Section A.1), are at risk of not meeting the maturity criteria, shall be selected as reduced sample. Then, one of them shall be taken for determination of dry matter content (while the remaining one shall be retained for an additional inspection if the test result of the first fruit is less than the specified requirements).
- B.2.3.3 The examination shall be carried out as quickly as possible after sampling in order to avoid any change of the characteristics to be examined.

B.3 LABORATORY SAMPLES

The reduced sample, to be submitted to the laboratory, shall be placed in a sealed container. The container shall then be sealed in such a manner that unauthorized opening is detectable. The labelling shall be clear, readily legible and permanent, and shall include the following information:

- 1) name of sample, variety, quality class;
- 2) name of consignor;
- 3) place of sampling;
- 4) date and time of sampling;
- 5) identification code of the sample and of the lot;
- 6) name and signature of sampler;
- 7) method of sampling;
- 8) atmospheric conditions during sampling that may affect the test;
- 9) name of testing laboratory (if necessary).

The sample should be sent to its destination as soon as possible to avoid any damage to the sample.

ANNEX C

(NORMATIVE)

FLOW-CHART FOR DECISION CRITERIA

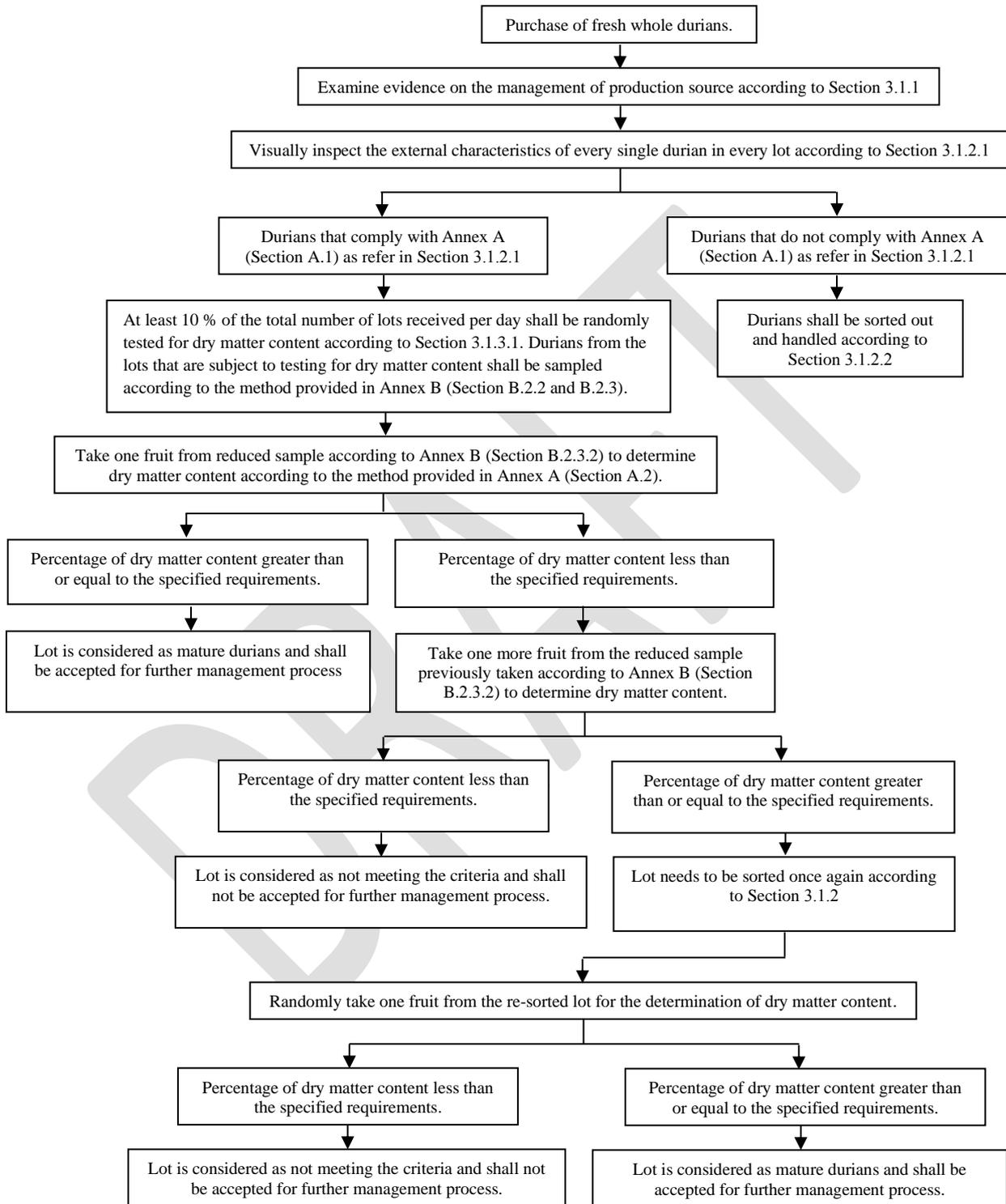


Figure C.1 Flow-chart for decision criteria
(Section 3.1.3.2)

ANNEX D
(INFORMATIVE)
UNIT

The units and symbols used in this standard and the units recognized to be used by SI (International System of Units or Le Système International d'Unités) are as follows:

Measurement	Unit	Symbols
Length	centimeter	cm
	millimeter	mm
Mass	gram	g
	kilogram	kg