Phytosanitary irradiation treatment of Lychees and Mangoes exported from Vietnam to Australia

Item	Information
General	• Both lychees and mangoes respond well to phytosanitary irradiation. It is important however to ensure product is properly produced, selected and prepared, and treatment is applied correctly. • Specific to mangoes, the ripening process before treatment is a particularly important consideration.
Production practices	• Production practices prior to harvest can have a significant impact on the shelf life of lychees and mangoes intended for export. • Field hygiene and preharvest fungicide treatments reduce the incidence and severity of postharvest disease which will not be effectively controlled by phytosanitary irradiation treatment. • Any sprays should be scheduled and applied as per government regulations and international best practice. When chemicals are used, withholding periods should be noted and harvesting schedules adjusted accordingly

Fruit selection, including maturity stage	• The stage and uniformity of maturity can impact fruit ripening which is an important consideration during the phytosanitary irradiation treatment.
	• Maturity selection parameters include:
	  ○ Fruit shape
	  ○ Peel/skin colour
	  ○ Peel/skin texture
	  ○ Flesh firmness
	  ○ Flesh colour development
	  ○ Soluble solids content
	  ○ Latex content
	• Varietal differences, growing regions, climatic conditions, agronomic practices all influence the expression of maturity indicators.

Harvest, collection and packing	• Fruit should be packed as soon as possible after harvest.
	• Mechanical injuries hasten deterioration and ripening as well as providing infection sites for decay organisms and pest infestations. Fruit must be handled carefully to avoid bruising, cuts, punctures, and abrasions.
	• Fruit grading should remove unmarketable fruit, including those with:
	  • Physical injuries, misshapen and immature fruit
	  • Any evidence of decay
	  • Lenticel damage, sap burns, surface scald or collapsed areas (symptoms of hot water damage)
	• Lenticel spotting and sap burns not removed during grading may be exacerbated by phytosanitary irradiation treatment.
	• Fruit should be packed tightly into suitable cartons to minimise movement during transport, but should not be forced into position.
	• Fruit must not protrude above the top of the carton, as this will lead to pressure bruising or crushing of fruit when cartons are stacked.
	• Cartons must be designed to allow proper airflow to assist in temperature management and ripening.
	• A minimum of 5% of carton face should be ventilated to allow adequate heat exchange and should be placed to ensure uniform distribution of air throughout carton.
	• Unused cartons and packaging material should be stored in an area free from contamination.
	• New, quality pallets that are sized for shipping and packaging should be used.
	• Place cartons carefully on pallets, ensure no overhang and proper alignment of carton ventilation holes. Pallets should be appropriately strapped and braced.

Gas ripening of mangoes	• Irradiation treatment of hard green mangoes may delay or prevent ripening as it disrupts ethylene receptors in the fruit. • If mangoes are being prepared for a market that favours coloured mangoes, ripening to colour stage 2-4 (depending on variety and market) should occur prior to treatment. See Mango Skin Colour Guide for maturity index (https://www.industry.mangoes.net.au/resource-collection/2017/9/6/mango-skin-colour-guide). • Controlled ripening of mangoes with ethylene will enhance consistency of colour stage and arrival condition in export market. • The rate and duration of gas ripening treatment will depend on variety, seasonal conditions, and maturity at harvest. See Mango Ripening Manual (https://www.industry.mangoes.net.au/resource-collection/mango-ripening-manual).
Phytosanitary Irradiation Treatment	• Both Australia and Vietnam benefit by access to phytosanitary irradiation treatment to facilitate trade in fresh produce. • Collaboration with treatment providers is vital to ensure treatment is tailored to delivering on technical and commercial market requirements. • Taking a tour of the treatment facility can help exporters build understanding for the treatment process. • Both exporter and treatment provider need to consider unique product attributes, handling requirements and other matters that are important to planning the treatment process and associated logistics.
Temperature management	• Temperature and relative humidity management and cold chain integrity play a critical role in ensuring high quality fruit is received by consumers • Avoiding high temperatures and quickly reducing temperatures to the optimum for transport reduces the rate of physiological and biochemical change that occurs after harvest, minimises water loss and slows the growth of decay causing microorganisms • There is a limit to the low temperatures that the fruit can tolerate due to their susceptibility to chilling injury. • Agreement should be reached between importer and exporter as to required storage temperature. • Phytosanitary irradiation treatment provider must be engaged to ensure appropriate action taken to ensure integrity of cold chain
Logistics	• Speed to market is critical and airfreight ideal method of transport following phytosanitary irradiation treatment. • All landside operations should be optimised to minimise time between harvest and uplift.
Record-keeping	• Keeping records is an important part of a quality control program • Exports should develop forms for recording all operations and procedures that are performed