



THAI AGRICULTURAL STANDARD

TAS 9039-2013

**GOOD MANUFACTURING PRACTICES
FOR READY-TO-EAT FRESH PRE-CUT
FRUITS AND VEGETABLES**

National Bureau of Agricultural Commodity and Food Standards

Ministry of Agriculture and Cooperatives

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**Technical Committee on the Elaboration of the Thai Agricultural Standard on
Good Manufacturing Practices for Ready-to-eat Fresh Pre-cut Fruits and Vegetables**

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(3)

Ready-to-eat fresh pre-cut fruits and vegetables have increased in trend and their popularity in consumption. The development of good manufacturing practices is vital for quality and safety of the products. Therefore, the Agricultural Standards Committee deems it necessary to establish the Thai Agricultural Standard on Good Manufacturing Practices for Ready-to-eat Fresh Pre-cut Fruits and Vegetables to promote production and consumer confidence on product quality and safety.

This standard is based on the following documents:

CAC/RCP 53-2003. Code of Hygienic Practice for Fresh Fruits and Vegetables. Joint FAO/WHO Food Standards Programme, FAO, Rome.

TAS 9023-2007. Thai Agricultural Standard. Code of Practice: General Principles of Food Hygiene. National Bureau of Agricultural Commodity and Food Standards, Bangkok.



NOTIFICATION OF MINISTRY OF AGRICULTURE AND COOPERATIVES
SUBJECT: THAI AGRICULTURAL STANDARD:
MANUFACTURING PRACTICES FOR
READY-TO-EAT FRESH PRE-CUT FRUITS AND VEGETABLES
UNDER THE AGRICULTURAL STANDARDS ACT B.E. 2551 (2008)

Whereas the Agricultural Standards Committee, by the decision of the fourth session dated 28 August B.E. 2556 (2013), deems it necessary to establish an agricultural standard on Good Manufacturing Practices for Ready-to-eat Fresh Pre-cut Fruits and Vegetables as a voluntary standard in accordance with the Agricultural Standards Act B.E. 2551 (2008) to promote such agricultural commodity to meet its standards on quality and safety.

By virtue of Sections 5, 15 and 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: Good Manufacturing Practices for Ready-to-eat Fresh Pre-cut Fruits and Vegetables (TAS 9039-2013), 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
GOOD MANUFACTURING PRACTICES FOR READY-TO-EAT
FRESH PRE-CUT FRUITS AND VEGETABLES

1. SCOPE

1.1 This Thai Agricultural Standard covers good manufacturing practices for ready-to-eat fresh pre-cut fruits and vegetables at all steps from raw material receiving, washing and soaking, peeling, cutting, slicing, shredding, packing, storing and transportation to obtain the quality and safety of ready-to-eat fresh pre-cut fruits and vegetables.

1.2 This standard does not apply for fresh produce packing, fresh pre-cut fruits and vegetables for further processing, e.g. fruit juice, fermentation, freezing, and production of mixed ready-to-eat fresh pre-cut fruits and vegetables and meat products.

2. DEFINITIONS

For the purpose of this standard:

2.1 Fresh pre-cut fruit and vegetable mean fresh fruits and vegetables that have been physically altered from its original form, while still maintaining the cell viability.

2.2 Hazard means a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.

2.3 Contamination means the introduction or occurrence of a contaminant in food or food environment.

2.4 Cross-contamination means the transfer of hazards particularly hazard from pathogenic organisms from one food to another food, contact surfaces or the air, either by direct and/or indirect contact.

2.5 Contaminant means any chemical or biological agent, foreign matter, or other substances not intentionally added to food which may compromise food safety or suitability.

2.6 Clean water means water that does not contaminate any hazard as indicated in 2.2 at a level that compromise food safety in the circumstances of its use.

2.7 Potable water means water which meets the quality standard of drinking water or potable water notified by relevant Competent Authorities.

3. REQUIRMENTS

Requirements for Good Manufacturing Practices for Ready-to-eat Fresh Pre-cut Fruits and Vegetables shall be as in Table 1.

Table 1 Requirements

(Section 3)

Items	Requirements
1. Establishment (1) Location	1.1 Locate in an area that has no risk of contamination causing adverse impact on the consumer safety. Such location shall be away from potential sources of contamination such as industrial pollution, flood plain, pest harbouring and landfill.
	1.2 If the establishment locates in an area that has a risk of contamination, effective and appropriate preventive measures against hazards shall be in place.
	1.3 If there has been any crisis affecting the site of establishment occurred such as flood, the evidence of system verification shall be provided to ensure that corrective actions have been taken to continue to its normal production operation.
(2) Building	1.4 Separate production area out of the residential area.
	1.5 Internal building structure and its components shall be strong and durable and easy to maintain and clean or disinfect.
	1.6 Floor is made of durable materials which permit effective cleaning and facilitate maintenance. The floor surface is non-slippery, non-absorbent of water, non-cracking and in good conditions with slope to the drains.
	1.7 Ceiling is in good conditions without dirt accumulation or water droplets.
	1.8 Walls, doors and windows are made of materials that are easy to clean, light coloured, have a smooth surface, non-absorbency of water and good conditions.

Items	Requirements
	<p>1.9 Availability of effective systems for drainage and waste disposal of the building and the production area, without causing any contamination to pre-cut fruits and vegetables or potable water system</p> <p>1.10 Separate potable water system from non-potable water supply and clearly identify with tags or signs.</p> <p>1.11 There shall be no unused or irrelevant item in the production area.</p> <p>1.12 Availability of sufficient space for the installation of machines, tools and equipment as well as for the operations</p> <p>1.13 Design and plan the production line layout in order to facilitate hygienic practices, maintenance and cleaning, and to prevent pets, pest and cross-contamination.</p> <p>1.14 Separate the areas of washed fresh pre-cut fruits and vegetables against the receiving unwashed raw materials.</p>
(3) Machines, tools and equipment	<p>1.15 Numbers of machines, tools and equipment are sufficient for the operations and ready to use. They shall be made of non-reactive materials to fresh fruits and vegetables and do not cause contamination.</p> <p>1.16 Tools and equipment shall have smooth surface, be corrosion-resistant and easy to clean and maintain.</p> <p>1.17 Tools and equipment related to the control of operations, such as timers, temperature-measuring instruments and weighing scales shall be of accuracy and precision. Their function shall be verified regularly.</p> <p>1.18 Surface of table that comes into contact with pre-cut fresh fruits and vegetables is made of non-reactive materials to fresh fruits and vegetables including cleaning agents and disinfectants. Such table surface shall also be smooth, non-absorbent to water and corrosion resistant.</p>
(4) Facilities	<p>1.19 Availability of sufficient supply of clean water and/or potable water for the operations</p>

Items	Requirements
	1.20 Availability of adequate drainage in the production area and effective management
	1.21 Availability of adequate cleaning facilities with separate hygienic storage
	1.22 Availability of hand wash basins, hand-washing and hygienic drying facilities, including soaps and cleansers
	1.23 Availability of adequate numbers of toilets that are clean and in good conditions for workers
	1.24 Toilet shall be separately located from the production area and not able to have direct access to such area.
	1.25 Availability of proper area and sufficient facilities for changing clothes.
	1.26 Availability of adequate temperature control facilities.
	1.27 Availability of building ventilation suitable for the operations.
	1.28 Availability of building light suitable for the operations.
	1.29 Availability of protective shields for light bulbs in the production area. Maintain the products and containers including areas prone to contamination with broken glass in order to avoid physical hazard.
	1.30 Availability of proper and separate areas and facilities for the orderly storage of tools, equipment, raw materials, food additives, materials and other chemicals in order to prevent contamination.
2. Control of operations (1) Raw material receiving	2.1 Incoming raw materials shall be from the certified Good Agricultural Practices (GAP) for Food Crop farms or its equivalence, or in compliance with the trading partner requirements or relevant laws and regulations.

Items	Requirements
	<p>2.2 Availability of control measures during raw material transportation to prevent cross-contamination and contamination from pesticides. Verify the cleanliness of the transport vehicles.</p> <p>2.3 Inspect raw materials by sorting only raw materials that meet quality and safety requirements appropriate for the production. Record inspection results and raw material procurement.</p> <p>2.4 Control the operations to prevent contamination and deterioration during unloading of raw materials and hygienically store.</p>
(2) Packages	<p>2.5 Materials used to make packages are non-toxic or non-harmful to consumer.</p> <p>2.6 Availability of control measures for the receipt of packages, inspection and sorting of non-conforming packages in order to prevent contamination and harm to the consumer, including damage to the products</p> <p>2.7 Keep packages in dry and clean containers to prevent dust and pest.</p> <p>2.8 Availability of separate and hygienic storage for packages</p> <p>2.9 Availability of cleaning procedure and checking cleanliness of the packages prior to use</p>
(3) Water	<p>2.10 Control and check quality of water used for washing raw material and pre-cut fresh fruits and vegetables. These shall be checked according to frequency and requirements, and kept as the records.</p> <p>2.11 Control and check the quality and temperature of water used in cooling system according to established frequency and requirements. Keep the records.</p> <p>2.12 Water used in direct contact with fresh fruits and vegetables in the production line shall be potable water.</p>
(4) Control of operations for essential processing steps - Raw material preparation	<p>2.13 Availability of measures for sorting undesirable and/or foreign materials and trimming any damaged and rotten parts prior to use</p>
- Pre-washing and microbiological decontamination	<p>2.14 Availability of control measures for pre-washing raw materials with clean water to reduce dirt such as soil and sand</p>

Items	Requirements
	<p>2.15 In case it is necessary to use antimicrobial agents to minimize cross-contamination during pre-washing, their use shall be in line with good hygienic practices. Types, concentrations and dosage of antimicrobial agents shall be checked for their effectiveness. Replicated the washing, where necessary and appropriate, to minimize chemical residues. However, the use of antimicrobial agents shall not exceed the permitted levels as required by relevant laws and regulations. Record the use of such antimicrobial agents.</p>
	<p>2.16 Where necessary, temperature of water used for pre-washing raw materials may be controlled and checked.</p>
	<p>2.17 Where ice is in direct contact with fresh fruits and vegetables in the production process, ice shall meet the quality standard of relevant laws and regulations. Ice shall be produced and stored under hygienic conditions to prevent contamination.</p>
- Pre-cooling	<p>2.18 In case vacuum cooling or room cooling is used to lower the temperature of fresh fruits and vegetables, the temperature and relevant conditions shall be of concern in order to prevent condensate dripping onto fresh fruits and vegetables. The inside of pre-cooling room shall be regularly cleaned and recorded.</p>
	<p>2.19 In case hydro cooling or ice cooling is used to lower the temperature of fresh fruits and vegetables, potable water shall be used in cooling systems. The measure on water quality control in such systems shall be regularly checked and recorded.</p>
	<p>2.20 In case forced-air cooling is used to lower the temperature of fresh fruits and vegetables, the air cooling systems shall be appropriately designed and maintained to avoid any contamination and keep the record.</p>
- Cold storage prior to pre-cut process	<p>2.21 If there is a need to store fresh fruits and vegetables after cooling, the fresh fruits and vegetables shall be maintained in cold room that is clean and hygienic. Storage conditions shall be controlled appropriately corresponding to the types of fruits and vegetables. The temperature of the cold storage shall be regularly checked.</p>
	<p>2.22 Availability of control measures to prevent condensate dripping onto fresh fruits and vegetables in cold room.</p>
- Pre-cut process	<p>2.23 Availability of control measures for pre-cut process in a hygienic manner.</p>

Items	Requirements
	2.24 Availability of documented operating procedures for fresh pre-cut processes, e.g. cutting, slicing and shredding, to minimize contamination from hazards.
- Washing after pre-cut process	2.25 Availability of quality control and check the water temperature and replacement frequency according to the procedure to minimize the build-up of organic materials and prevent cross-contamination.
	2.26 If antimicrobial agents are used to minimize cross-contamination during washing, their use shall be in line with good hygienic practices. Types, concentrations and dosage of antimicrobial agents shall be checked for their effectiveness. Replicated the washing, where necessary and appropriate, to minimize chemical residues. However, the use of antimicrobial agents shall not exceed the permitted levels as required by relevant laws and regulations. Record the use of such antimicrobial agents.
	2.27 If anti-browning agents, firming agents or other food additives are used in the fresh pre-cut fruits and vegetables, such agents shall be in compliance with relevant laws and regulations. Such use shall be recorded.
	2.28 Remove excessive water from fresh pre-cut fruits and vegetables to minimize microbiological growth.
- Packing	2.29 Availability of control measures for packing ready-to-eat fresh pre-cut fruits and vegetables hygienically.
	2.30 Availability of documented operating procedure for packing to minimize contamination from hazards.
- Cold storage	2.31 Maintain ready-to-eat fresh pre-cut fruits and vegetables at low temperature to minimize microbial growth prior to transportation.
	2.32 Availability of measures to control temperatures and storage conditions corresponding to the types of fruits and vegetables.
	2.33 Cooling systems shall be controlled to prevent condensate dripping onto fresh pre-cut fruits and vegetables.
	2.34 Sample ready-to-eat fresh pre-cut fruits and vegetables to check their quality as specified by relevant laws and regulations.
(5) Management and supervision	2.35 Supervisors shall be of competency to perform their duties properly.

Items	Requirements
	2.36 Availability of documented procedures for the operations and monitoring.
(6) Recall of Products	2.37 Identification or lot number shall be indicated to enable recall and traceability in case of safety problems.
3. Maintenance and sanitation (1) Plans	<p>3.1 Availability of plans for maintenance, sanitation and verification of the efficacy covering methods, frequency and responsible persons for specified areas and lists of machines, tools and equipment, as follows:</p> <p>(1) maintenance and repair programmes for the building, machines, tools and equipment;</p> <p>(2) cleaning programme for the building, machines, tools and equipment and disinfection;</p> <p>(3) pest control programme; and</p> <p>(4) waste management programme.</p>
(2) Maintenance programme	<p>3.2 Availability of inspection and maintenance for the establishment, machines, cooling equipment, tools and equipment to be in good working conditions and record.</p> <p>3.3 Availability of calibration of tools and equipment that are essential for food safety in the pre-cut processes at least once a year and verification of their accuracy at least twice a year and record as evidence.</p>
(3) Cleaning programme	<p>3.4 Clean the building and the production areas according to the plan schedule and record.</p> <p>3.5 Clean tools and equipment that are in contact with raw materials and fresh pre-cut fruits and vegetables according to plan schedule before and after operations to prevent contamination. Inspect the effectiveness of cleaning activities and record.</p>
	<p>3.6 Appropriately store cleaned tools and equipment in a separate area and in a sanitary manner.</p> <p>3.7 In case cleaning agents and disinfectants are used, it is essential to apply correct types, dosage and amount used according to the instruction on the labels or relevant laws and regulations. There shall be a control measure for such application.</p>
	3.8 Hygienically store cleaning agents and disinfectants in a designated area and clearly identify their types and usage with clear tags or signs.
(4) Pest control programme	3.9 Availability of prevention and control measure for pest and pets in the establishment and the production area

Items	Requirements
	3.10 Inspect the trace of pest harbouring in the establishment and surrounding area.
	3.11 Inspect the operations in accordance with pest control programme.
	3.12 Use chemicals to control pest according to the instruction on the labels or relevant laws and regulations. There shall be a control measure for their application and record.
	3.13 No pets allowed in any area of the production building.
(5) Waste Management programme	3.14 Availability of methods for distinguishing between containers for production waste against the containers for ready-to-eat fresh pre-cut fruits and vegetables
	3.15 Availability of appropriate management, disposal and removal of waste and unwanted leftover after processing
4. Personnel hygiene	4.1 Availability of personnel hygiene requirements for workers and visitors entering the production area. Availability of personnel hygiene monitoring plan. Keep the records of operations.
	4.2 Personnel shall work hygienically such as washing hands before working, after toilet using or after handling any raw materials/chemicals/materials which may cause contamination, including regularly maintain the cleanliness of hands and nails.
	4.3 Personnel who come into contact with ready-to-eat fresh pre-cut fruits and vegetables shall be in good health without signs of respiratory or gastrointestinal tract diseases or being carrier of a communicable or skin disease, and no wounds that may cause contamination.

Items	Requirements
	<p>4.4 Personnel shall wear clothing, gloves, masks or hair coverings that are clean and appropriate for their operations, where necessary.</p> <p>4.5 Personnel who work in the production areas shall not wear personal effects such as jewelry, during the operations.</p> <p>4.6 Availability of preventive measures against hazardous contamination, such as glasses, hard plastic and soiled shoes before entering the production area, particularly high care area operations such as packing of finished products.</p> <p>4.7 Inspect the operations according to personnel hygiene monitoring programme set forth for the personnel who work in the area that come into contact with ready-to-eat fresh pre-cut fruits and vegetables and the visitors who enter the production area.</p> <p>4.8 Prohibit eating or smoking during the operations or any unfavourable behavior that may result in the contamination of ready-to-eat fresh pre-cut fruits and vegetables.</p>
5. Transportation	<p>5.1 Availability of effective preventive measures against contamination and deterioration of the products during transportation</p> <p>5.2 Transport vehicles shall be used for food transportation only. In case ready-to-eat fresh pre-cut fruits and vegetables are needed to be transported together with other kinds of foodstuff or non-food commodities, effective methods shall be apparently applied to separate those commodities and record.</p> <p>5.3 If the transport vehicle or container is also used for transporting other kinds of foodstuff or non-food commodities, effective cleaning after unloading shall be carried out in combination with disinfection, where necessary. Keep the records of the use of transport vehicles and the disinfection.</p> <p>5.4 Temperature of fresh pre-cut fruits and vegetables or necessary conditions during the transportation shall be appropriately controlled and recorded.</p> <p>5.5 Transport vehicles shall be clean, able to be disinfected, when necessary, ready for use and able to prevent contamination effectively as well as able to maintain product quality from origin to destination.</p>
6. Product labelling	6.1 Information on the label shall be complied with relevant laws and regulations as well as trading partner requirements.

Items	Requirements
7. Training	
(1) Workers	<p>7.1 Training programmes shall be provided to the workers at least as follows:</p> <ul style="list-style-type: none"> (1) the good hygienic practices for processing of ready-to-eat fresh pre-cut fruits and vegetables; (2) the food hygiene necessary for the operations; and (3) the specific items concerning packing systems used for fresh pre-cut fruits and vegetables, the importance of temperature control during production and storage, including the risks of contamination or microbial growth during the packing.
(2) Refreshment	<p>7.2 Availability of refreshment training to gain knowledge on the production process and food hygiene. The training shall be regularly updated at least once a year.</p>
8. Records and record keeping	<p>8.1 Producers shall record important information of the production processes, such as kinds and quantity of products, styles and specifications of products, operation controls and distribution, for the purposes of inspection and traceability as well as the continuous improvement of the operational system, i.e.</p> <ul style="list-style-type: none"> (1) record of raw material suppliers (Section 2.3); (2) record of operation control (Sections 2.15,2.18 – 2.20); (3) record of water quality and test results of potable water (Sections 2.10 - 2.11); (4) record of inspection and maintenance (Sections 3.2); (5) record of calibration results (Sections 3.3); (6) record of sanitation programme (Sections 3.4-3.5); (7) record of pest control programme (Sections 3.12); (8) record of personnel hygiene (Sections 4.1); (9) record of training (Sections 7.2); (10) record of product distributions (Sections 5.2-5.4). <p>8.2 Keep the records for at least two years or as required by partner countries or Certification Bodies.</p>