

# PROTOCOL FOR THE EXPORTATION OF KENT VARIETY MANGO FROM PERU TO JAPAN

## I Definition

1. Product included in the program  
Fresh Kent variety mango (*Mangifera indica* L.) fruit produced in Republic of Peru.

## II Participants' Responsibilities

1. The Peruvian phytosanitary authority (SENASA).
  - (a) Provide and maintain an up-to-date protocol for the program.
  - (b) Provide management and supervision of the program.
  - (c) Coordinate the activities and communications of the program with Ministry of Agriculture, forestry and fisheries of Japan (MAFF) and pertinent organizations (facility staff, exporter, etc.).
  - (d) Certify new thermal water treatment (TWT) equipment (tank) and facility and re-certify them, on a periodic basis for the program.
  - (e) Provide the onsite certification of TWT and conduct the export inspections to ensure that the MAFF requirements have been met according to this protocol.
  - (f) Ensure that all facilities and equipment are in good working conditions and have an appropriate event recorder and back up for TWT, and that the packing facilities are clean, pests free and fully enclosed to prevent live Mediterranean fruit fly (*Ceratitidis capitata* Wiedemann), *Anastrepha fraterculus*, *A. obliqua* and *A. striata* entry.
  - (g) Ensure that all cartons are properly marked and certified according to the protocol.
  - (h) Maintain all records concerning the exportation of Kent variety mango to Japan, and keep them at least for a year until the MAFF's audit of next season. SENASA shall provide the records to the MAFF expert when the expert requests them.
  - (i) Sign and issue phytosanitary certificates for export shipments.
  - (j) Approve all TWT equipment, treatments, and shipment s.
  - (k) Request annual audit visit the MAFF expert by letter. The letter is delivered to MAFF with an anticipation of one month prior to the expert's arrival.
  - (l) Provide MAFF with the latest information regarding the certified facilities in before the export season.
  - (m) Attend the MAFF expert's audit.
  - (n) Inform MAFF of any serious problems which result in rejection of TWT or the export shipment and in the case of any serious violation as determined by SENASA, request for MAFF expert to come to SENASA to investigate and discuss the course of action to be taken.
2. Ministry of Agriculture, forestry and fisheries of japan (MAFF)
  - (a) Send an expert once per calendar year or more if needed, to audit the mango export program to confirm that all of the MAFF requirements have been met according to this protocol. SENASA and MAFF will decide in advance, when would be the best time for the MAFF expert's audit visit.
  - (b) The following will be reviewed when the MAFF expert arrives to audit the program:
    - (1) Method and frequency of the calibration of the self-registering thermometer, and

the results. (Calibration shall be conducted during the audit and compared with the calibration result during the other period.)

- (2) TWT facilities and packing facilities. (MAH expert confirm that the requirements for them in regard to the measures to prevent recontamination are accurate.)
- (3) Appropriateness in the procedure of Inspection of TWT facilities and the placement of the fruit thermosensors.
- (4) Appropriateness in TWT method for commercial shipments (loading, self-registering thermometer position, etc.) and confirmation method (interval of temperature record, etc.).
- (5) Situation in keeping temperature record (TWT time, TWT equipment, commodity, amount, fruits size, sensor fruits size, self-registering thermometer position, starting time, treatment temperature record, ending time and if the information on people who confirmed the treatment is kept properly.)
- (6) Record for export inspection by SENASA.
- (7) Copies of phytosanitary certificates issued by SENASA.
- (8) Documents exchanged between SENASA and each facility (application for registration, reports for repair, contents of improvement, etc.). MAFF expert confirm whether or not there is a difference between the latest information regarding the facilities which MAFF received from SENASA and the facility information on site.
- (9) Record of abnormal incidents such as TWT equipment problems, etc. and details on the measures taken (all these should be documented and signed by SENASA expert with the date.)

### 3. Pertinent organizations (facility operator/staff, exporter, etc.)

- (a) Maintain a Mediterranean fruit fly, *Anastrepha fraterculus*, *A. obliqua* and *A. striata* proof facility for the program.
- (b) Facilitate of the protocol implementation through the strict compliance with agreed procedures.
- (c) Provide the necessary assistance and logistic support for timely completion of protocol.
- (d) Inform the acquisition of new TWT equipment and changes into the facilities and request the re-certify them to SENASA.
- (e) Maintain all facilities and equipment in good working conditions ensure timely registration of events and the availability to have an appropriate event recorder and back up for TWT, and that the packing facilities are clean, pests free and fully enclosed to prevent live Mediterranean fruit fly, *Anastrepha fraterculus*, *A. obliqua* and *A. striata* entry.
- (f) Maintain and document an accurate record of TWT, inspection and any problems encountered.
- (g) Apply all TWT equipment, TWTs, and shipments.
- (h) Cover all costs required for the annual audit visit the MAFF inspector. Details in the calculation and method of payment will be later coordinated by SENASA.

## III Operational Procedures

### 1. TWT equipment and Facility Approval

- (a) Each exporting company will submit to SENASA a copy of TWT facilities, diagram of the

layout of the packing facilities, and a site plan showing the relationship of TWT facilities and packing facilities. (See the Annex "Procedure of Inspection of Thermal Water Treatment (TWT) Facility" for a detailed procedure)

- (b) Any new or modified TWT equipment must receive approval and examined by SENASA.
- (c) SENASA will provide MAFF with the latest information regarding the facilities (a copy of TWT facilities, diagram of the layout of the packing facilities, and a site plan showing the relationship of TWT facilities and packing facilities, floor plans of the facilities, number of self-registering thermometers and hygrometers, etc.) SENASA certified.

## 2. Inspection and Certification

- (a) Conducted under SENASA and accompanied by the phytosanitary certificates issued by that authority, which acknowledges that, as a result of inspection, it is apparently free of any quarantine pests or diseases, especially Mediterranean fruit fly, *Anastrepha fraterculus*, *A. obliqua* and *A. striata*.
- (b) SENASA experts will conduct the inspection and TWT for the mango fruit export to Japan, and will ensure that the MAFF requirements have been met according to this protocol. Also, TWT date, the treatment method, TWT duration and TWT temperature must be recorded in the treatment section of the phytosanitary certificate.

## 3. TWT

Disinfestation is conducted in TWT equipment, which heats mango with water at 47°C until temperature on fruit's center reaches 46°C.

## 4. TWT Facility

- (a) TWT facility shall satisfy the following requirements, which SENASA expert will be responsible for:
  - (1) Equipment to increase fruit's temperature should use the thermal water immersion method.
  - (2) Self-registering thermometer should be installed.
  - (3) Self-registering thermometer should be capable of measuring water temperature as well as temperature in the center of fruits places on stretchers.
  - (4) TWT equipment should keep temperature in the fruit's center at a given degree.

## 5. Inspection and disinfestation

- (a) The confirmation of the enforcement of disinfestation shall be conducted with SENASA experts as follows;
  - (1) Confirm the acuteness of the thermometer prior to treatment.
  - (2) Confirm the temperature measurement points in the fresh fruit's center.
  - (3) Confirm whether temperature in the three selected fruit's center has reached 46°C and 47°C in water, inside TWT equipment. Fruit's sensors are placed in the largest mangos to be treated.
  - (4) Confirm whether fruits in the tank are below 10 cm from the water surface.
- (b) SENASA expert will review the following documents and verify that TWT has met all the requirements. These records will be kept in a special file for MAFF's review during the annual visit.

- (1) The computer printout of the start of TWT and the last hour of TWT signed by SENASA expert.
- (2) The diagram of TWT equipment showing the self-registering thermometer placements within the treatment load.
- (3) The complete computer printout and all appropriate documents related to this program will be kept at SENASA office for at least one year for the MAFF expert to review.

#### 6. Packing and Packing Facility

- (a) When air holes are provided in the packages, one of the following conditions must be met:
  - (1) Fruit shall be wrapped with a packing material before they are packed in a package. (When there are air holes in a packing material, the diameter of the hole shall be 1.6 mm or less.)
  - (2) Air holes shall be screened. (The diameter of the screen mesh shall be 1.6 mm or less.)
  - (3) The package or the bundled packages shall be covered by a screen. (The diameter of the screen mesh shall be 1.6 mm or less.)
- (b) The places for packing must satisfy the following conditions:
  - (1) It shall be installed adjoining to TWT facilities, windows and any other opening shall be screened (diagonal of the screen must be less than 1.6mm) in order to prevent infestation by Mediterranean fruit fly, *Anastrepha fraterculus*, *A. obliqua* and *A. striata*.
  - (2) It shall be used exclusively for packing treated fresh mangoes.
  - (3) It shall be disinfested with insecticide prior to its use each year and shall be disinfested as often as necessary.

#### 7. Inspection of Packing Facilities and TWT facilities

- (a) In principle, the inspection of the packing facilities and TWT facilities shall be conducted by SENASA.
- (b) If live Mediterranean fruit fly, *Anastrepha fraterculus*, *A. obliqua* and *A. striata* are found in the packing facility, no shipment from that facility will be allowed. The cause of the find will be thoroughly investigated by SENASA and the incident will be documented.
- (c) Each package or each bundled package shall be sealed by SENASA.

#### 8. Confirmation of Export Inspection

- (a) At least 5 percent of the total number of cartons of export mango shall be inspected by SENASA to confirm the freedom of quarantine pests and diseases, especially Mediterranean fruit fly, *Anastrepha fraterculus*, *A. obliqua* and *A. striata*.
- (b) In the case when live Mediterranean fruit fly, *Anastrepha fraterculus*, *A. obliqua* and *A. striata* are found, MAFF should be notified immediately. Until the cause is identified and it is approved by MAFF, no TWT shall be conducted.

#### 9. Marking

Each fruit package and/or block of packages which underwent disinfestation treatment described in No.5 and inspected as indicated in No.8 should be labeled with the

indication which mentions that fruit has passed vegetal quarantine for exportation and that its destination is Japan.

Indication mentioned for mango shall be according to the following as letters. Indications shall be marked on the side surface of each package or bundle of packages where can easily be noticed and be large enough to be recognized easily.

EXPORT MANGO TO JAPAN - HOTWATER TREATMENT  
SENASA PERU

10. Phytosanitary Certificate

- (a) Following confirmation that the fruit was treated in accordance with this protocol, and that no quarantine insect pests or diseases were found during the export inspection as described in this protocol, SENASA will sign and issue a phytosanitary certificate for each TWT.
- (b) The phytosanitary certificate shall also bear especially following remarks:
  - (1) The fresh fruits are not infested with the Mediterranean fruit fly, *Anastrepha fraterculus*, *A. obliqua* and *A. striata*.
  - (2) The fresh fruits have been disinfested with TWT.
- (c) TWT date, treatment method, TWT duration and TWT temperature should be recorded in the Additional Declaration section of the phytosanitary certificate.

11. Transportation Method

Treated and certified fruits may be exported to japan as air freight and/or ship cargo.

**IV Infraction**

Any serious infraction of the conditions of this protocol which indicates that the program is not properly managed to prevent the threat of Mediterranean fruit fly, may be subject to cancellation of the current system, and the mango export program will revert back to full MAFF on-site presence.

## Annex

### Procedure of Inspection of Thermal Water Treatment (TWT) Facility

#### 1. Calibration of thermosensors

Calibration of thermosensors for fruit and water used in the trial will be verified according to the following methods. Such calibration will be conducted more than once a month.

- (1) All thermosensors are submerged in water keeping TWT equipment or isothermal pool at a temperature of 47.0°C, using a standard thermometer to measure the temperature of water.
- (2) The thermosensor's temperature is registered 3 times every 5 minutes through the temperature registration system.
- (3) A temperature correction factor is decided, which is indicated more than two out of the three measurements with the same result in thermosensors. In case the thermosensor indicates different results at three different times, measurements will be taken two additional times. The correction factor is decided on the basis of temperature which coincides more than two times and all sensors are calibrated.
- (4) In addition, if the thermosensor has a fixing ability in the sensor's registration system temperature indication, each of the sensors is adjusted to 47.0°C after above (1). Thereafter, the work (2) and (3) is conducted.
- (5) In case the thermosensor's measurement result in above (3) or (4) exceeds 47.0°C ± 0.3°C; or indicates 5 different results, the mentioned sensor will not be used.

#### 2. Running Test in TWT equipment

With the purpose of determining the place of minimum temperatures, where thermosensors are placed during disinfestation verification, a running test will be conducted according to the ways indicated in the following points between (1) and (7). In principle, the running test shall be conducted in before the start of the export season for Japan and when new TWT equipment is certified and TWT equipment is repaired.

It can be understood that fruits used in such test have finished disinfestation treatment, if and only if there has been compliance of treatment condition.

- (1) The temperature of water in TWT equipment is taken. When there is more than one sensor in the equipment, the sensor indication the lowest temperature is used.
- (2) It is verified that water in the equipment for TWT is at 47.0°C.
- (3) More than 9 big fruits are selected for treatment. Fruit thermosensors are placed inside the mangoes and sealed with waterproof tape to avoid water entrance during treatment.
- (4) Mangoes with thermosensors are placed at the top, middle and bottom of water outlet side, inlet side and the center of the fruit stretcher. In case treatment is being conducted to more than one box at a time, mangoes with sensor are placed on the top, middle and bottom of water outlet side of the box placed on the water outlet, water inlet side of the box placed on the water inlet and the box placed on the center of the fruit stretcher.
- (5) The measurement result is registered with the temperature registration system of all sensors every 5 minutes at the most.
- (6) Fruits placed on stretchers are submerged up to 10cm below the water surface in TWT equipment.
- (7) After verifying that all fruit thermosensors reach 46.0°C, the location of mangoes with sensors is identified with the fruit sensor which indicates the situation in which it is most

difficult to increase temperature.

3. Verification of disinfestation treatment for fruits destined to Japan

It is verified that disinfestation treatment for fruits destined to Japan comply with the following rules:

- (1) Fruit thermosensors are placed in the largest mangoes to be treated.
- (2) Total weight of fruits places in box (es) will be less than the weight established in the running test.
- (3) Sensor fruits will be placed where it took longer for temperature to reach 46.0°C.