

**Revision of the *Plant Quarantine Import Requirements for Fresh Mango*
*Fruits from Brazil***

10 October 2024

1. Areas and plants of application

Fresh fruits of mango (*Mangifera indica* L.) produced commercially from Brazil

2. Means of conveyance

Air cargo and ship cargo

3. Registration of export orchards, packinghouses and hot water treatment facilities

- A. Orchards growing mango (hereinafter referred to as "export orchards"), packinghouses and hot water treatment facilities for export to Korea shall register with the National Plant Protection Organization of Brazil (hereinafter referred to as "DSV (Departamento de Sanidade Vegetal)").
- B. DSV shall inform the list of registered export orchards, packinghouses and hot water treatment facilities to Animal and Plant Quarantine Agency of the Republic of Korea (hereinafter referred to as "APQA") each year before commencement of export.
- C. DSV shall oversee and supervise registered export orchards to make sure that they are managed under total pest management system.

4. Monitoring and management of export orchards against Korea's quarantine pests

- A. DSV shall conduct monitoring of incursion of *Xanthomonas campestris* pv. *mangiferaeindicae* in each registered export orchards during growth, and shall undertake appropriate control measures upon the incursion.
- B. The results of monitoring should be submitted to APQA each year before the

commencement of export.

5. Sorting

A. DSV shall check sanitary conditions of export packinghouses (including hot water treatment facilities and storages) each year before export and shall oversee and supervise to ensure that the following are in place:

- (1) Maintaining cleanliness such as regularly disinfecting packinghouses each year;
- (2) Taking appropriate measures such as automatic doors, rubber curtains or air curtains at the entrance of packinghouses; installation of insect-proof facilities in all openings; container loading in closed places to prevent recontamination or reinfection of pests in packinghouses;
- (3) Ensuring fresh mango fruits for export to Korea are not sorted together, or mixed together or loaded together with non-export orchards or for export to other markets, or any other fruits;

B. DSV shall take appropriate measures to ensure that contaminants such as leaves, twigs or soils are moved from the export consignments during sorting process.

6. Hot water treatment

A. The fresh fruits of mango for export to Korea shall be treated with hot water at over 46.1°C according to the hot water treatment standard per fruit weight.

Weight of mango fruit (g)	Immersion time (minutes)
Up to 375	65
376 ~ 500	75
501 ~ 700	90
701 ~ 900	110

- B. The hot water treatment shall be conducted on each consignment in the registered facilities under the supervision of plant quarantine inspector of Brazil.
- C. The details of the hot water treatment shall comply with the Annex 2. Detailed Guidelines on Hot Water Treatment for Fresh Mango from Brazil of the requirements.

7. Packing and labeling

- A. DSV shall mark registration numbers of export orchards, packinghouses and hot water treatment facilities and "For Korea" on each packing cartons or pallet for export to Korea.
- B. In case the fruits are packed with cartons that have ventilation holes, the cartons shall conform to one of the following requirements:
 - (1) Only cartons whose ventilation holes are covers covered with nets with the mesh size less than 1.6×1.6mm in diameter shall be used.
 - (2) The whole packing or pallets shall be wrapped with nets with the mesh size less than 1.6×1.6 mm in diameter.
 - (3) The cartons or pallets shall be directly loaded into container from hot water treatment facilities or storages which are equipped with nets.
- C. DSV shall implement measures to ensure that export consignments that are packed are not re-contaminated during storage or conveyance.

8. Export inspection and certification

- A. DSV shall carry out export inspection where are free from recontamination of Korea's quarantine pests.
- B. DSV shall carry out export inspection for checking Korea's quarantine pests on at least 2% of total packed fruit cartons after applying hot water treatment.
- C. In case a live fruit fly is intercepted, the export of mango from Brazil to Korea shall be provisionally suspended until the two countries reach agreement after identifying the

cause and establishing improvement measures. DSV shall immediately notify the interception of live fruit fly to APQA by an official letter.

D. In case *Xanthomonas campestris* pv. *mangiferaeindicae* is found, DSV shall reject consignments where the pests are intercepted and suspend export of fresh fruits of mango produced by the relevant export orchards for that export season. DSV shall immediately notify the detection of *Xanthomonas campestris* pv. *mangiferaeindicae* and suspended export orchard to APQA through the official letter.

E. In case other quarantine pests are intercepted, the relevant stack shall be rejected. Nevertheless, if pests are completely destroyed or removed, the stack may be exported.

F. DSV shall issue phytosanitary certificate (hereinafter referred to as "PC") on fresh fruits that are not infected by Korea's quarantine pests (See Annex 1) and consignments that comply with requirements agreed by the two countries through the export inspection. The following statements shall be described in the PC.

- (1) Registration numbers of export orchards and packing houses (including hot water treatment facilities)
- (2) "This consignment is free from *Xanthomonas campestris* pv. *mangiferaeindicae* and other Korea's quarantine pests."
- (3) Results of hot water dipping (treatment date, temperature, duration) shall be described in the treatment section

9. Import inspection

A. Upon arrival of consignments, APQA shall check the following points. If the consignment has problems in the following points, all or parts of the consignment shall be destroyed or returned.

- (1) The attached PC with Additional Declaration
- (2) The condition of labeling of "For Korea" and registration numbers of export orchards and packinghouses on the outside the export packing cartons or pallets

- (3) The condition of sealing for the packing cartons or pallets
- B. APQA shall conduct the import inspection in accordance with Plant Protection Acts and Regulations of Korea. In case a live fruit fly is found during the import inspection, the consignment shall be destroyed or returned, and the importation shall be suspended until the cause is identified and remedial measures are implemented.
- C. In case of a consignment may not be conducted pre-clearance inspection, APQA shall conduct the laboratory test on-arrival in Korea
- D. In case *Xanthomonas campestris* pv. *mangiferaeindicae* is found, the relevant consignment shall be destroyed or returned while the fresh fruits of mango from the relevant export orchards shall be suspended from export to Korea for that season.
- E. In case other live quarantine pests are found during import inspection, the consignment shall be treated. In case no treatment is available, the consignment shall be destroyed or returned.
- F. In case other new unassessed pests are intercepted or Korea's quarantine pests (Annex 1) are continuously intercepted, pest risk assessment shall be conducted and necessary measures can be determined based on the result of assessment.

10. Pre-clearance Inspection or on-site survey

- A. APQA conduct on-site survey to import mango fresh fruits from Brazil every year.
- B. DSV shall send APQA an official invitation letter including below information 30 days before commencement of exportation.
- (1) The number of plant quarantine inspector from Korean and required inspection period (pre-clearance inspection only)
- (2) Estimated volume of export and export areas;
- (3) A schedule of plant quarantine inspector of Korea (on-site survey only)
- C. APQA plant quarantine inspector shall carry out inspection or survey as follows.
- (1) APQA plant quarantine inspector may request necessary records and information to DSV to conduct on-site survey, and DSV shall provide them.

- (2) APQA plant quarantine inspectors may check export orchards or packing houses or hot water treatment facilities.
 - (3) APQA plant quarantine inspectors may request to DSV correction or exclusion of export orchards or packing houses or hot water treatment facilities which are non-complied with the requirements from the export to Korea.
 - (4) APQA plant quarantine inspector dispatched for pre-clearance inspection shall carry out export inspection and check the conditions of preparation for hot water treatment jointly with DSV plant inspector.
- D. All costs pertaining to pre-clearance inspection or on-site survey by APQA plant quarantine inspector shall be paid by the Brazil side in accordance with the schedule for overseas travel cost of Korea. The Brazil side shall provide all of conveniences such as arrangement of transportation and interpreter for the APQA inspector.
- E. If a quarantine problem occurs, such as repeated violation of this import requirement or new pests occurs, pre-clearance inspection can be resumed upon request of APQA.

11. Others

- A. If a new pest that Korea may be concerned about is found from fresh mango fruits, DSV shall immediately notify APQA.
- B. If it is determined that the pest and phytosanitary condition has changed significantly in Brazil, APQA can review the import requirements.

[ANNEX 1]

Korea's Quarantine Pests of Fresh Mango From Brazil

< Pathogen (8 species) >

<i>Xanthomonas campestris</i> pv. <i>mangiferaeindicae</i> * <i>Ceratocystis paradoxa</i> <i>Dothiorella aromatica</i>	<i>Corticium koleroga</i> <i>Dothiorella dominicana</i> <i>Phytophthora heveae</i> <i>Phomopsis anacardii</i> <i>Phomopsis mangiferae</i>
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< Pests (30 species) >

<u><i>Ceratitis capitata</i></u> * <u><i>Bactrocera carambolae</i></u> * <u><i>Anastrepha fraterculus</i></u> * <u><i>Anastrepha obliqua</i></u> * <u><i>Anastrepha serpentina</i></u> * <u><i>Anastrepha distincta</i></u> * <u><i>Anastrepha pseudoparallela</i></u> * <u><i>Anastrepha striata</i></u> * <i>Anastrepha turpinae</i> * <i>Frankliniella schultzei</i> <i>Selenothrips rubrocinctus</i> <i>Aleurothrixus floccosus</i> <i>Aonidiella aurantii</i> <i>Aonidiella orientalis</i> <i>Aspidiotus nerii</i> <i>Aulacaspis tubercularis</i>	<i>Lepidosaphes beckii</i> <i>Pseudaonidia trilobitiformis</i> <i>Selenaspis articulatus</i> <i>Asterolecanium pustulans</i> <i>Ceroplastes floridensis</i> <i>Ceroplastes rusci</i> <i>Coccus viridis</i> <i>Pulvinaria psidii</i> <i>Dysmicoccus brevipes</i> <i>Ferrisia virgata</i> <i>Pseudococcus longispinus</i> <i>Pseudococcus jackbeardsleyi</i> <i>Brevipalpus phoenicis</i> <i>Erosomyia mangiferae</i>
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* 10 species : required specific risk mitigation measures

(* 8 species : prohibited pests)

[ANNEX 2]

Detailed Guidelines on Hot Water Treatment for Fresh Mango from Brazil

1. How Water Treatment Facilities

- A. Hot water treatment facilities shall be registered with National Plant Protection Organization of Brazil (hereinafter referred to as "DSV"); maintain clean sanitary conditions; and be sealed or be equipped with insect proof facility to prevent entry of pests.
- B. Hot water treatment facilities shall be the batch system where baskets of fruit are loaded onto a platform which is then lowered into the circulating hot water.
- C. Clean water must be used for hot water tank and the water quality must be checked and replaced regularly. The water used for hot water treatment for fruits for domestic markets or for other export markets shall not be reused for mango for export to Korea.
- D. The water in hot tank shall be circulated continuously in order to keep the temperature uniformly at 46.1 °C all throughout the tank.

2. Temperature sensor

- A. The temperature calibrator must be confirmed with a certificate issued by an institution recognized by DSV and the accuracy of the temperature sensor shall be within $\pm 0.3^{\circ}\text{C}$ of the treatment temperature (46.1 °C).
- B. The hot water tank must be able to continuously circulate water to maintain an even temperature in the tank, which can be demonstrated by installing a temperature sensor 1/3 of the way down the tank.
- C. For hot water treatment, the requirement is at least two sensors per hot water tank. However, in tanks that treat multiple baskets (cages) of fruit, there must be at least one sensor per basket.

3. Temperature recorder

- A. The temperature recorder must have the automatic temperature recording function (the strip chart or date logger) so that the temperature can be checked anytime from outside, and all temperature sensor measurements should be recorded, saved and printed continuously. It shall also indicate identification number of the recorder and hot water treatment facilities.
- B. The temperature recorder shall be able to record the temperature within at least every 2 minutes. It shall not be made possible to make changes to the measurements.

4. Method of hot water treatment

- A. Only fruits which are selected through the first sorting, in which misshapen or rotten fruits are discarded, shall undergo hot water treatment.
- B. Fresh mango fruits shall be divided according to weight grade before hot water treatment commences, and fruits in the tank shall be selected randomly for weight measurement to decide hot water treatment time per separated tank. Mangoes that exceed weight grade shall be applied with applicable treatment standard, and fruits mixed with different weight grades shall not be allowed for hot water treatment.
- C. The temperature of the fruit core shall be over 21.1°C before the hot water treatment. The fruit core temperature shall be measured randomly and if the temperature reaches expected temperature, the fruits shall be treated with hot water treatment.
- D. All temperature sensors in water tank must record 46.1°C or above before treatment can commence, and fruits shall be treated according to the hot water treatment standard per fruit weight.
- E. The fruits must be immersed at least 10cm or more below the water surface.
- F. In case when the fruits are to be stored at room temperature without rapid cooling or cooled using water after the treatment is complete, fruits shall be water cooled after a waiting period of 30 minutes since taking them out from hot water tank. However, in case when the fruits are water cooled right after treatment, the treatment period shall be extended by 10 minutes.

5. Prevention of re-contamination after the hot water treatment

A. Fruits treated with hot water treatment shall be stored, packed and transported in a facility equipped with enclosed or insect proof facility.

6. Rejection standards for the hot water treatment

A. In case when the temperature and duration of treatment cannot continuously meet the hot water treatment standard per fruit weight.

B. In case that the temperature of the fruit pulp is lower than 45°C, when the fruit pulp temperature is checked randomly, immediately after the treatment;

C. In case there are any factors that may influence the result of the treatment.