
DSR STANDARD



DSR 01:2022

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DSR Musang King Durian Standard

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Foreword

This standard was developed by the Project Committee on DSR Musang King Durian established by SIRIM Berhad.

This standard was developed with the following objectives:

- a) to provide guidance to DSR and consumers for specification of Musang King Durian (D197) grown from *Durio zibethinus* L. to be supplied in whole and fresh fruit, fresh pulp, frozen pulp and frozen paste; and
- b) to be used as a basis document for the purpose of product certification.

This standard will be subjected to review to reflect current needs and conditions. Users and other interested parties may submit comments on the contents of this standard for consideration into future versions.

Information to assist users of the standard

For the purposes of this standard, the following ISO definitions have been adopted regarding verbal forms for the expression of provisions:

- a) “**shall**” indicates an **auditable requirement**: it is used to indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted;
- b) “**should**” indicates a **recommendation**: it is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited;
- c) “**may**” indicates a **permission**: it is used to indicate a course of action permissible within the limits of the document; and
- d) “**can**” indicates a **possibility** or a **capability**: it is used for statements of possibility and capability, whether material, physical or causal.

Compliance with this standard does not by itself grant immunity from legal obligations.

DSR Musang King Durian Standard

0. Introduction

0.1 Musang King Durian (D197)

Durian (*Durio* Spp.) is a seasonal fruit that is extensively grown in tropical regions, including Malaysia. Durian has been highlighted as one out of nine selected premium fruits in the Malaysian National Agro-food Policy 2011 - 2020. The Department of Agriculture Malaysia has reported that a total of 204 durian clones have been registered in Malaysia as at May 2022. Musang King Durian (D197) is a cultivar (cultivated variety) of durian (*Durio zibethinus* L.) which is currently one of the leading clones, especially for export market. Treasured for its unusual combination of buttery, thick, bright yellow flesh and robust flavor, with a hint of bitterness, Musang King Durian is the most popular variety of durian in Malaysia and demands a premium price over other varieties. Like other varieties of durian, Musang King Durian is rich in energy, vitamins and minerals. Its flesh contains fiber, starch, sugar and fat. When consumed in moderate quantities, it can give a positive impact on digestion, blood pressure and cardiovascular health. The demand for Musang King Durians has increased rapidly in recent times and it has become popular worldwide. Based on the demands of specific markets, Musang King Durian is marketed either as a whole fruit, or in pulp form or in paste form to local and overseas customers.

0.2 DSR Taiko Berhad

DSR Taiko Berhad (DSR) is a company that has been involved in a fully integrated orchard-to-market durian industry. DSR, which was established in 2017, started with a small durian orchard of 3.4 acres in Raub, Pahang. Since it was first established, DSR has expanded the size of its durian plantation to around 100 acres, encompassing over 3,800 durian trees. Most of the durian trees are the authentic Raub Musang King variety. The orchard has around 350 durian trees which are over 25 years old, and they are known to produce premium quality durians. DSR is experienced in product development, is equipped with state-of-the-art facilities and has established a wide distribution network which has enabled the group to expand its market globally and bring Malaysia's distinctive taste to the world. DSR is now taking a step further to enhance the added value of fresh durians by developing unique specialty products.

0.3 Products of DSR Taiko Berhad

DSR produces Musang King Durian fruits and related downstream products of the highest quality. Products of DSR among others are:

- a) fresh whole Musang King Durian;
- b) frozen whole Musang King Durian;
- c) fresh pulp;
- d) frozen pulp; and
- e) frozen paste.

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1. Scope

This standard specifies the requirements for Musang King Durian (D197) grown from *Durio zibethinus* L. in the form of:

- a) whole fruit;
- b) fresh pulp;
- c) frozen pulp; and
- d) frozen paste.

It covers requirements for the selection of planting material, specification of the fruit, good agronomic practices, harvesting and post-harvest activity, export requirements, production of downstream products (i.e. fresh pulp, frozen pulp and frozen paste) and traceability of the fruit along the supply chain.

2. Normative references

The following normative references are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the normative reference (including any amendments) applies.

Environment Quality Act 1974

Environment Quality Regulations 1979

Federal Agricultural Marketing Authority Act 1965 [Act 141]

Federal Agricultural Marketing Authority (Grading, Packaging and Labelling of Agricultural Produce) Regulations 2008

Food Act 1983

Food Regulations 1985

Food Hygiene Regulations 2009

Malaysian Quarantine and Inspection Services Act 2011 [Act 728]

Pesticides Act 1974

MS 1500, Halal Food - Production, Preparation, Handling and Storage - General Guidelines

MS 1480, Food safety according to Hazard Analysis and Critical Control Point (HACCP) system

MS 1784, Good Agricultural Practice (GAP) - Crop commodities (Second revision)

MS 2431, Durian specification

3. Terms and definitions

For the purposes of this standard, the following terms and definitions apply.

3.1 damage

Any injury caused by pests and/or diseases infestation, mechanical and/or physiological means, which materially affects the appearance, internal, keeping and eating quality of the fruit.

3.2 defects

The characteristics which affect the appearance and shape.

3.3 integrated pest management (IPM)

Utilisation of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimise risks to human health and the environment.

3.4 pulp

Aril or fleshy portion of the fruit.

3.5 peduncle

Section adjoining the fruit to the stem-end.

4. Requirements of DSR Musang King Durian

4.1 Fruit characteristics

Characteristics of the fruit shall be as described in Table 1.

Table 1. Characteristics of DSR Musang King Durian

Characteristics	Descriptions
Shape (Figure 1)	Ovate
Skin colour (Figure 2)	Green (low land produce) or brownish green (highland produce)
Fruit skin (Figure 3)	Wrinkled and aged skin (> 20 years old tree)
Flesh (Figure 4)	Thick and golden yellow
Taste	Creamy, sweet and slightly bitter
Special characteristic (Figure 5)	Starfish shape located at the bottom of the fruit
Thorn (Figure 3)	Quite large, moderately short and pyramid-shaped
Seed (Figure 6)	Flat and tiny
Circle at the base of the peduncle (Figure 7)	Clearly visible and less thorny

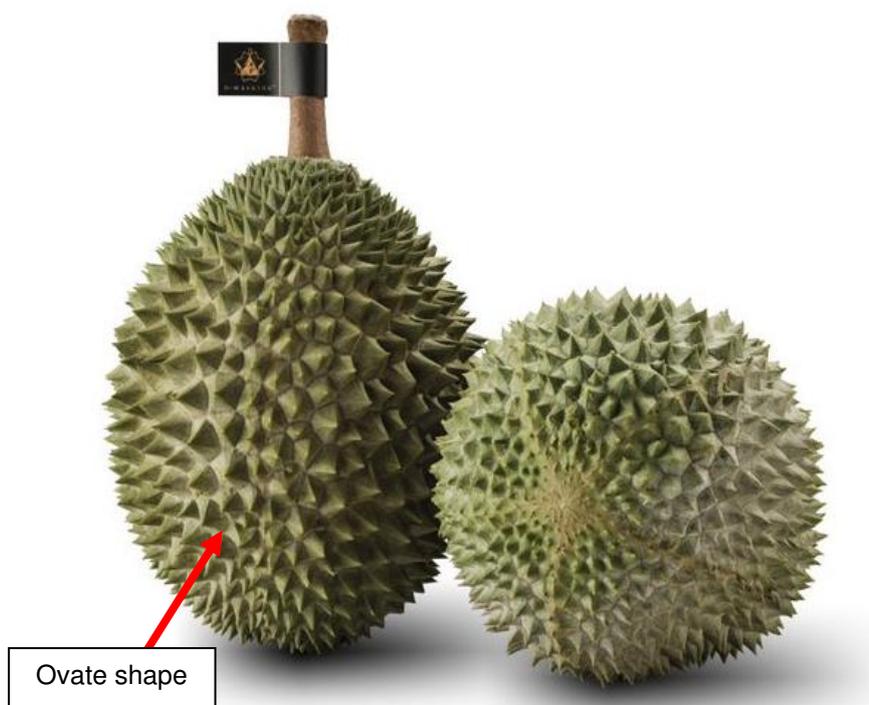


Figure 1. DSR Musang King Durian



Figure 2. Brownish green skin colour of highland DSR Musang King Durian



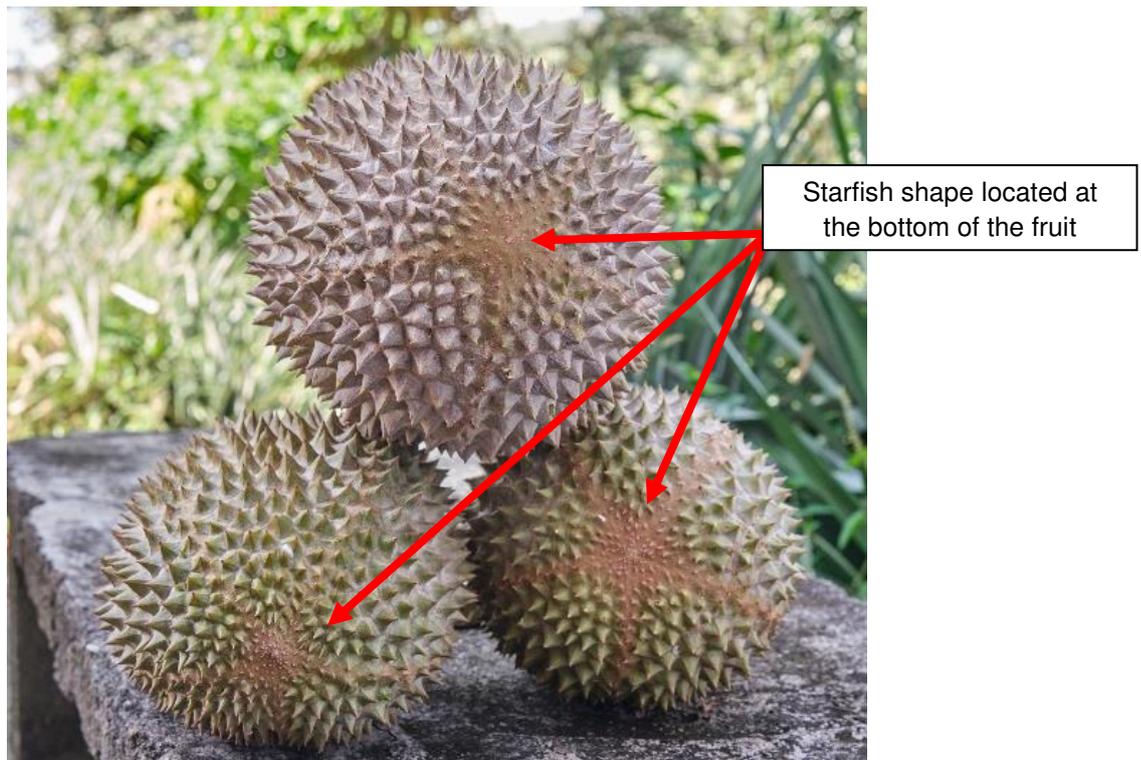
Large, moderately short
and pyramid-shaped

Figure 3. Wrinkled and aged skin of DSR Musang King Durian from more than 20 years old tree



Thick and golden yellow

Figure 4. Flesh of DSR Musang King Durian



Starfish shape located at the bottom of the fruit

Figure 5. Starfish shape on DSR Musang King Durian

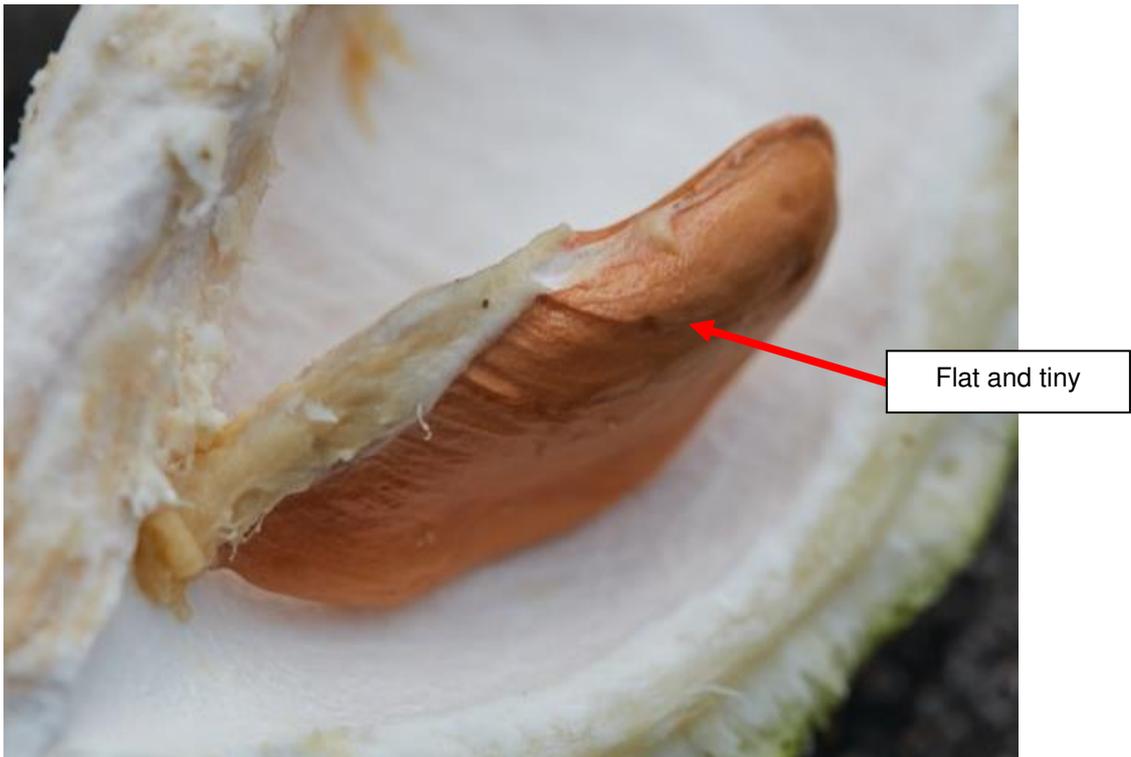


Figure 6. Seed of DSR Musang King Durian

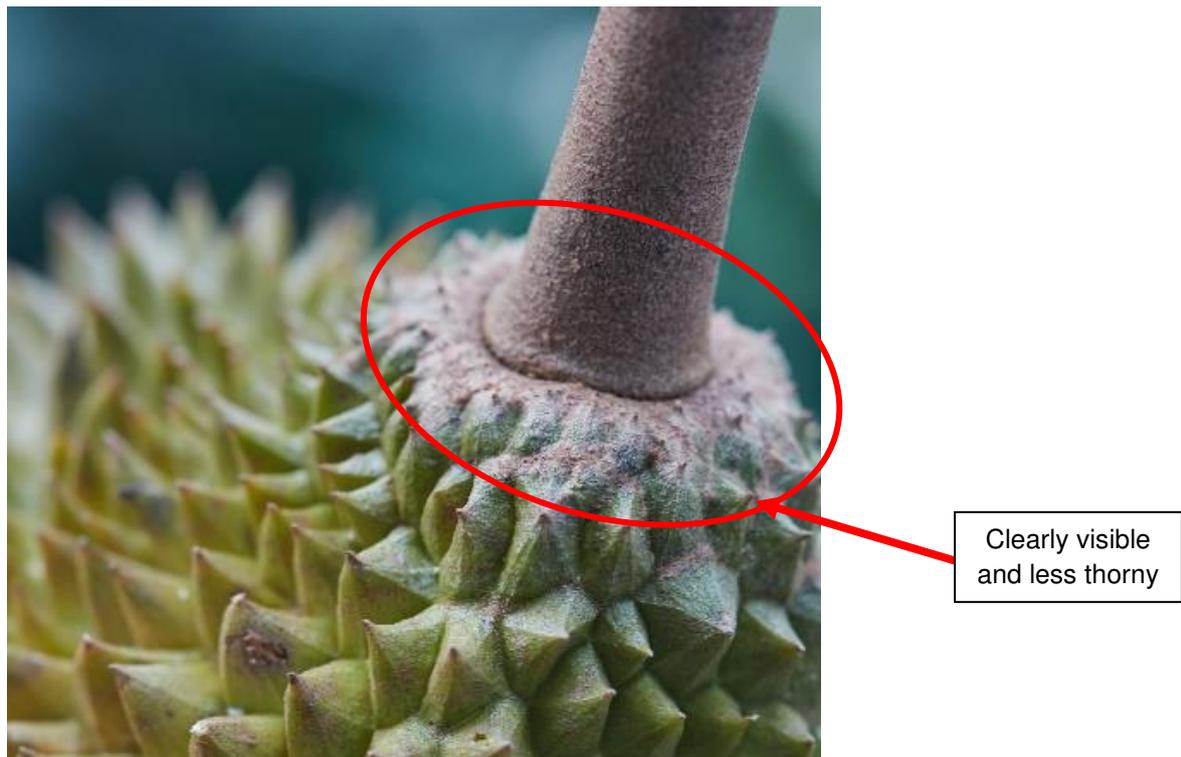


Figure 7. Circle at the base of the peduncle of DSR Musang King Durian

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4.2 Minimum requirements

4.2.1 The fruit shall be:

- a) whole with intact peduncle;
- b) fresh and clean;
- c) practically free from visible defects;
- d) practically free from damage caused by pest;
- e) free from damage caused by low and/or high temperatures;
- f) free of any foreign smell and/or taste; and
- g) when ripe, the following abnormal pulp is not allowed: hardened pulp, tip burn and wet core (water core). If any of these defects are present, the total defects shall not exceed 5 % of the edible portion.

4.2.2 The fruit shall follow requirements stipulated in Clause 7 for harvesting.

4.2.3 The condition of the fruit shall be such as to enable it:

- a) to withstand transportation and handling; and
- b) to arrive at its destination in a satisfactory condition.

4.2.4 The pesticide residue, heavy metals and microbial content of the fruit shall not exceed the maximum limits specified in the *Food Act 1983* and *Food Regulation 1985* and, where applicable, in the specific requirement of the importing country.

4.2.5 Marketing and export of the fruit shall comply with the *Federal Agricultural Marketing Authority Act 1965 [Act 141]* and *Federal Agricultural Authority (Grading, Packaging and Labelling of Agriculture Produce) Regulations 2008*.

4.3 Grading

The fruit shall be graded according to the requirements specified in Table 2.

Table 2. Quality grades and requirements of DSR Musang King Durian

Grade	Requirements	Tolerances (maximum)
Premium	<ul style="list-style-type: none"> – The fruit has superior quality with characteristics of Musang King Durian. – The fruit is free from cracked skin, defects and/or damages that do not affect the general appearance of the produce, the internal quality, the keeping quality and presentation in the package. – The fruit shall carry a minimum of 5 developed locules. – The fruit is harvested from durian tree aged more than 20 years.^a – The fruit is harvested from durian tree cultivated on highland area (above 180 m from sea level). 	5 % by number or weight of the fruit not satisfying the requirements of this grade, but meeting those of Grade 1.
1	<ul style="list-style-type: none"> – The fruit is good quality with characteristics of Musang King Durian. – The fruit shall carry a minimum of 4 developed locules. – Slight defects and/or damage, including cracked skin may be allowed provided that the defects/damage do not affect the general appearance of the produce, the internal quality, the keeping quality and presentation in the package. 	<ul style="list-style-type: none"> – damage not exceeding 5 %; – defect not exceeding 5 %; and – 10 % by number or weight of the fruit not satisfying the requirements of this grade, but meeting those of Grade 2.
2	<ul style="list-style-type: none"> – The fruit in this grade include those which do not qualify for higher grades, but satisfy the minimum requirements specified in clause 4.2. – The fruit shall carry a minimum of 2 developed locules. – Slight defects and/or damage, including cracked skin, may be allowed provided that the defects/damage do not affect the pulp. 	<ul style="list-style-type: none"> – damage not exceeding 5 %; – defect not exceeding 10 %; and – 15 % by number or weight of the fruit satisfying the requirements of this grade.
<p>NOTE:</p> <p>^a Fruit harvested from older trees (20 years and above) will produce better quality fruit as compared to younger trees.</p>		

4.4 Sizing

Size of the fruit shall be as specified in Table 3.

Table 3. Size of DSR Musang King Durian

Size code		Weight per fruit (kg)
2	XL	> 2.5
3	L	1.6 to 2.5
4	M	1.1 to 1.5
5	S	0.5 to 1.0

NOTES.

1. For all sizes, the size tolerance is 10 % by number or weight of fruit corresponding to the size immediately above and/or below that indicated on the package.
2. Table is sourced and modified from MS 2431.
3. Size code 1 and XXL is not applicable to Musang King (medium variety).

5. DSR Musang King Durian orchard requirements

5.1 Traceability

5.1.1 The fruit shall be traceable to the tree from which it has been harvested through a properly established traceability system that enables the identification of product lots and their relation to batches of raw materials, processing and delivery records.

5.1.2 The traceability system shall be able to identify incoming material from the immediate suppliers and the initial distribution route of the fruit.

5.1.3 Traceability records shall be maintained for a defined period for system assessment to enable the handling of potentially unsafe products and in the event of product recall. Records shall be in accordance with statutory and regulatory requirements and customer requirements and can be based on the fruit lot identification.

5.2 Record keeping

Record keeping shall be transparent and enable easy retrieval of information to ensure traceability throughout the whole operation. The requirements for record keeping shall be as follows:

- a) Records shall be kept up to date.

- b) Records (e.g. purchasing, pesticides/herbicides application, etc.) documentation and accounts shall provide traceability and be made available to the inspector for audit trail and trace back verification at any time.
- c) All records shall be maintained for a period of not less than 7 years unless stipulated by any specific legislation.
- d) Records shall be readily accessible.
- e) All records shall be treated as confidential.

5.3 Transportation of fresh fruit

5.3.1 All vehicles used to transport fruits to packing house/processing facility/ local consumer shall be suitable for the purpose, in good physical condition, dry (no dripping or standing water), well maintained and clean. All vehicles and containers shall be inspected for debris, soil and odour prior to loading.

5.3.2 The management shall implement measures to minimise risk of pest infestation and/or microbial contamination during transit.

5.3.3 The fruits shall be transported by vehicles that have good fresh air circulation to maintain its freshness. The ventilation of vehicle can be improved with the installation of louvers for more elaborate air intakes, to ensure a positive airflow through the load.

5.3.4 The fruits shall not be transported in vehicles that have been used to transport live animals, animal parts, soil or chemicals.

5.3.5 All transportation vehicles for fruits shall be inspected for pests prior to loading and transporting.

5.3.6 All transportation vehicles for fruits should be cleaned and sanitised with a food-grade sanitiser prior to loading and transporting.

5.3.7 The fruits shall reach local consumers within 24 hours to 48 hours and overseas consumers within 48 hours to 60 hours from harvesting.

5.4 Personal hygiene

5.4.1 The requirement for hygiene procedures in accordance with the *Food Hygiene Regulations 2009* shall be adopted by all orchard workers.

5.4.2 Written instructions on hygiene practices shall be provided to orchard workers and displayed on prominent locations.

5.4.3 Orchard workers shall have access to clean toilet and washing facilities in the vicinity of their workplace.

5.4.4 Orchard workers shall notify the management should they contract any transferable diseases and/or are unfit to work in the vicinity of produce.

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5.5 Biosecurity and sanitary measures

The orchard management shall ensure effective farm biosecurity measures are in place to minimise the risk of unwanted plant, animal and microbiological organisms entering the orchard and causing problems.

NOTE. Good biosecurity and hygiene practices in place at the farm and orchard level minimises the risk of new pests from both entering the orchard and spreading undetected and unrestricted within the orchard.

5.5.1 Fencing, signage and access roads

Orchards should have secure external fencing with appropriate signage and gates, that should, in most instances, be kept closed.

5.5.2 Vehicles, machinery and equipment

5.5.2.1 The orchard management shall minimise the movement in and out of the orchard. All non-essential vehicles should stay out of production areas.

5.5.2.2 Farm machinery including sprayers, chainsaws etc., should be washed down prior to entry into the orchard if they have been used in other areas of lower biosecurity management.

5.5.2.3 Vehicles, machinery and equipment coming from another property should preferably be cleaned initially before they leave the previous property.

5.5.3 People management

5.5.3.1 People entering the property, including staff, contractors, utility providers and tourists may bring contaminants from overseas, interstate and/or other properties.

5.5.3.2 The number of entry points to the property shall be limited, and adequate signage shall be provided to inform visitors of the biosecurity requirements upon entering the property.

5.5.3.3 Visitors' register and checklist shall be in place to ensure all relevant people are made aware of designated parking areas, wash down stations and wash down protocols, permitted areas and any off-limits areas.

5.5.4 Pest and disease control

5.5.4.1 The orchard management shall ensure proper selection of planting material to prevent pest and disease infestation. Refer clause 6.3. Records of the sourcing of all planting material shall be maintained.

5.5.4.2 Management shall appoint relevant officers to conduct regular surveillance of the orchard and associated yards to identify trouble spots and potential sites of pest and disease infestation. Any pest and disease issues found within and nearby the orchard shall be recorded. The relevant authorities should be contacted for support in the event of detection of potential pest and disease infestation or other similar issues that are not readily identifiable.

5.5.4.3 Management shall ensure all workers are well trained for pest and disease identification.

5.5.4.4 Disinfect equipment, particularly pruning equipment, at regular intervals to minimise the potential for spread of pests or disease.

5.5.4.5 Personal protective equipment (PPE), wherever applicable, shall be cleaned after every use and stored separately from contaminants. Separate storage areas should be provided for clean and used PPE. Clean PPE shall be used in such a manner that the likelihood of cross-contamination is minimised.

5.6 Training of workers

5.6.1 All workers should be trained on the following topics to ensure good understanding of the topics and correct application of them in their daily tasks:

- a) good agricultural practices;
- b) good hygienic practices;
- c) food safety;
- d) food hygiene; and
- e) safe working practices (e.g. accident prevention, emergency procedures, risk reduction and usage of personal protective equipment (PPE)).

NOTES:

1. Training on good hygienic practices is to ensure all workers are aware of their roles and responsibilities in protecting products from contamination and deterioration.
2. Information relating to safe working practices is recommended to be made available and displayed appropriately.

5.6.2 Workers shall be trained to perform the work correctly.

5.6.3 All workers should be briefed on the importance of biosecurity and of the on - farm hygiene practices in place. Staff induction should include the process of cleaning footwear and equipment on entering and exiting the property and of any internal on-farm hygiene requirements.

5.6.4 Workers directly involved in the orchard and subsequent processing, where applicable, shall be in good health condition and receive basic training in hygiene requirements. Record of training shall be kept.

5.7 Workers welfare

5.7.1 General

5.7.1.1 All employment requirements shall comply with national and local labour laws, and where appropriate, relevant International Labor Organization (ILO) conventions.

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5.7.1.2 Safe orchard work conditions shall be ensured at all times, in line with the *Occupational Safety and Health Act 1994* and relevant ILO conventions to ensure safe and healthy working conditions.

5.7.1.3 If basic amenities for on-site living is provided, it shall comply with national and local laws.

6. Agronomic practices

The following clauses describe the essential elements of good agronomic practices based on Good Agricultural Practices (GAP) which the orchard shall adopt for the production of good quality Musang King Durian in a sustainable manner.

6.1 Site history and site management

6.1.1 The management shall demonstrate compliance with applicable legislations currently in force in Malaysia such as land title, licensing and operational approval requirements from the relevant authorities.

6.1.2 A risk assessment shall be carried out for new orchards to determine the suitability of the land for cultivation of Musang King durian and the result shall be properly documented and maintained. The risk assessment shall, as a minimum, take the following factors into account:

- a) prior use of the land;
- b) potential impacts of the production on adjacent crops and areas; and
- c) potential impact of activities carried out at adjacent areas.

6.1.3 Orchards should not be located more than 1 000 m above sea level unless the necessary regulatory approvals for such plantations have been granted.

6.1.4 Where orchards are located on sloping land (within the permissible level i.e. 6° - 12° and foothills), appropriate soil conservation measures shall be undertaken to prevent soil erosion and silt deposition into drains, waterways, etc.

6.1.5 A visual identification or reference system, in form or map etc. for each orchard shall be established and maintained.

6.1.6 The management shall closely monitor any changes on the orchard site that might affect the risk factors that were outlined in the risk assessment.

NOTE. The areas that are commonly monitored regularly include records of tests to determine contamination in water sources and records of tests of samples taken for detecting contamination in products.

6.2 Soil management

6.2.1 Soil and topography map of the orchard shall be available for planning and planting programmes.

6.2.2 Orchard floor management shall be done properly by means of cover cropping. Naturally occurring grass shall be maintained so as to form a protective vegetation cover on the soil surface and the roots are highly branched as to conserve the soil against erosional hazard. Trimming of the grass shall be done regularly to promote growth.

6.2.3 The orchard shall adopt the following quarantine strategies for soil:

- a) Where chemical treatment of soils is carried out, it shall be justified and recorded.
- b) Drainage system shall be designed for removal of excess runoff whilst buffering wide spread of pests and diseases.
- c) Equipment and machinery shall be sanitised to reduce potential pests and diseases.

6.3 Rootstock requirement

6.3.1 The rootstock shall be sourced from reliable and reputable nursery(ies).

6.3.2 The rootstock shall be healthy, vigorous, free from pests and disease, of excellent quality and with compatible species, variety or clone.

6.4 Fertiliser management

6.4.1 Nutrient requirement

6.4.1.1 To ensure nutrient balance and minimise nutrient loss, proper soil and crop management practices should be adopted to suit the soil types.

6.4.1.2 The application of fertilisers should be based on nutrient levels of the soil or substrates and requirements of the crop.

NOTE. A pH range of 5.5 to 5.6 is considered ideal for cultivation of durian. Higher pH will cause iron and zinc deficiencies.

6.4.2 Fertiliser utilisation

6.4.2.1 Usage of fertilisers should be in accordance with science-based recommendations or best developed practice.

6.4.2.2 The type, quantity, method, timing and frequency of fertiliser application should be carefully observed to maximise benefits and minimise losses.

NOTES.

1. Critical periods for fertilization are after harvest, mid-vegetative growth, before flowering, during flowering and fruit set and two to four weeks after fruit development.

2. Fertiliser is best applied during the break of heavy rainfall.

6.4.2.3 During dry season, fertiliser should be applied with irrigation to facilitate absorption.

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6.4.2.4 Appropriate application of organic fertiliser should be done to improve soil structure, aeration and water retention properties of the soil.

6.4.2.5 Application of suitable bio-fertilisers should also be done to increase fruit productivity.

6.4.3 Records of fertiliser application

All applications of fertilisers shall be recorded. Records shall include the following:

- a) location (block);
- b) date of application;
- c) fertiliser supplier;
- d) type and quantity of fertiliser applied;
- e) method of application; and
- f) name of operator.

6.4.4 Machinery and equipment

Fertiliser application machinery and equipment should be kept in good working condition. Any malfunctioning machinery components due to wear and tear/life span (based on manufacturer's recommendation) shall be repaired and/or replaced.

6.4.5 Fertiliser storage

6.4.5.1 Fertiliser inventory shall be kept up-to-date and made available.

6.4.5.2 Fertilisers shall be stored on raised platform in a covered, clean, dry and well-ventilated location where there is no risk of contamination of water sources. For organic fertiliser, it should be stored in an appropriate manner to reduce the risk of contamination of the environment.

6.4.5.3 Any unfinished fertilizer shall be properly stored by tying the bag well and keeping it at room temperature to minimise moisture absorption.

6.5 Water supply and water quality

6.5.1 The quality of the water used for the cultivation shall be maintained at suitable alkalinity and pH to ensure good growth and health of the trees. The water quality shall be monitored and recorded throughout the cultivation.

6.5.2 Water used shall be obtained from non-polluting sources. It shall not be untreated wastewater from any activity that may cause contamination.

6.5.3 In case it is necessary to use wastewater, suitable treatment shall be carried out to ensure water quality is in compliance with *Environment Quality Act 1974* and *Environment Quality Regulations 1979*.

6.5.4 The management should adopt an appropriate irrigation system to ensure sufficient water is provided for fruit development stages to achieve good and quality yields.

6.5.5 The irrigation system can also be used to deliver plant nutrients, supplements and chemicals directly to the trees, especially during the dry season.

6.5.6 The tree shall only be irrigated when the soil moisture drops to a middle point between field capacity and permanent wilting point.

6.5.7 During crop establishment (i.e. first 2 years of cultivation), the young tree shall be irrigated once or twice a day, depending on the rainfall.

6.6 Fruit protection (IPM or pesticide)

6.6.1 The management shall seek advice from competent authorities on IPM and pesticide usage.

6.6.2 IPM should be implemented to discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimise risks to human health and the environment.

6.6.3 The management shall ensure that only officially registered chemicals under the Pesticides Act 1974 are allowed.

6.6.4 The management shall ensure that all requirements of the importing country pertaining to pesticides usage shall be adhered to.

6.6.5 The management shall take active measures to avoid the risk of pesticide drift from own plots to neighboring production areas. This may include, but not limited to, knowledge of what the neighbors are growing, maintenance of spray equipment, etc.

6.6.6 Records of application for usage of pesticides shall be kept.

6.6.7 Training and instructions on the usage of pesticides, including instructions on their safe handling and application, shall be provided to workers.

6.7 Chemicals storage

6.7.1 All chemical compounds shall be stored in secure lockable store(s) and in accordance with manufacturers' instructions or as recommended by the competent authority and, where appropriate, be physically separated.

6.7.2 Manufacturer's Product Specification and Safety Data Sheets (SDS) for all chemical compounds shall be retained and be easily retrievable.

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6.8 Waste management

6.8.1 All possible waste products and sources of pollution in the orchard and its surrounding areas should be identified.

6.8.2 Effective waste and pollutants management should be developed and implemented to avoid or reduce wastage and pollution. Crop debris may be composted and re-cycled for soil conditioning.

6.8.3 Storage structure(s) for pesticides, fertilisers and other agrochemicals shall not be located adjacent to water sources.

6.9 Pruning

6.9.1 Trees shall be pruned while they are still young (immature), before fruiting. The matured trees shall also be properly pruned on a regular basis in order to develop a strong tree structure, healthy and vigorous with a canopy shape, that encourages early flowering and good yield.

6.9.2 Pruning shall be done on young trees to remove certain parts of the tree as below.

- a) New shoots that appear on the stock plant below grafting point.
- b) Lower branches up to about 70 cm.
- c) All branches that are grow vertically.
- d) All water shoots and unhealthy branches.

6.9.3 Pruning should be done on matured and/or fruiting trees to remove certain parts of the tree as below.

- a) Water shoots and suckers that grow into the canopy.
- b) Branches that have borne too many fruits and become weak.

6.9.4 Pruning should be done on water shoots before fertiliser application, on branches after fruit formation, and immediately after harvest for removing dried or diseased branches.

7. Harvesting requirements

7.1 Mature fruit shall be allowed to drop naturally. Appropriate method shall be used to assist proper harvesting such as netting and/or securing the fruit peduncle with a rope to protect the fruit from falling to the ground.

7.2 Orchard workers shall be healthy and fit to work while collecting fruit. Any case of unhealthy worker shall be reported to the management to avoid introduction and contamination of human pathogens such as bacteria, viruses, and parasites to the fruit.

8. Post-harvest management

The fruit shall be processed immediately after harvest.

8.1 Cleaning

8.1.1 The harvested fruit shall be immediately cleaned to remove dirt and other foreign matters on the thorn and/or skin.

8.1.2 The fruit shall undergo dry cleaning process through appropriate method such as soft brush and air blowing. The use of water for cleaning shall be avoided.

8.1.3 Cleaned fruit shall be properly segregated from the uncleaned fruit to avoid cross contamination.

8.2 Sorting

8.2.1 The process shall be done to fulfil the following objectives.

- a) Selecting good quality fruit that is free from defects and damages.
- b) Sizing of fruit. Refer requirement described in Clause 4.

8.2.2 The workers shall be trained to perform sorting properly.

8.2.3 Defects and damages, as described in MS 2431 and Annex A, shall be properly identified. Affected fruit shall be segregated and properly labelled and disposed.

8.3 Packing and labelling

8.3.1 Packing and labelling of fruit shall comply with the requirements of the relevant authority such as *Federal Agricultural Marketing Authority Act 1965 [Act 141]* and *Federal Agricultural Marketing Authority (Grading, Packaging and Labelling of Agricultural Produce) Regulations 2008*.

8.3.2 Packing and packaging

8.3.2.1 The fruit shall undergo packing process in a designated packing house.

8.3.2.2 The packaging used shall be made of suitable material of good quality, clean, practical and able to keep the freshness and quality of the product during handling and transporting.

8.3.2.3 Suitable packaging technique and technology (e.g. vacuum-pack, shrink-wrap etc.) to preserve and prolong the shelf life of fruit should be adopted.

8.3.2.4 Fruit for further processing shall be carefully loaded into designated containers with proper labelling.

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8.3.3 Labelling

8.3.3.1 The management shall ensure that the consumers are able to get important information related to the fruit through written labels, QR codes etc.

8.3.3.2 The following information, as applicable, shall be on the label.

- a) Name of the produce (i.e. Durian) and variety (i.e. Musang King Durian (D197));
- b) Net weight (in kg);
- c) Class or grade;
- d) Size code and/or size;
- e) Name and address of grower/supplier/importer and/or exporter;
- f) Country of origin (applicable for export market);
- g) "Produce of Malaysia" phrase for export market;
- h) Date of production or packaging;
- i) Date of harvest;
- j) Orchard identification/location; and
- k) Certification (MyGAP, etc.).

9. Fresh pulp, frozen pulp and frozen paste of Musang King Durian specification

9.1 General

9.1.1 The fruit shall be sourced from DSR orchards and shall comply with clause 5.1 for requirements on traceability.

9.1.2 The fruit shall be grown in accordance with clause 6.

9.1.3 The fruit shall be of good quality and comply with requirements specified in Clause 4.

9.1.4 The product shall be manufactured in a facility that complies with Good Manufacturing Practices (GMP) or equivalent.

9.1.5 Durian pulp intended to be sold as frozen pulp or paste shall be extracted in an air-conditioned room, with temperature maintained at or below 16 °C.

9.2 Quality requirements

9.2.1 Fresh pulp and frozen pulp shall be made of raw Musang King Durian pulp from which no seed has been extracted.

9.2.2 Frozen paste shall be the concentrated Musang King Durian pulp from which the seed has been extracted and containing not less than 25 % w/w of total solids. Refer Annex B for test method for determination of total solids.

9.2.3 The products shall have basic odour, flavour (bitterness) and colour corresponding to the characteristics of Musang King Durian.

9.2.4 The products shall not contain any preservative, food conditioner and/or coloring substance.

9.2.5 The products shall be free from extraneous matters.

9.2.6 The products shall be free from objectionable or off flavour or objectionable odour of any kind.

9.2.7 The product shall be free from any pesticide residues.

9.2.8 The frozen product (i.e. frozen pulp and frozen paste) shall be stored under -18°C.

9.2.9 The product shall comply with the requirements given in Tables 4, 5 and 6 and any other requirements stipulated under the *Food Act 1983* and *Food Regulations 1985* currently enforced in Malaysia.

Table 4. Quality requirements for fresh pulp, frozen pulp and frozen paste of Musang King Durian

Physicochemical properties	Quality requirements	Test method
Color	Golden yellow	Visual inspection
Total soluble solids (°Brix)	> 34	Annex C

Table 5. Maximum permitted level of microbial contaminants for fresh pulp, frozen pulp and frozen paste of Musang King Durian

Microbial properties	Maximum permitted level
Total plate count	< 10 ⁵ cfu/g
Escherichia coli (cfu/g)	Not detected
Staphylococcus aureus (cfu/g)	Not detected
Salmonella (cfu/25 g)	Absent
Listeria monocytogenes	Not detected

Table 6. Maximum permitted level of metal contaminants for fresh pulp, frozen pulp and frozen paste of Musang King Durian

Metal contaminants	Maximum permitted level
Arsenic	1 mg/kg
Lead	2 mg/kg
Mercury	0.05 mg/kg
Cadmium	1 mg/kg
Antimony	1 mg/kg

9.3 Hygiene and sanitation

9.3.1 The product shall be processed and packed under hygienic and sanitary conditions in premises licensed in accordance with the public health legislations currently enforced in Malaysia.

9.3.2 The product shall comply with the provisions of this standard and be prepared and handled in accordance with *MS 1514* and *Food Hygiene Regulations 2009*.

9.3.3 The products shall be prepared in accordance to Hazard Analysis and Critical Control Points (HACCP) in accordance with *MS 1480*.

9.3.4 The products shall also be prepared in accordance with Halal and *toyyiban* requirements in accordance with *MS 1500*.

9.4 Packaging and labelling

9.4.1 The product shall be packed in clean and suitable food grade packaging materials.

9.4.2 Each individual pack shall be marked to give the following information, as applicable:

- a) type of product, i.e. “fresh pulp of Musang King Durian”, “frozen pulp of Musang King Durian” or “frozen paste of Musang King Durian”;
- b) brand name or trade name;
- c) nett weight;
- d) lot identification;
- e) name and address of the manufacturer and/or packer, or distributor;
- f) product of Malaysia;
- g) date of manufacture;
- h) best before;
- i) nutritional values;
- j) orchard identification/location; and
- k) certification (HACCP, Halal, etc.).

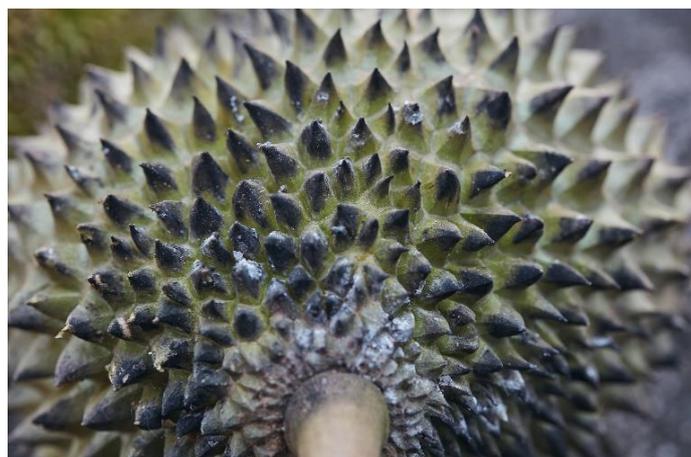
9.5 Transport and distribution

9.5.1 The product temperature during transport and distribution should be maintained at -18°C or colder.

9.5.2 Distribution of the product shall be carried out in such a way that any rise in product temperature is kept to a minimum to ensure it does not affect the safety and quality of the product.

Annex A
(informative)

Example of defects and damage of Musang King Durian



Annex B (normative)

Determination of total solids

B.1 General

The total solids are determined by measuring the mass of water in a known mass of sample of a food before and after the water is removed by evaporation.

B.2 Apparatus

Convection and forced draft ovens.

B.3 Procedure

B.3.1 Weigh sample and label as initial weight.

B.3.2 Put the sample on a tray and spread evenly.

B.3.3 Place in an oven for a specified time and temperature (e.g. 3 hours at 100 °C).

B.3.4 Weigh the dried sample and label as dried weight.

B.3.5 Calculate as below.

$$\text{Total solids, \%} = \frac{\text{Dried weight}}{\text{Initial weight}} \times 100\%$$

Annex C
(normative)

Determination of total soluble solids

C.1 General

The total soluble solids are determined by using hand refractometer. Measurements are carried at sample temperature of 20 °C.

C.2 Apparatus

Hand refractometer.

C.3 Procedure

C.3.1 Clean the refractometer before use.

C.3.2 Place one or two drops of sample on the prism.

C.3.3 Close the daylight plate gently and ensure the sample is spread all over the prism surface.

C.3.4 Look at the scale through the eyepiece.

C.3.5 Read the scale where the boundary line intercepts it.

C.3.6 Clean the prism after use.

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