



## PATHWAY ASSURANCE REPORT

### THAILAND IRRADIATION FACILITIES

**27-31 MAY 2013**

Fresh Produce Imports  
Plants, Food & Environment Directorate  
Standards Branch



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## ACKNOWLEDGEMENTS

The Ministry for Primary Industries (MPI) acknowledge and thank the officials of the Department of Agriculture (DOA) who generously gave their time and co-operation during this pathway assurance visit. In particular, thanks are extended to Mr [REDACTED] (Director, Plant Quarantine Research Group, DOA, Bangkok) and Miss [REDACTED] (International Affairs Officer, Ministry of Agriculture and Cooperatives, Bangkok) for the organisation of the itinerary, co-ordination of meetings and visits to lychee and longan orchards, packing houses and irradiation treatment facilities. We also thank Miss [REDACTED] (Policy Support Officer, New Zealand Embassy, Bangkok) for liaising with DOA on MPI's behalf and for arranging the itinerary.

## EXECUTIVE SUMMARY

The primary purpose of the visit to Thailand was:

- For MPI to assess and review activities at the two irradiation facilities in order to approve/accredit the facilities against ISPM 18 to ensure the minimum irradiation requirements for lychee and longan to New Zealand are met.
- To observe the production, and packing processes involved in the current export of lychee and longan to New Zealand (cold treatment), with a view to assist in the developments of a risk management proposal and official assurance programmes for the export of irradiated lychee and longan to New Zealand.

### *Treatment facility review*

The review of the irradiation facilities focussed on general system components and operational processes (i.e. phytosanitary inspections, treatment facility infrastructure, treatment procedures, treatment application, post-treatment security and phytosanitary inspection and certification).

In general, the irradiation facilities showed that both were operating quality systems which comply with international requirements. Thailand currently exports pre-shipment inspected irradiated lychee and longan to the USA. The facilities are supervised and certified by DOA to conduct phytosanitary treatment of fresh produce. It is also noted that USDA annually conduct audits of the facilities.

It is expected that MPI will provide the risk management proposal for the irradiation of lychee and longan for consultation to DOA and local industry before the import health standard for both the commodities can be amended to include irradiation as an additional equivalence treatment. It is also expected that an official assurance programme (OAP) will be agreed between DOA and MPI to cover the irradiation treatment of lychee and longan (and potentially other commodities).

It was agreed that DOA will forward dose mapping studies for lychee and longan to New Zealand prior to trade commencing.

## BACKGROUND

The Department of Agriculture, Thailand (DOA) sent an equivalent request to export irradiated lychee and longans to New Zealand. Thailand have existing market access for both

these commodities and currently require either cold disinfestation or vapour heat treatment to mitigate the presence of fruit flies. The aim of the visit was to accredit the irradiation facilities which would enable MPI to draft the risk management proposals and the OAP. DOA also proposed MPI visit lychee and longan orchards and packing houses in Chiang Mai province.

The visit itinerary included:

1. On-site visits to two lychee orchards in Fang District, Chiang Mai Province, Thailand 27 May 2013.
  2. On-site visits to two longan orchards in Phrao District, Chiang Mai Province, Thailand, 28 May 2013.
  3. Visit to [REDACTED] and [REDACTED] packing houses, Nakhon Pathom province, 29 May 2013.
  4. Visit to Synergy Health Irradiation facility, Chonburi province, Thailand. 30 May 2013.
  5. Visit to Thai Irradiation Centre (TIC), Phatumthanee Province, Thailand, 31 May 2013
- A discussion with DOA officials on the preliminary outcomes of the visit (31 May 2013 April 2013).

## REFERENCES

- Import Health Standards, Commodity Sub-Class: Fresh Fruit/Vegetables, (*Litchi chinensis*) from Thailand and (*Dimocarpus longan*) from Thailand;
- Australia New Zealand Food Standards Code – Standard 1.5.3 – Irradiation of Food;
- Code of Practice for Radiation Processing of Food (CAC/RCP 19-1979);
- Codex General Standard for Irradiated Foods Codex Standard 106-1983, Rev.1-2003;
- International Standard for Phytosanitary Measures Publication No. 18 – Guidelines for the Use of Irradiation as a Phytosanitary Treatment;
- Standard operating procedures for the treatment facilities seeking MPI-approval.

[Checklists for treatment facility reviews were composed of the above standards and are attached in appendices]

## ENTRY MEETING

An entry meeting was conducted with DOA in-transit to Chiang Mai on 27 May 2013. The following points were clarified:

- Purpose, scope and criteria of the treatment facility review
- Confirmation of the review plan and itinerary
- Process of equivalence approval following the MPI assessment [this was clarified again at the exit meeting]

# SUMMARY OF LYCHEE AND LONGAN ORCHARD VISIT FINDINGS

All lychee and longan orchards exporting to New Zealand (and other export markets) are GAP certified. Before an orchard is GAP certified, they must express their interest to the Department of Agriculture extension, Thailand. An official from DOA extension visits the orchards and makes recommendations to the orchards including the use of a DOA approved integrated pest management programme. Once an orchard meets the criteria for GAP certification, a DOA official visits the orchard and if all criteria are met, a GAP certificate is issued to the grower. This GAP certificate is valid for two years from the date of issue. Prior to the export season, the orchards are visited by DOA extension officials and further recommendations are made as necessary. If a grower detects a pest/disease outbreak, the first point of contact is DOA extension, who make recommendations on which pesticides to use to control the pest. GAP certificates were sighted for the orchards visited. Each GAP certificate has a unique grower number and states the number of orchards covered by a particular GAP certificate, using unique orchard numbers. The certificates also state the area of each orchard.

Example of GAP certificate

Grower ID

Unique orchard numbers

Commodity

รหัสแปลง	พื้นที่	ไร่
รหัสแปลง 500903-130-0014	พื้นที่ 12	ไร่
รหัสแปลง 500903-130-0015	พื้นที่ 30	ไร่
รหัสแปลง 500903-130-0016	พื้นที่ 6	ไร่
รหัสแปลง 500903-130-0017	พื้นที่ 5	ไร่
รหัสแปลง 500903-130-0018	พื้นที่ 2	ไร่

DOA informed MPI that the lychee export season is relatively short (one month) and that the orchards visited had completed harvesting the fruit. *Conogethes punctiferalis* yellow peach moth (YPM) is primarily controlled by the use of the insecticide Methomyl carbamate and is only applied when signs of YPM infestations are detected in the orchards. One of the lychee orchards visited had signs of YPM infestations. DOA informed us that this orchard had completed exporting for the season, and stopped in-field controls for YPM. MPI was

informed that the orchard conducts daily inspections for pest outbreak during the growing season and before fruit harvest.



Lychee fruit with YPM entry hole



Lychee fruit infested with YPM

DOA informed MPI that the longan export season is longer compared to lychee. The pest control activities are similar to lychee orchards and MPI were informed YPM is more prevalent in

lychee orchards than longan orchards. MPI were informed that fruit fly traps are laid out in the canopies of trees once the fruit start maturing and removed after fruit harvest and the trees are pruned.

The visit to the lychee and longan orchards gave a good overview of the pre-harvest practises currently in place. Information gathered during this visit gave MPI a greater understanding of DOA's GAP certification system.

## **SUMMARY OF RECCOMENDATIONS**

**Action 1:** DOA to consider recommending orchards to dispose of fallen fruit as soon as practical to avoid infestations of pests including YPM and fruit flies.

**Action 2:** DOA to consider recommending the use of standardised fruit fly traps and insecticides for the control of fruit flies in longan and lychee orchards.

## SUMMARY OF PACKING HOUSE VISTS

Two packing houses [REDACTED] were visited. As the lychee export season is relatively short (one month) and the longan season was yet to commence, packing and processing of mangosteen were observed. DOA informed MPI that the packing of lychee and longan uses a similar system to that observed. [REDACTED] packing house also had a vapour heat treatment (VHT) facility attached to the packing house. [REDACTED] also exported mangoes to New Zealand using the vapour heat treatment (VHT) facility. The VHT facility was not considered during this visit as it was outside the scope.

Both packing houses visited were clean and operated in a professional manner. Both facilities had measures including insect zappers and plastic strips to prevent the entry of insects within the packing house. The facilities also had measures in place to wash and dry the product treated. The packed treated produce was kept in a separate room in insect proof boxes and held securely to prevent re-infestation after treatment. The storage rooms had plastic curtains as well as multiple insect zappers to further prevent the incidence of insects. The operational staff were aware of New Zealand's requirements.

DOA expressed an ongoing issue regarding mangosteen exported where eggs were intercepted on arrival in New Zealand. MPI were informed that all mangosteen for the export market were fumigated with methyl bromide (MeBr) (at 32gm<sup>3</sup> for 2 hours at 21°C or above) and the fruit was then cleaned (in particular under the sepals and calyx of the fruit) either using a high pressure water or high pressure air blaster. New Zealand currently accepts mangosteen as a non-host of fruit fly and do not require fumigation treatment. DOA informed MPI that all packing houses/treatment facilities use mandatory MeBr fumigation prior to export to New Zealand (and other export markets).

## ACTION POINTS

- DOA discussed the possibility of certifying mangosteen to New Zealand as fumigated with MeBr on the phytosanitary certificates to MPI on the agreement that should eggs be found in a consignment on arrival in New Zealand, the consignment could be released on the basis that they have already been treated at the packing house. DOA had agreed to formally write to MPI with this proposal.
- DOA had also expressed interest in MBR fumigation of lychee and longan prior to cold treatment again as a possible treatment for eggs. Again it was agreed that DOA would formally write to MPI with this proposal.
- [REDACTED] expressed their interest in exporting semi processed coconuts to New Zealand. MPI explained the process for countries wanting to export semi-processed commodities and also informed DOA that currently seven different exporters from Thailand were allowed to export semi-processed coconuts to New Zealand. DOA & [REDACTED] agreed to write to MPI with information to support the application for semi-processed coconuts.
- DOA discussed the use of MBR as a possible treatment for fruit flies for commodities exported to New Zealand. MPI informed DOA that we are willing to consider all equivalence treatment options provided they are backed by appropriate efficacy data.



MPI informed DOA to send us the information and we will assess any equivalence request made.

## SYNERGY HEALTH IRRADIATION FACILITY

Address: [REDACTED]

Contacts: [REDACTED], Operation Manager, Synergy Health  
[REDACTED], Quality Assurance Manager, Synergy Health

Synergy Health Ltd. (Synergy) irradiates pharmaceutical and medical products, pet toys, and food including fresh fruit and spices using gamma irradiation (Cobalt 60). The facility currently treats 10,000 cubic metres of material a month. The company was verified and certified in March 2008 by the Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA) to irradiate fresh approved fruits for the US market. The facility has a pallet irradiator and a tote irradiator although only the pallet irradiator is used to irradiate fresh fruits. The facility has completed dose mapping studies that are approved by USDA for lychee, longan, rambutan, pineapple, mango, mangosteen, dragon fruit and are awaiting approval for guava. However, due to commercial demand, only longans and mangosteen are treated on a large scale and lychee is only treated for a short period due to its short export season. The facility has completed dose mapping studies for different sizes of fruit (e.g. large and small pineapples) and fruit in baskets and boxes (e.g. longans in boxes and longans in baskets). The facility has also completed studies on partially filled fruit pallets (using dummy material with similar density) but have not used this as there is no commercial need for this (FI-OQ-200 Report Partially-Filled.pdf

<http://fcs.maf.govt.nz/webtop/drl/objectId/090101b380baa9b9>

FCS Folder Location: <http://fcs.maf.govt.nz/webtop/drl/objectId/0b0101b380b967cb>)

It is noted that the studies on partially filled pallets using dummy materials were done at higher absorbed doses than those required for phytosanitary treatment of fresh produce.

The facility operates 24 hours a day to treat commodities although only a small portion of this is used to treat fresh fruit.

The facility was clean and secure when visited. The facility receives the fruit pre-packaged from packing houses and is loaded onto conveyer belts from the outside of the facility. A fence separates the treated area from the untreated area to prevent untreated product inadvertently being mixed with treated product. Double plastic doors and insect zappers are installed in this area to prevent the introduction of insects. Every consignment is accompanied with a 'Notification for Booking for Fruit irradiation' which specifies the exporter's name, number of boxes and total weight of boxes. The facility staff weigh and check the number of boxes to be treated and check for other information such as; the presence of the unique 'PUC' (production unit code) and 'PHC' (packing house unit code), packing date and the presence of radura sign or a statement saying 'Treated by/ with irradiation'.

Once this is complete, the consignment is held in the 'pre-treatment area' and the fruit is inspected by USDA and DOA. A total of 100 fruit (50 by USDA and 50 by DOA) is inspected and if signs of infestation are detected, the fruit is cut open to verify the presence of the pests. If less than two target pests are detected, then the consignment is treated. If more

than two target pests are found, then the packing house is notified and informed to clean future consignments of fruit. New Zealand's requirements of 600 unit inspection was explained to DOA and Synergy staff. DOA and Synergy staff stated that the same process would be followed for export to New Zealand (with a higher inspection rate by DOA).

Once the consignment is given clearance to be treated by DOA, the dosimeters are placed in pre-determined locations as per the dose mapping studies and the consignments are loaded onto the conveyer belts for irradiation. Although there are no charts to specify the location of the dosimeters and the configuration of the boxes in the pallets, operational staff are given a '*Routine Dosimetry Instruction Sheet*' (see below) which is specific for each commodity which specifies the product name and the configuration to stack the boxes (or bins if applicable) and written instructions on where to place the dosimeters. The location of the dosimeter depends on the Dose mapping report (identified at the top of the '*Routine Dosimetry Instruction sheet*').

Once the consignment is treated, it is unloaded and held in the 'holding area' until the dosimetry results are received. Synergy use a B3 Thin Film Dosimeter for fresh fruit. Once the results are confirmed, the process controller checks the cleanliness and general condition of the sea container, before the treated fruit is loaded into the container and sealed.

Appendix 1 provides a summary of the review of the facility and corresponding objective evidence.

As the risk management proposal (RMP) for lychee and longan to New Zealand and the accompanying official assurance programme (OAP) have yet to be finalised and consulted, Synergy/DOA have not completed dose mapping studies specific to New Zealand. However, DOA anticipate that these will be similar configurations currently used for USA.

#### RECOMMENDATION

1. DOA to send configurations and dose mapping studies of longan and lychee used to be exported to New Zealand to MPI once the RMP and OAP's are finalised after consultation with Synergy and exporters.

## TIC (THAI IRRADIATION CENTRE) IRRADIATION FACILITY

Address: [REDACTED]

Contacts: [REDACTED], Radiation Center Manager, TIC  
[REDACTED], Head of Technical and Product Development Section, TIC

TIC is a government run facility that caters to both government and private sectors and irradiates for research and commercial purposes. The facility treats herbs and spices, animal feeds, medical devices and frozen products, and fresh fruit using gamma irradiation (Cobalt 60).

TIC was first was verified and certified in October 2007 by the Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA) to irradiate fresh approved fruits for the US market. TIC have completed dose mapping studies for mango, mangosteen, longan, pineapples and rambutans in different loading configurations

for export to the USA. TIC does not irradiate partially filled pallets but informed MPI that they may consider doing dose mapping should there be considerable export demand.

The facility was clean and secure when visited. All doors had plastic screens and multiple insect zappers installed in the facility. A detailed list of pest exclusion and trapping done (including trapping for fruit flies) at TIC is described in section 6 of the SOP.

The SOP for TIC can be accessed at the following link:

<http://fcs.maf.govt.nz/webtop/drl/objectId/090101b380b993d6>

FCS Folder Location: <http://fcs.maf.govt.nz/webtop/drl/objectId/0b0101b380b967cb>

Similar to Synergy, upon receipt of product for treatment, exporters are required to fill out a '*Notification for irradiation treatment*' form. This describes the exporter's name, the number of boxes, total weight of the consignment, packing house code (PHC), production unit code (PUC) etc. The consignment is loaded onto a double door system from the outside into the untreated area of the facility. The facility has a fence that clearly separates the treated area and the untreated areas.

The consignment is first inspected by facility staff for damage and to ensure the boxes have PUC and PHC codes. After the presence of these codes has been confirmed, samples are taken from the consignment and inspected by DOA and USDA. Once DOA provides the approval for treatment, the fruit is arranged in pallets and 'unique barcode' is affixed on each box. The inspection by DOA/USDA follows the same process as described above (50 fruit inspected by DOA and 50 fruit inspected by USDA). Again, New Zealand's requirement of 600 unit inspection was emphasised and understood by DOA and TIC staff. The barcode contains information including; type of fruit, irradiation date, quantity of boxes, treatment identification and minimum and maximum dose required, PHC and PUC codes. The room where the consignment is received and inspected includes a separate area for palletization and shrink wrapping. Approved configurations are displayed in this area for all commodities. Once confirmation is received from DOA that the consignment is approved for treatment, the consignment is palletized, shrink wrapped and directed for treatment. The consignment is moved via conveyer belt and enters the 'untreated area'. The consignments are then placed in a queue for treatment.

The dosimeters used by TIC for fruit treatment are Opti-chromic dosimeters. Following treatment, the consignment is unloaded onto the treatment area and marked with a sign stating '*Pending product for absorbed dose measurements*'. Once the absorbed dose is confirmed, the container is cleaned in accordance to section five of the SOP and loaded with the consignment and sealed for shipment.

Appendix 2 provides a summary of the review of the facility and corresponding objective evidence.

As the risk management proposal (RMP) for lychee and longan to New Zealand and the accompanying official assurance programme (OAP) have yet to be finalised and consulted, TIC/DOA have not completed dose mapping studies specific to New Zealand. However, DOA anticipate these will be similar configurations currently used for USA. DOA have agreed to conduct separate dose mapping studies for lychee and longan and forward the results to MPI prior to export of this fruit to New Zealand.

## RECOMMENDATION

2. DOA to send configurations and dose mapping studies for longan and lychee to be exported to New Zealand to MPI once the RMP and OAP's are finalised.

# EXIT MEETING

A meeting was conducted on 31 May in Bangkok at DOA offices.

Staff present at the exit meeting were:

MPI	[REDACTED]	Senior Adviser, Fresh Produce Imports
DOA	[REDACTED]	Director, Plant Quarantine Research Group
Ministry of Agriculture and Cooperatives	[REDACTED]	International Affairs Officer
New Zealand Embassy, Bangkok	[REDACTED]	Policy Support Officer

The majority of the recommendations and action points were conveyed to Mr [REDACTED] at the exit meeting. However, Mr [REDACTED] was informed that additional points may be raised following the review of all information. A number of action points were discussed and DOA had agreed to formally write to MPI to progress these points.

Once again, MPI thanks DOA for openly providing all requested information and for organising the visits to treatment facilities and longan and lychee fruit production sites and packing house facilities. We look forward to working with DOA over the coming months with a view to start importing irradiated lychee and longan in the future.

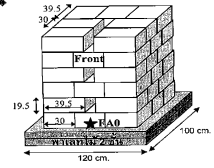
# Appendix 1: Review of Synergy Health Irradiation Facility

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**Routine Dosimetry Instruction Sheet**

Customer	Dose mapping report	After source modification
<b>Yin Chan International Co., Ltd.</b>	<b>2011 5081</b>	21
Modify existing specification(s)	Number	Product name
Require creation of new specification(s)	F-K 455 LG 00 B1	<b>LONGAN (Box # 1)</b>
Specification #	<b>F-K 455 LG 00 B1 (Rev. 0)</b>	
Frequency of dosimeters	1 <sup>st</sup> , every 9 and the last pallet	
Minimum dose (kGy)	0.400	
Maximum dose (kGy)	1.000	
Dosimeters per location	1	
Type of dosimeter	<b>B3 Thin Film</b>	
Dosimeter 1	Location (see sketch)	FA0
	Coefficients to	D <sub>minimum</sub> 0.614 D <sub>maximum</sub> 1.329
Processing	X minimum	0.73 X
	X maximum	0.80 X
Data entered in database by / on		
Data entries in database checked by / on		

Box dimension: (w) 30 x (l) 39.5 x (h) 19.5 cm Gross weight 9.0 kg/box  
 Arrangement of boxes: 6 layers of 7 boxes per pallet  
 Products are stacked on a double wooden pallet



For Information Only

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## Appendix 2: Review of TIC Health Irradiation Facility

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[REDACTED]		[REDACTED]
[REDACTED]		[REDACTED]
[REDACTED]		[REDACTED]
[REDACTED]		[REDACTED]

<p>[REDACTED]</p>		<p>[REDACTED]</p>
<p>[REDACTED]</p>		<p>[REDACTED]</p>
<p>[REDACTED]</p>		<p>[REDACTED]</p>
<p>[REDACTED]</p>		<p>[REDACTED]</p>
<p>[REDACTED]</p>		<p>[REDACTED]</p>
<p>[REDACTED]</p>		<p>[REDACTED]</p>

<p>[REDACTED]</p>		
<p>[REDACTED]</p>		<p>[REDACTED]</p>
<p>[REDACTED]</p>		<p>[REDACTED]</p>
<p>[REDACTED]</p>		<p>[REDACTED]</p>
<p>[REDACTED]</p>		<p>[REDACTED]</p>
<p>[REDACTED]</p>		<p>[REDACTED]</p>



[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

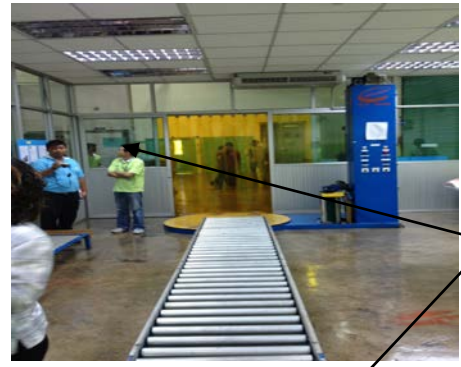
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[REDACTED]

[REDACTED]

[REDACTED]



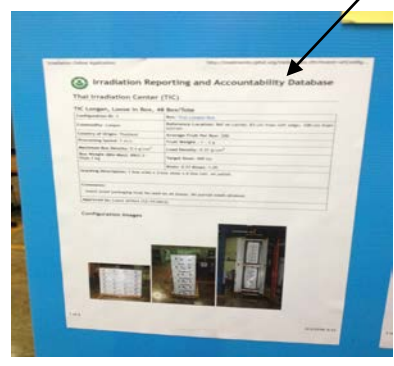
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]





[REDACTED]		[REDACTED]
[REDACTED]		
[REDACTED]		[REDACTED]
[REDACTED]		
[REDACTED]		[REDACTED]
[REDACTED]		
[REDACTED]		[REDACTED]
[REDACTED]		



<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>		<p>[REDACTED]</p>
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