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QRM Quarantine Regulators Meeting
Regulation and Collaboration: the future of biosecurity

Ho Chi Minh City, Vietnam
13-17 May 2024

Five-day plan

DAY ONE: *Monday 13 May 2024*

Lunch	From 12:00 pm at the Mezz Restaurant Sofitel Saigon 2nd Floor
Afternoon	Industry seminar – hosted by the Plant Protection Department, Vietnam ***Please meet at 2:00 pm at the Diamond A conference room, ground floor***

DAY TWO: *Tuesday 14 May 2024*

Morning	ICCBA Technical Working Groups ***Please meet at 8:30 am at the Diamond A conference room, ground floor***
Afternoon	ICCBA plenary session
Evening	Welcome Reception and QRM delegate registration ***Please arrive at the poolside on the 18th floor at 6:00 pm.***

DAY THREE: *Wednesday 15 May 2024*

Morning	Quarantine Regulators Meeting – day one ***Please meet at 8:30 am at the Diamond A conference room, ground floor***
Afternoon	Quarantine Regulators Meeting

DAY FOUR: *Thursday 16 May 2024*

Morning	8:30am to 12:30pm - Field Trip ***Please meet at the hotel foyer by 8.15 am***
Afternoon	1:30pm to 6:00pm - Cultural experience
Evening	6:00pm to 9:00pm - Official QRM Dinner

DAY FIVE: *Friday 17 May 2024*

Morning	Quarantine Regulators Meeting – day three ***Please meet at 8:30 am at the Diamond A conference room, ground floor***
Afternoon	Quarantine Regulators Meeting
Afternoon	4:00pm to 5:00pm - 8th ICCBA Steering Committee Meeting

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Plant Protection Department of Viet Nam

Australian Government
Department of Agriculture, Fisheries and Forestry

附件2

QRM Quarantine Regulators Meeting

Agenda

Industry day

Industry Day: Monday 13 May 2024		
Time	Agenda item	Topic
2:00pm – 2:30pm	*1*	Introduction to CA (Controlled Atmosphere) measures *Mr Nguyễn Văn Nhất, Peterson-ECO2 Việt Nam Company*
2:30pm – 3:00pm	*2*	Introduction to heat treatment using electromagnetic waves and microwaves *Mr Nguyễn Văn Nhất, Peterson-ECO2 Việt Nam Company*
Tea Break		
3:30pm-4:00pm	*3*	Introduction to irradiation treatment of fresh fruit for export *Mr Vương Đình Khoát, Toàn Phát Irradiation Company*
4:00pm – 4:30pm	*4*	Discussion *Mr Lê Sơn Hà: chair*
4:30pm-5:00pm	*5*	Closing *Mr Lê Sơn Hà: chair*

ICCBA

International Cargo Cooperative Biosecurity Arrangement

Methyl Bromide Technical Working Group

Meeting 1

Sofitel Saigon Plaza

9:00am WIB, Tuesday 14 May 2024

Agenda

ICCBA Secretariat: **Nathan Reid (chair)**
Robert Douros (minutes)

Agenda item	Responsible Person	Comments
Welcome: • Introduction • Attendance and Apologies	**Chair**	
ICCBA – history and purpose: • Structure • Governance • Challenges	**Chair**	
Morning tea break (10.00 – 10.30 am)		
Methyl Bromide Fumigation Methodology • Overview of review • Consultation with ICCBA (refer to comments paper provided)	**All**	
Lunch (12.00 pm – 1.30 pm)		
Other business: • Next steps with ICCBA MB schedule (refer to MB Schedule v1.0) ○ Terms of Reference review (refer to ToR v2.0 and comments forwarded by NZ MPI) • Arrangement review • Plenary	**All**	

QRM Quarantine Regulators Meeting

Regulation and Collaboration: the future of biosecurity

15 to 17 May 2024
Sofitel Saigon Plaza
Ho Chi Minh City, Vietnam

Day One: Wednesday 15 May 2024

MS Teams: Join the meeting now
Meeting ID: **418 844 943 58**
Passcode: **E4KgtF**

Time	Agenda item	Topic
8:30am – 9:00am		Arrival tea and coffee
9:00am – 9:15am	*1a*	Official Welcome: *Dr Huynh Tan Dat, Director General, Plant Protection Department, Ministry of Agriculture and Rural Development, Vietnam*
9:15am – 9:30am	*1b*	Keynote Address *Ms Anna Brezzo, Acting First Assistant Secretary, Department of Agriculture, Fisheries and Forestry, Australia*
9:30am – 9:45am	*2*	Reconnecting, collaborating and connecting meaningfully *Mr Nathan Reid, Principal Director, Department of Agriculture, Fisheries and Forestry, Australia*
9:45am – 10:15am	*3*	Supporting safe and efficient trade in Asia and the Pacific *Mr Shane Sela, Senior Trade Facilitation Specialist, World Bank*
10:15am – 10:45am	*4*	Identification of stink bugs and other biosecurity threats using image classification in smartphone apps (virtual) *Dr Alexander N Schmidt-Lebuhn, Senior Research Scientist, Commonwealth Scientific and Industrial Research Organisation, Australia*
Morning Tea and Official Photo		
11:15am– 11.45am	*5*	Collaboration to reduce barriers for adopting alternative treatments for biosecurity purposes (virtual) *Mr Ken Glassey, Senior Adviser, Ministry for Primary Industries, New Zealand*
11:45am – 12:15pm	*6*	Plant quarantine system and import export phytosanitary inspection procedures in Vietnam *Mr Nguyen Tuan Anh, Official, Plant Quarantine Division, Plant Protection Department, Ministry of Agriculture and Rural Development, Vietnam*
Lunch		
1:00pm – 1:30pm	*7*	WTO Standards and Trade Development Facility (STDF):

		Promoting IT Solutions for Pest Surveillance and reporting in the Asia-Pacific (virtual) *Ms Carol Quashie-Williams, Standards and Trade Development Facility (STDF) Project Manager, Department of Agriculture, Fisheries and Forestry, Australia* *and* *Ms Marjorie Kemoi, STDF Country Manager, National Agriculture Quarantine and Inspection Authority, Papua New Guinea*
1:30pm – 2:00pm	*8*	Trading in a digital evolution (virtual) *Mr Matthew Moore, Director, eCert and Micor, Department of Agriculture, Fisheries and Forestry, Australia*
2:00pm – 2:30pm	*9*	Biosecurity treatment certificate portal and risk profiling *Mr Sam Griffiths, Acting Director, Department of Agriculture, Fisheries and Forestry, Australia*
2:30pm-3:00pm	*10*	Emerging trends, vulnerabilities, and opportunities *Ms Anna Brezzo, Acting First Assistant Secretary, Department of Agriculture, Fisheries and Forestry, Australia*
Afternoon tea		
3:30pm – 4:00pm	*11*	Quarantine treatment alternatives to Methyl Bromide for perishable goods - preliminary trial experience with ethyl formate in Taiwan *Dr Kuo-Shiou Huang, Animal and Plant Health Inspection Agency, Taiwan*
4:00pm – 4:30pm	*12*	NPPO structure of Singapore and the recent collaboration effort between National Parks and the Department of Agriculture, Fisheries and Forestry *Mr Eric Casiano Tulang, Deputy Director, National Parks Board Singapore*
4:30pm – 5:00pm	*13*	The future of biosecurity in the OIRSA region: Innovation and Development *Mr Iván Hernández, Regional Director of Quarantine Services, Organismo Internacional Regional de Sanidad Agropecuaria (International Regional Organisation for Plant and Animal Health)*

Day Two: Thursday 16 May 2024 – Field Trip

Time		Activity
8:15am - 8:30am	*1*	*Meeting at the foyer of Sofitel Saigon*
8:30am - 10:30am	*2*	*Travelling from Ho Chi Minh City (HCMC) to Hoang Phat Long An warehouse and dragon fruit orchard*
10:30am - 11:30am	*3*	*Touring Hoang Phat Long An warehouse and dragon fruit orchard to look at orchard management methods*
11:30am – 12:30pm	*4*	*Travelling to My Tho, Tien Giang*
Lunch at My Tho (recommended dish: "My Tho noodle soup")		
1:30pm – 3:30pm	*5*	*Con Phung tour, featuring famous landscape of the Mekong Delta land:* *- Explore the islands of Long, Lan, Quy, Phung islands, see the Rach Mieu bridge connecting Tien Giang and Ben Tre provinces.* *- Enjoy honey tea, visit the coconut candy production facility.* *- Riding canoes through the canals.* *- Enjoy a musical performance and eat fruits in the garden.* *- Visit the Coconut Dao ruins and handicraft production site.*
3:30pm – 6:00pm	*6*	*Moving back to HCMC* *On the way back to HCMC:* *-Visit Vinh Trang Pagoda: immerse in the uniqueness of the combination of architecture and Buddhist images in popular culture.*
6:00pm – 9:00pm	*7*	Gala Dinner hosted by Vietnam's Plant Protection Department

Day Three: Friday 17 May 2024

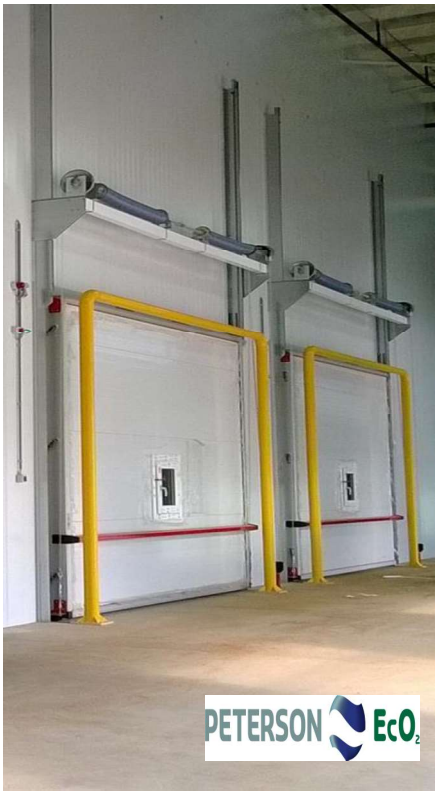
MS Teams Link: Join the meeting now
Meeting ID: **470 784 297 769**
Passcode: **yhuJPb**

Time	Agenda Item	Topic
8:30am – 9:00am		Arrival tea and coffee
9:00am – 9:30am	*14*	Sea containers: Update on work by the Sea Container Focus Group (virtual) *Mr Rama Karri, Director, Hitchhiker Working Group, Department of Agriculture, Fisheries and Forestry, Australia*
9:30am – 10:00am	*15*	In-field next-generation plant pathogens detection with CRISPR/Cas-based methods (virtual) *Dr Frank Bedon, Research Scientist, Plant Innovation Centre (PIC), Department of Agriculture, Fisheries and Forestry, Australia*
10:00am – 10:30am	*16*	Integrated Biosecurity Management in Food and Agriculture In the Sultanate of Oman *Mr Waleed Al Maamari, Head of Plant Quarantine Department, Ministry of Agricultural Wealth, Fisheries and Water Resources*
Morning tea		
11:00am – 11:30am	*17*	Regulations on phytosanitary treatment for regulated articles and updates on phytosanitary treatment measures in Vietnam *Mr Nguyen Tuan Anh, Official, Plant Quarantine Division, Plant Protection Department, Ministry of Agriculture and Rural Development, Vietnam*
11:30am – 12.00pm	*18*	Analytics that inform decisions *Dr Andrew Robinson, Chief Executive Officer, Centre of Excellence for Biosecurity Risk Analysis*
12:00pm – 12:30pm	*19*	Using Advance Data to manage biosecurity risk in the mail pathway (virtual) *Ms Mirelle Anthony, Director, Profiling and Targeting, Department of Agriculture, Fisheries and Forestry*
Lunch		
1:30pm – 2:00pm	20	Solomon Islands National Biosecurity System and the work of Biosecurity Solomon Islands *Mr Crispus Fanai, Deputy Director, Biosecurity Solomon Islands, Solomon Islands*
2:00pm – 2:30pm	*21*	*Catalysing safe agri-food trade through partnerships and innovation – lessons from STDF's work* *Ms Marlynne Hopper, Deputy Head, Standards and Trade Development Facility*

2.30 – 2:45	*22*	Overview of the Indonesian Quarantine Agency *Mr Bambang, Deputy Plant Quarantine, Indonesian Quarantine Agency*
2:45pm – 3:30pm	*23*	Discussion – emerging issues heading into the future. What will be our biggest concerns as regulators? *Facilitated by Mr Nathan Reid, Principal Director, Department of Agriculture, Fisheries and Forestry, Australia*
3:30pm – 3:45pm	*24*	Closing remarks
Afternoon Tea		
4:00pm – 5:00pm		8th International Cargo Cooperative Biosecurity Arrangement (ICCBA) Steering Committee meeting

Peterson-EcO2 CONTROLLED ATMOSPHERE

NON-TOXIC PEST CONTROL



PETERSON EcO2

Global Presence

25+ Countries

Since 2000 in Netherland

50+ Terminal

Projects

- **The Netherlands** (12 locations)
- **France** (1 location)
- **Belgium** (2 locations)
- **United Kingdom** (6 locations)
- **Austria** (1 location)
- **Germany** (2 locations)
- **Spain** (1 location)
- **Turkey** (2 locations)
- **Greece** (8 locations)
- **Vietnam** (21 locations)
- **India** (2 locations)
- **Italy** (1 location)
- **Switzerland** (11 locations)
- **Australia** (1 location)
- **Uganda** (1 location)
- **Singapore** (1 location)
- **Tunisia** (1 location)
- **Bolivia** (1 location)
- **Indonesia** (1 location)
- **Japan** (2 locations)
- **Malaysia** (1 location)
- **Philippines** (5 locations)
- **USA** (1 location)
- **Ivory Coast** (4 locations)
- **UAE** (1 location)

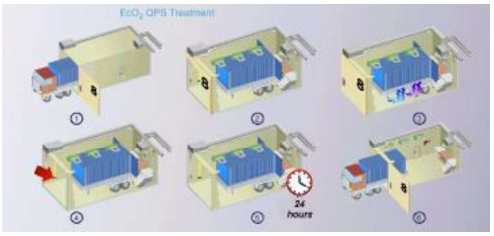
CONTROLLED ATMOSPHERE PRODUCTS

Insect infestation can severely affect the quality of products in the postharvest chain. Postharvest losses during storage and production can be mitigated with proper preventative and curative measures. Often, harsh chemicals such as phosphine and methyl bromide are used to eliminate pest concerns, which can have ill effects on human health and the environment.

CONTROLLED ATMOSPHERE AS A SAFE ALTERNATIVE

- Treatments are 100% natural without using any toxic chemicals
- Based on the principle: No Oxygen = No Life, oxygen levels are reduced to a level which is lethal to insects using Carbon Dioxide or Nitrogen.
- Treatment methods are safe and can be applied in organic production

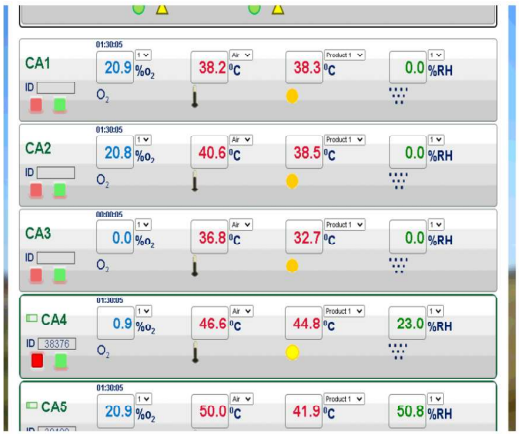
Insect control by Controlled Atmosphere

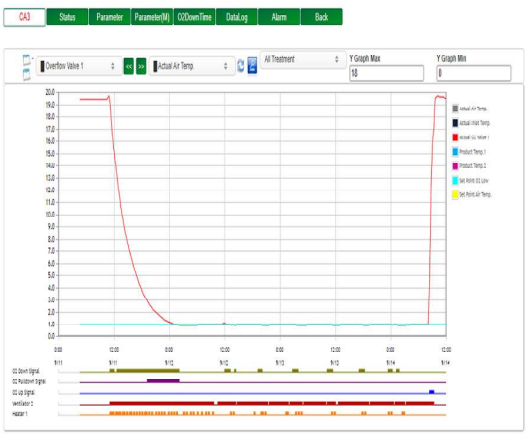


- Custom-made system based on low oxygen to control insects in every life stage
- A good environment is created with temperature and humidity; a low oxygen regime kills the insects.
- Total control of O_2 , temperature and humidity.
- Working with the EcO_2 Oxygen Converter System; a generator based system.
- Remotely controlled, via the computer and internet.
- Treatment times vary from 1 to 7 days.
- Permitted technique in organic production and approved by SKAL and The Soil Association.

During each treatment

- Online control of treatments and parameters (by e-mail, internet, mobile phone)
- Issue of treatment certificates and quality marks
- Database of parameters to control insects in every stage
- Data recording - traceability





Insect by product information

Product	English name of Insect	Latin name of Insect	Treatment condition
Rice	Rice weevil	Sitophilus Oryzae	35C - 1% - 6days
Walnut	Saw-toothed grain beetle	Oryzaephilus surinamensis	28C - 1% - 4days
Peanut	Meal worm / worst case	Tenebrio molitor	28C - 1% - 9days 35C - 1% - 6days
Almond	Moth	heterocera	28C - 1% - 2days
Hazelnut	Red flour beetle, confused flour beetle	Tribolium spp.	28C - 1% - 2days
Cashew	Red flour beetle, saw-toothed grain beetle, Rusty grain beetle	Tribolium sp., Oryzaephilus surinamensis, Cryptolestes sp.	43C - 1% - 2days 40C - 1% - 3days
Apricot	Mites & maggots	Many species belong to subclass Acarina	28C - 1% - 9days 35C - 1% - 6days
Wheat	Moths & maggots, moth & rice weevil	Heterocera suborder, ex. Ephestia Elutella, Sitophilus Oryzae	28C - 1% - 9days 35C - 1% - 6days
Barley, Oat	Grain weevel	Sitophilus Granarius	28C - 1% - 7days
Maize	Maize weevil	Sitophilus zeamais	28C - 1% - 9days
Raisin	Maggots	Many species belong to subclass Acarina	28C - 1% - 9days
Mushroom	Moths	Ephestia Elutella	28C - 1% - 4days
Lentil	Rice weevil	Sitophilus Oryzae	28C - 1% - 9days 35C - 1% - 6days
Dates	Carob Moths, worm of date	Etomyelois ceratoniae Zeller	35C - 1% - 3days
Cocoa	Rice weevil, coca moth	Sitophilus spp, Ephestia Elutella	28C - 1% - 9days 35C - 1% - 6days
Flour	Saw-toothed grain beetle	Oryzaephilus surinamensis	28C - 1% - 4days
Sunflower seed	Saw toothed grain beetle, red flour beetle, grain beetle	Oryzaephilus surinamensis, Tribolium castaneum, Sitophilus granarius	28C 1% 7days
Tobacco	Cigarette beetle	Lasioderma Serricorne	28C - 0.5% - 9days 33C - 0.5% - 5days 38C - 0.5% - 4days
Green tea	Drugstore beetle	*Stegobium paniceum*	35C - 1% - 9days
Raw coffee	Coffee Bugs	Araecerus Fasciculatus	28C - 1% - 9days 35C - 1% - 6days
Sesame seeds	Indian meal moth/ warehouse moth/ Tobacco moth/ cacao moth	Plodia interpunctella/ Ephestia Ellutella	28C - 1% - 4days 35C - 1% - 2days

Phosphine versus EcO_2 Controlled Atmosphere

- **Phosphine**

Benefits:

✓ Effective gas for pest control if used properly

Disadvantages:

✓ Risk of chemical residues in the products

✓ Resistance occurring in pest population

✓ Dangerous for workers

✓ Dependent of atmospheric influences

- **EcO_2 CA Rapid Treatment**

Benefits:

✓ Effective method for pest control

✓ Low cost

✓ Environmental-friendly

✓ No residual chemicals

✓ No resistance in pest population

✓ Independent of atmospheric influences

✓ Applicable in production process

✓ Safe for workers

Disadvantages:

✓ to invest in a treatment facility

Treatment process

- Step 1: Loading untreated product inside treatment area properly
- Step 2: Thrusting product temperature sensor in right position
- Step 3: Closing gastight doors
- Step 4: Starting treatment and set parameters
- Step 5: Monitoring treatment and adjust parameter if necessary
- Step 6: Stopping treatment

Effect in total supply chain

Export with toxic pest control

Commodities

⇩

Fumigated with toxic chemicals in country of origin

⇩

Transported

⇩

Necessary to make gas-free measurement in country of destination

⇩

Defumigation and extra demurrage

Export with Non-toxic pest control

Commodities

⇩

Treated with EcO_2 Controlled Atmosphere in country of origin

⇩

Transported

⇩

Received in country of origin

Note: no need to make gas-free measurement or defumigation

EcO2 CONTROLLED ATMOSPHERE COMMODITIES

Grains: Barley, Buckwheat, Cereals, Flour, Rice, Maize etc.

Nuts: Cashews, Almonds, Ground nuts, Hazelnuts, Pistachio, Walnuts

Spices: Pepper, Cinnamon, Coriander, Ginger, Marjoram

Dried Fruits: Apples, Apricots, Raisins, Figs, Coconut

Seeds: Sunflower seed, Grass seed, Radish seed, Sesame seed

***Other*:** Tobacco, Coffee, Cocoa beans, Food additives, Pet feed, Tea

Treatment tracking

CA TREATMENT OVERVIEW	
	TOTAL TREATMENT
2006 -2024	35,144
Europe	11,459
Africa	1,469
Asia	22,216
Average per year	3,800

PETERSON EcO2 — The smart choice in pest control and preservation

TREATMENT CERTIFICATE

Address of treatment : [Địa chỉ công ty khách hàng]
EcO2 Treatment Nr. : [Mã số khách hàng] – [mã số ID khử trùng]
Date of treatment : [Ngày tháng năm bắt đầu khử trùng]

Client Reference***	Tên khách hàng
Lot/Batch Numbers*	Mã số lot sản phẩm
Product*	Tên sản phẩm
Packaging*	Quy cách đóng gói
Number of Packages*	Số lượng đóng gói
Number of Pallets	Số lượng pallet
Total weight (kgs)*	Khối lượng sản phẩm

Used Technique : EcO2® Controlled Atmosphere Technique
Registration No. : 005/BVTV-KD
Condition : [Điều kiện áp dụng cho khử trùng]
Insect : [Tên côn trùng cần khử trùng]
Treatment Provider : Peterson - EcO2® Vietnam, 11A2, Lot B, NA5 Street, My Phuoc II IP, My Phuoc Ward, Ben Cat District, Binh Duong Province, Vietnam

Place of Issue Date: Vietnam, [dd/mm/yyyy] | Treatment Supervisor: [Tên nhân viên giám sát] | Signature / Stamp

CÔNG TY TNHH PETERSON-ECO2 VIỆT NAM

PETERSON – ECO2 VIETNAM CO., LTD.
11A2, Lot8, NA5 street, My Phuoc Industrial Park II, My Phuoc Ward, Ben Cat District, Binh Duong Province, Vietnam.
Phone: +84 28 6281 3365 - Fax: +84 28 6281 0966 - Web: www.eco2.nl - Email: treatment@eco2.nl

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TREATMENT CERTIFICATE

Address of treatment : [Client company address]
EcO2 Treatment Nr. : [Client code] – [treatment no]
Date of treatment : [Day month year started treatment]

Client Reference***	Client Name
Lot/Batch Numbers*	Lot/Batch Numbers
Product*	Product Name
Packaging*	Packaging
Number of Packages*	Number of Packages
Number of Pallets	Number of Pallets
Total weight (kgs)*	Total weight

Used Technique : EcO2® Controlled Atmosphere Technique
Condition : [Condition applys for treatment]
Insect : [insect name]
Treatment Provider : EcO2 Projects B.V. Boompjes 270, 3011 XZ Rotterdam

Place of Issue Date: Rotterdam, [dd/mm/yyyy] | Treatment Supervisor: [Supervisor Name] | Signature / Stamp

EcO2 Projects B.V.
Boompjes 270
3011 XZ Rotterdam
The Netherlands

PETERSON – ECO2 VIETNAM CO., LTD.
11A2, Lot8, NA5 street, My Phuoc Industrial Park II, My Phuoc Ward, Ben Cat District, Binh Duong Province, Vietnam.
Phone: +84 28 6281 3365 - Fax: +84 28 6281 0966 - Web: www.eco2.nl - Email: treatment@eco2.nl

EcO2 CONTROLLED ATMOSPHERE
THE DESIGN – CHAMBER SYSTEM

Basic Equipment

Heater

Ventilations for air circulation

Control valves and ballon

Oxygen & temperature, humidity sensors

Oxygen up ventilator

Control cabinet

Safety devices

Gastight sliding doors

MACHINE ROOM

Basic Machine system

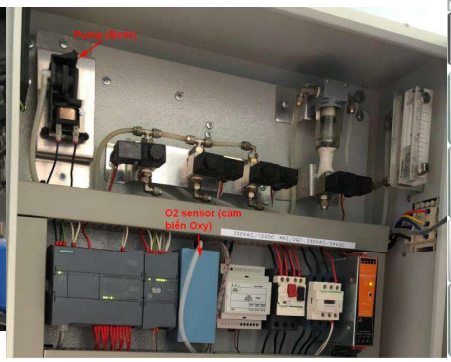
Compressor

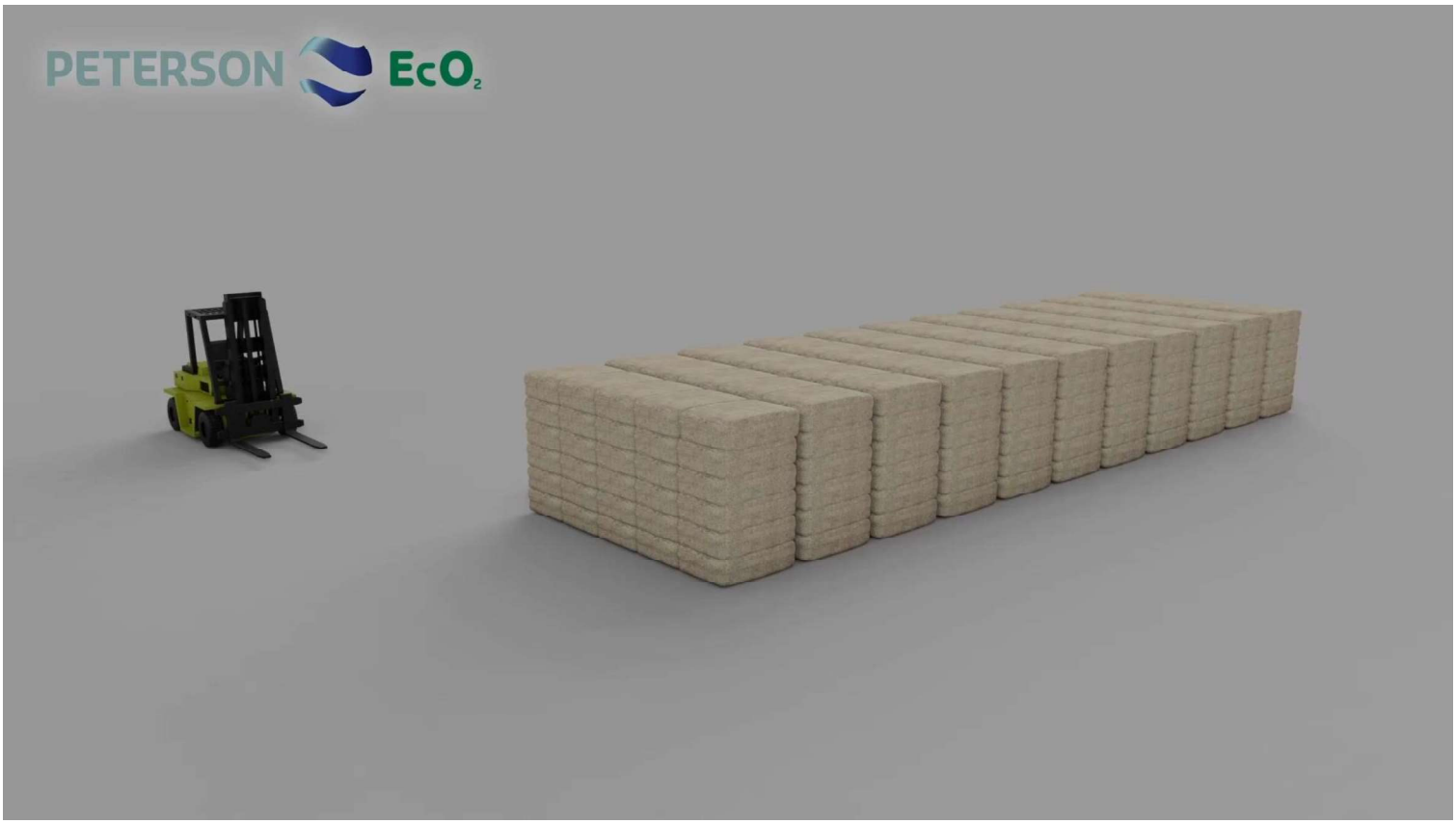
Nitrogen generator

2 air buffer tanks

Machine cabinet

Laptop software





EcO2 CONTROLLED ATMOSPHERE

MOBILE TREATMENT – CONTAINER, REFERENCE PROJECT

The machine room will include the machine system: compressor, air tanks, nitrogen converter, the controller… This room will be placed in fixed or can be designed as a trial as the above picture for mobile solution.

The treatment room with the reefer-container in 40ft will be designed as a gastight space and connected with the machine room by a valve. This valve will be used to flush the pure nitrogen gas inside.

The dry container also can be applied for controlled atmosphere fumigation, but it will be required more energy than reefer container system will.

CONTAINERS SYSTEM PROJECTS

EcO2 CONTROLLED ATMOSPHERE
MOBILE TREATMENT – BULK +BAG

The bulk is sealed with nylon tarp and a containerized mobile machine room is connected to it.

Peterson-EcO2 CONTROLLED ATMOSPHERE
MOBILE TREATMENT – BAG+CONTROLLER

In order to reduce the amount of plastic released into the environment, we have designed a controlled atmosphere bag, with this bag we can reuse it many times, reducing environmental pollution and helping customers save more costs.

The bag is designed with many sizes to reach the fumigation needs of customers with different quantities.

The controller will play an important role, it will be used to connect nitrogen valve, also help to make the oxygen and temperature level under the control through the treatment time.



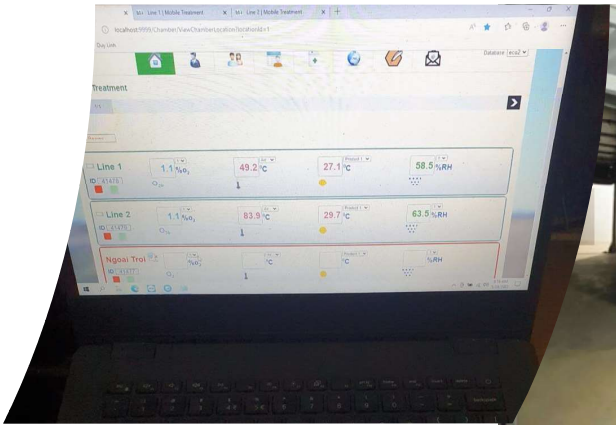
Peterson-EcO2 CONTROLLED ATMOSPHERE

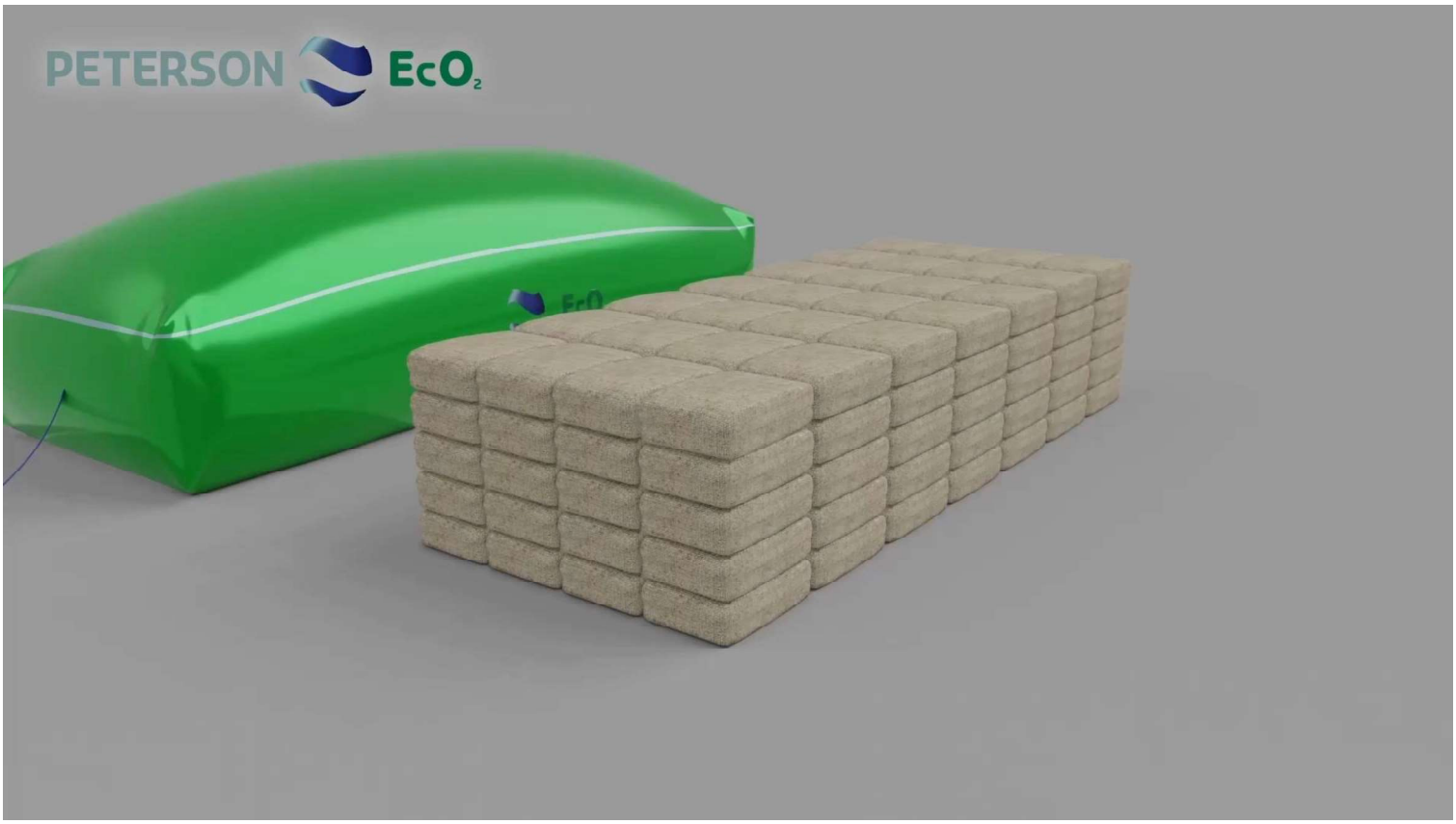
MOBILE TREATMENT – BULK/BAG TREATMENT WITH NITROGEN CONVERTER

- The bulk/bag is connected to the mobile machine room.
- The nitrogen converter will help to supply the nitrogen gas directly inside to the bulk/bag.
- With this bag treatment, we can not heat up the temperature inside, so it takes the treatment time longer than the chamber/container system does.
- The *monitoring system* will be used throughout the treatment time to ensure the parameter will reach the achievement.
- After the treatment is successful, the ECO2 fumigation certificate will be provided to the client.

- With the bag/bulk treatment **without mobile machine room**, we need the Nitrogen tanks supply instead.
- The controller will help to connect the nitrogen tanks with the bag/bulk
- The oxygen level will be under the control throughout the treatment time to make sure that the treatment achieves the right parameter. The process of monitoring will be done by the controller.
- Without machine room, it may cause more operation cost due to rent the nitrogen gas tanks outside



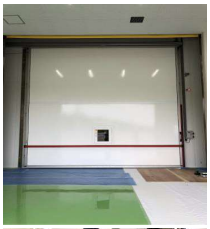




PETERSON EcO2

PRODUCT PORTFOLIO:
CONTROLLED ATMOSPHERE CHAMBER

GLOBAL PROJECT



ANTARC HEADQUARTER

- Project lead time: 2014
- Location: Chiba Japan
- Number of Chamber: 2
- Dimension: 9.6 x 3.0 x 7.1m
- No of C48: Bales
- Average one-time treatment: Approximately 10.800 kg
- Noted: Packing 210 PP

www.eco2.nl +84 (0) 274 3567973 Ho Chi Minh City, Vietnam

PETERSON EcO2

PRODUCT PORTFOLIO: CONTROLLED ATMOSPHERE CHAMBER

GLOBAL PROJECT

PHILIP MORRIS

- Project lead time: 2013
- Location: Malaysia
- Number of CA Chamber: 6
- Dimension: 22.0 x 6.1 x 4.3m
- No of C48: 400
- Average one-time treatment: Approximately 80.000 kg

PETERSON EcO2

PRODUCT PORTFOLIO: CONTROLLED ATMOSPHERE CHAMBER

GLOBAL PROJECT

PMFTC BATANGAS (PHILIP MORRIS)

- Project lead time: 2014
- Location: Philippines
- Number of CA Chamber: 2
- Dimension: 12.4 x 6.1 x 4.2m
- No of C48: 192
- Average one-time treatment: Approximately 28.880 kg

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PETERSON EcO2

PRODUCT PORTFOLIO: CONTROLLED ATMOSPHERE CHAMBER

GLOBAL PROJECT

JTI PHILIPPINES

- Project lead time: 2020
- Location: Philippines
- Number of CA Chamber: 7
- Dimension: 18.8 x7.5 x5.7m
- No of C48: 624

PETERSON EcO2

PRODUCT PORTFOLIO: CONTROLLED ATMOSPHERE CHAMBER

GLOBAL PROJECT

JTI INDONESIA

- Project lead time: 2019
- Location: Indonesia
- Number of CA Chamber: 6
- Dimension: 18 x 5.8 x 5.8m
- No of C48: 468

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PETERSON EcO2

PRODUCT PORTFOLIO: CONTROLLED ATMOSPHERE CHAMBER

GLOBAL PROJECT

TTL

- Location: Turkey
- Number of CA Chamber: 5
- No of C48: 492
- Average one-time treatment: Approximately 98.400 kg

PETERSON EcO2

PRODUCT PORTFOLIO: CONTROLLED ATMOSPHERE CHAMBER

GLOBAL PROJECT

JTI GREECE

- Location: Greece
- Number of CA Chamber: 11

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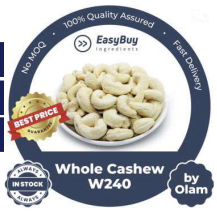
PETERSON EcO2

PRODUCT PORTFOLIO:
CONTROLLED ATMOSPHERE CHAMBER



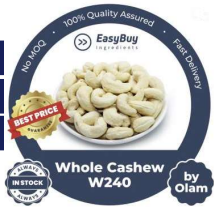
LOCAL PROJECT

OLAM PLEIKU

- Project lead time: 2011
- Location: Vietnam
- Number of CA Chamber: 6
- Dimension:
  - 01 chamber: 18.5m x 3.4m x 3.1m
  - 05 chambers: 9.3mx3.1mx3.1m

PETERSON EcO2

PRODUCT PORTFOLIO:
CONTROLLED ATMOSPHERE CHAMBER



LOCAL PROJECT

OLAM BIEN HOA

- Project lead time: 2010
- Location: Vietnam
- Number of CA Chamber: 8
- Dimension: 14.3m x 4.0m x 3.3m

PETERSON EcO2

PRODUCT PORTFOLIO:
CONTROLLED ATMOSPHERE CONTAINER

CONTROLLED ATMOSPHERE CONTAINER

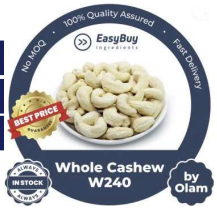
By using the refer-container to make the controlled atmosphere system. This mobile-controlled atmosphere system. This mobile system will be suitable for a flexible solution because it is easy to locate it everywhere in the client plant.

Advantages of CA Container

- Applied the same principle with the CA Chamber
- The mobile treatment solutions
- Easy for modification location.
- The most effective CA solutions in the short term.

PETERSON EcO2

PRODUCT PORTFOLIO:
CONTROLLED ATMOSPHERE CONTAINER



LOCAL PROJECT

OLAM PITASCHIO

- Project lead time: 2023
- Location: Vietnam
- Number of CA Container: 3
- Dimension: 12.1m x 2.4m x 2.6m

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PETERSON EcO2

PRODUCT PORTFOLIO: CONTROLLED ATMOSPHERE BAG

CONTROLLED ATMOSPHERE BAG

In the process of product development, we have recently developed a new product: control atmosphere bags. With this controlled atmosphere bag, we can reuse it many times instead of using plastic for fumigation services for customers. Plastic bags in fumigation and discharge into the environment will adversely affect the environment and the atmosphere.

Advantages of CA bag or tent

- The best solutions for low-value products and do in huge volume.
- The cost optimization solution for small-volume organic companies

We provide different sizes according to the quantity of the customer's goods.

	Price (USD)
Machine room forCA bag contain 96 C48 Machine can run multi CA bag	30,000
Machine room forCA bag contain 192 C48 Machine can run multi CA bag	41,000
Machine room forCA bag contain 288 or 384 C48 Machine can run multi CA bag	43,000
Price of CA bag (depend on demand)	5000 - 7000

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PETERSON EcO2

PRODUCT PORTFOLIO: CONTROLLED ATMOSPHERE TENT

CONTROLLED ATMOSPHERE TENT

Including:
- Tent, equipment such as control cabinet, valve set using for treatment
- Nitrogen generator with buer tank
- Air compressor with buer tank

Benefit:
- Low investment cost
- Kill all stages of insects
- Limit contamination of products after treatment because there are 2 separate doors.
- No chemicals, no residue on the product
- Safe for the environment and users
- The monitoring system will be used throughout the treatment time to ensure the parameter will reach the achievement

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Conclusions

- The use of CA is a competitive technology.
- It is the pest control solution for the demanding consumers request for organic commodities and for conventional products.
- It is conform world wide legislation.
- There are no residues left after the treatment.
- The method is environmental friendly.
- The system is used without waiting for a fumigator.
- No insect or rodent resistance with the use of Controlled Atmosphere.
- Reducing the risk for working personnel and consumers.

Peterson-EcO2 CONTROLLED ATMOSPHERE
INVESTMENT COST

Investment cost: bases on quantity of product or particularly demand, we will design or advise appropriate solution

Mission: Promote local support and contribute to enhance value of client product.

For more information contact us at:

salesvn@eco2.vn

info@eco2.nl

Thanks for your attention!

PETERSON EcO₂

The smart choice in pest control and preservation

MICROWAVE DIELECTRIC HEATING TREATMENT FOR PEST IN AGRICULTURE

Present by Nguyen Van Nhat – Deputy Managing Director
ECO2 Company
13 May 2024

PETERSON EcO₂

Drawbacks of conventional method

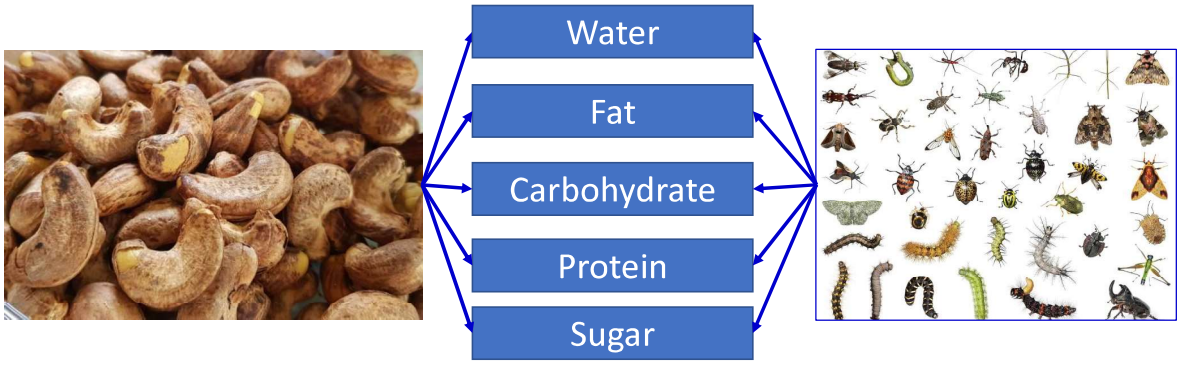
PETERSON EcO₂

- Ionization radiation: The main problem is that it is not possible to shut of the radiation after ending the treatment.
- Freezing treatment: It is not a complete method due to high price and relatively long required time.
- Conventional heating: This kind of heating warms both pest and the agricultural product similarly which may destroy product's quality.
- Chemical sprays:It has methyl bromide which is harmful to health and it affects on thickness of ozone layer.

Disadvantage of Pesticides

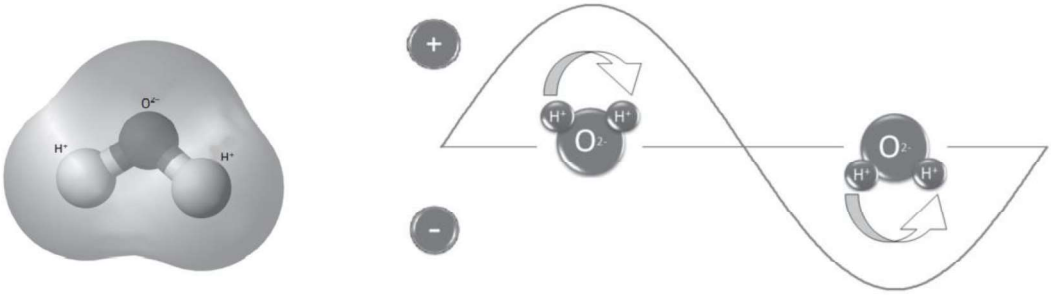
- Environmental Effects : Pollute Air, Water and Soil. Ecosystems are damaged. Reduce Nitrogen fixation, threaten fish, birds and animal habitat.
- Reducing the thickness of Ozone layer.
- Health Effects: May cause neurological and psychiatric complications, brain tumors, cancers, spontaneous abortions, stillbirths, and birth defects

Fundamental



Water, fat, carbohydrate, protein and sugar molecules are the main composition in Nuts and Insects. These molecules will absorb MW energy in a process called dielectric heating, leading to an increase in the temperature to kill insects as well as microbial.

Fundamental



A dipolar water molecule and Dipole orientation in a MW environment

Under the irradiation of microwave, the movement of water molecules creates heat as the rotating molecules hit other molecules and put them into motion.

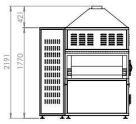
Important points:

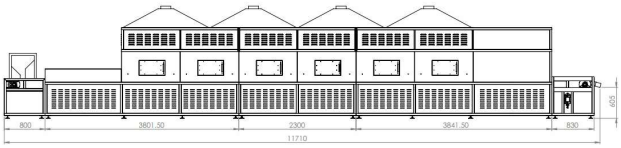
Heat is generated within the material
Rapid in comparison with conventional heating

Advantages of microwave treatment over conventional methods

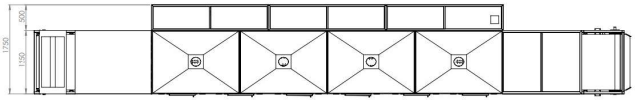
- Heat isn't transferred to material. Instead the material is induced to heat itself..
- Lower energy consumption.
- Causes less damage to substance than other conventional methods using high temperature
- Does not cause shrinkage or toughening of food
- Flavors and taste remain unchanged

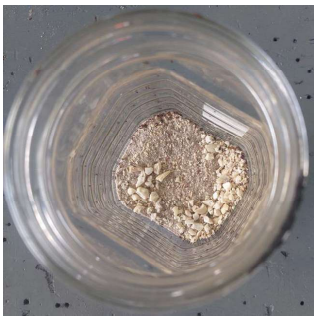
Experiments





Machine Dimension
(L x W x H mm)
11710 x 1750 x 2191





Result

No	Time		Weight (kg)	Speed (m/min)	Power (%)						Power (W)	Inlet								Outlet							Color of product	Insect status \ Mortality rate
												Moist of product (%)	Temperature of product (°C)	Temperature of product (°C)						Moist of product (%)	Temperature of product (°C)					Portable thermometer		
	Date	time			C1	C2	C3	C4	C5	C6	Total			C1	C2	C3	C4	C5	C6		C1	C2	C3	C4	C5	C6			
1	17/11/2022	14:30	130	2	40	40	40	40	40	40	22,800	4.6 (mới lấy từ phòng mát)		35	35	35	35	35	35	5.3	(36)	(39)	(43)	(47)	(52)	57	53-55	Unchange	Alive
2	17/11/2022	16:25	100	2	50	50	50	50	50	50	28,500	4.7		32.8	32.6	32.7	32.8	32.8	32.8	5.3	35.4-36.5	37.342.5	45.4-47	52.7-54.2	57.0-60.5	60.5-62.5	57-59	Unchange	90%
3	19/11/2022	9:34	75	2.5	58	58	58	58	58	58	33,060	5.1		27.8	27.5	27.5	27.7	27.8	27.7		34.8-35.1	39.5-41.1	46.4-47.3	53.5-54.3	57.3-58.1	60.6-62.5	58.4-61.2	Unchange	Alive
4	19/11/2022	10:50	75	2.5	69	59	52	74	45	30	32,910	5.1		28.8	28.8	28.9	29.1	29.3	29.3		35.0-35.2	41.9-42.7	47.9-49.5	52.6-53.5	57.6-58.1	60.2-63	57.4-59.2	Unchange	95%
5	21/11/2022	14:00	70	2.5	79	81	81	52	30	30	36,390	4.2	30	29.2	28.9	29	29.1	29.2	29.2	4	36.5-37.1	45.5-46.8	53.8-55	60-63.4	63.1-65.2	65.2-68.1	58-63	Unchange	100%
6	21/11/2022	14:30	150	2.5	79	81	81	52	30	30	36,390	4.2	30	~34	~34	~34	~34	~34	~34	4	37-37.2	44.3-45.5	52.6-53.4	61.8-62.2	67.3-68.1	68.6-71.5	58-63	Unchange	100%
7	23/11/2022	17:05	100	2.5	100	83	83	53	35	35	39,480	4.9	28	~28	~28	~28	~28	~28	~28	4.7	37.5-38.1	45-47.1	53-54.5	55.3-63.6	65-67	67-70	65-70	Unchange	100%
8	24/11/2022	14:10	100	2.5	91	89	89	45	30	30	38,550	5	28.8	~27	~27	~27	~27	~27	~27	4.8 (do sau 15' nguội)	35.5-36.3	43.5-44	49-51.3	56-57	59-60	60-61	58-61	Unchange	100%
9	24/11/2022	17:00	100	2.5	99	89	89	45	30	30	39,270	5.1	28.8	~28.8	~28.8	~28.8	~28.8	~28.8	~28.8		36.4-37	42.8-43.7	49.3-51.5	54.6-57	58.6-60.2	60.6-63	60-63	Unchange	100%
10	26/11/2022	09:10	150	2.5	94	89	89	45	30	30	38,820	5.2	28.5(29)	27+0.5	27+0.5	27+0.5	27+0.5	27+0.5	27+0.5	4.6	36.1-36.7	44.2-44.5	51.7-52.8	60.3-61	64.1-66.5	66.7-71.7	65.8-67.6	Unchange	100%
11	5/12/2022	15:25	110	2.4	29	86	86	43	29	29	31,890	4	35	~33	~33	~33	~33	~33	~33	3.7	39.5-40	45.7-46.2	51.7-53	58.3-62	61.5-63.3	62-64.8	60-62	Unchange	100%
12	6/12/2022	15:00	130	2.4	82	87	87	44	29	29	37,020	4.2	29.5	~33.3	~33.3	~33.3	~33.3	~33.3	~33.3	4.0 (do sau 15' nguội)	38.2-39.4	47.4-48.4	53.6-57.3	61.6-64.2	61.5-66	65-68.4	64-68.9	Unchange	100%
13	17/12/2022	11:10	150	2.4	81	86	86	43	29	29	36,570	3.9	29.5	~29	~29	~29	~29	~29	~29	3.9 (do sau 80' nguội)	36.6-37.4	45.5-46.8	53.7-55.3	60.9-62.4	65.8-68	67.9-69.7	66-68	Unchange	100%
14	26/12/2022	10:30	150	2.4	86	86	86	43	29	29	37,020	3.8	29	~26	~26	~26	~26	~26	~26	3.8 (do sau 15' nguội)	38.6-39.5	46.4-47	51.8-53	57.3-58.2	60.9-61.2	62.6-65.1	60-63	Unchange	100%

Conclusion

- This method \ dielectric heating can be used to kill the pests in post harvest agricultural storage without affecting the product.
- This method is more effective compared to the conventional methods.
- The MIT prove to be an efficient way of controlling the pests with minimum environmental and health hazards.

Features of MIT

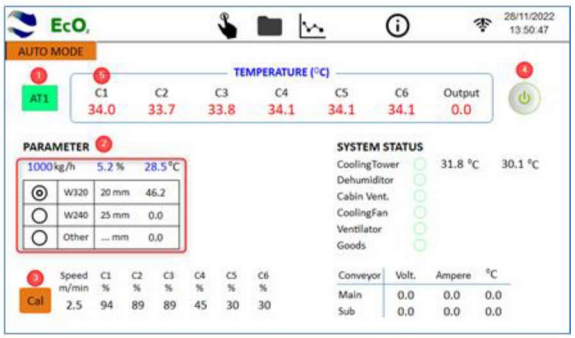
1. Simple, automatic, safe operation
2. Temperature control easily
3. Low energy consumption, reduce operation cost (no need worker for loading \ unloading into fumigation area)
4. Moisture control
5. Be able to adjust processing speed for various purpose

Benefit of MIT investment

Description	Microwave In-line Treatment machine	Value
Total time of processing	1 day \ do along with packing line	Optimizing process and quantity of treated products → Saving processing time → Optimazing cash flow
Volume of cashew kernel storage due to processing	2 Conts (continuous treatment, no waiting time during fumigation process)	Flexible \ reduce working capital \ saving cost of capital and flexible in processing
Flexible order filling	Don't have to wait number of days as conventional fumigation	Proactive in production plan
Risk of infestation	Reducing infestation to minimum as immediately packing	Save extra cost at destination \ import country
Required fumigation area	50 m2	Optimizing warehouse area
Labor for operation	Need only 1 supervisor	Saving labor cost, cost of equipment and goods damage. Cost for safety
Preservation	No require storage of untreated products → no space for growing insect	Reducing infestation to minimum. Treated products is vacuum immediately and sell in appropriate price

Operation process

- Step 1: Provide goods via hopper of the MIT.
- Step 2: At the control screen, switch to Automatic/ AT1, input expected productivity, and input product temperature and moisture.
- Step 3: Push START button



MIT information

	Machine capacity 1000 kg / hour	Machine capacity 1500 kg / hour	Machine capacity 2000 kg/hour
Dimensions (L x W x H) mm	12000 x 1700 x 2200 mm	(13910 + 620) x 1830 x 2200 mm	(17710 + 620) x 1830 x 2200 mm
Quantity of compartment	6	8	10
Power Supply	3 phase – 380 VAC – 50 Hz	3 phase – 380 VAC – 50 Hz	3 phase – 380 VAC – 50 Hz
Total magnetron (KW)	57 KW (Can be controlled)	69 KW (Can be controlled)	78 KW (Can be controlled)
Cooling method	Water (Closed Cooling Tower)	Water (Closed Cooling Tower)	Water (Closed Cooling Tower)
Conveyor belt (1m width)	Heat resistant 200°C	Heat resistant 200°C	Heat resistant 200°C
Speed rate meter / minute	0.5 ÷ 6	0.5 ÷ 6	0.5 ÷ 6
Controller	Siemen PLC	Siemen PLC	Siemen PLC
Temperature sensor	Infrared 0 ÷ 300°C	Infrared 0 ÷ 300°C	Infrared 0 ÷ 300°C

Insect control

3. **Result:**

Samples	Method	Result
Sample No.01	Dielectric Heat (DH) method by microwave at temperature 60 Celsius degree for 01 minute	Dead insects at all stage found. Live insects not found
Sample No.02	Dielectric Heat (DH) method by microwave at temperature 60 Celsius degree for 01 minute	Dead insects at all stage found. Live insects not found
Sample No.03	Dielectric Heat (DH) method by microwave at temperature 60 Celsius degree for 01 minute	Dead insects at all stage found. Live insects not found

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Sample No.04	Dielectric Heat (DH) method by microwave at temperature 60 Celsius degree for 01 minute	Dead insects at all stage found. Live insects not found
Sample No.05	Dielectric Heat (DH) method by microwave at temperature 60 Celsius degree for 01 minute	Dead insects at all stage found. Live insects not found
Sample No.06	Dielectric Heat (DH) method by microwave at temperature 60 Celsius degree for 01 minute	Dead insects at all stage found. Live insects not found

Table 1.1 Response of insect pests to high temperatures

Temperature range (°C)	Effect on insects
25–30	Optimum for development
30–36	Maximum temperature for reproduction of most species
36–42	Populations die out, mobile insects seek cooler zones
42–50	Death within a day
50–60	Death within an hour
Above 60	Death within a minute

Source: Modified from Banks and Fields (1995), and Burks *et al.* (2000).

Conventional heat (HT)
- Conventional steam or dry kiln heat chamber.
- Core temperature is likely to be the coldest.

Dielectric heat (DH)
- Surface temperature is likely to be the coldest.
- Wood must not exceed 20 cm across the smallest dimension (including bark).

Microwaves
- In 2013, when DH treatment was adopted, only microwaves had been shown to be able to achieve the prescribed temperature within the required time.

Radio-frequency waves
- RF waves penetrate wood more deeply than microwaves but also more slowly. As of 2013 RF waves had not been demonstrated to achieve the prescribed temperature within the time prescribed by ISPM 15 Annex 1.
- If RF waves can operationally achieve the ISPM 15 requirements, they can be used as an approved treatment.

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Microbial control

Table 1. Settings are verificated

SETTING	PARAMETER				
	Target temperature (The temperature is maintained in the Heat Chamber H4 & H5)	Belt speed	Residence time (at target temperature)	Bed depth	Total loading
Setting 1	80°C	0.9 m/min	2.5 mins	2 cm	100 kg
Setting 2	90°C	0.9 m/min	2.5 mins	2 cm	100 kg
Setting 3	100°C	0.9 m/min	2.5 mins	2 cm	100 kg

Table 3. The level of bacterial inoculum

No.	Organisms	Initial inoculum level	Log-transformed density	Method
1	*Escherichia coli* ATCC 13076	1.9 x 10^{11} CFU/mL	11.29 Log CFU/g	AOAC 990.12
2	*Salmonella* Enteritidis ATCC 25922	3.3 x 10^{11} CFU/mL	11.52 Log CFU/g	AOAC 990.12
3	Inoculation suspension	1.3 x 10^{11} CFU/mL	11.12 Log CFU/g	AOAC 990.12

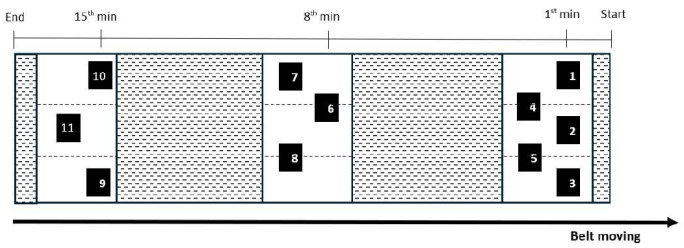

Table 9. Bacterial log-reduction data analysis of Setting 2 & 3

Parameter	Bacterial log-reduction after heat process by subgroup								
	Total (1-11)	Heading (1, 2, 3, 4, 5)	Middle (6, 7, 8)	End (9, 10, 11)	Left (1, 10)	Middle left (4, 6)	Middle (2, 11)	Middle right (5, 8)	Right (3, 9)
Setting 2: 90°C for 2.5 mins, 2 cm, 100 kg									
Mean	**4.1**	3.4	4.5	4.8	4.3	4.2	4.0	3.4	3.9
Setting 3: 100°C for 2.5 mins, 2 cm, 100 kg									
Mean	**4.9**	4.5	5.1	5.3	4.8	5.2	4.6	4.5	5.2

16

IN PRACTICE

IN PRACTICE

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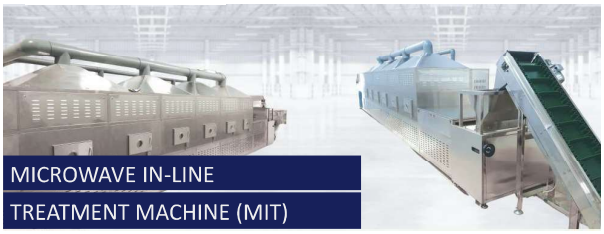

GLOBAL PROJECT

Quang Thien Imex S.A

- **Project lead time**: 2023-2024
- **Location**: Côté D'Ivoire
- **Productivity**: 1 MIT 1,500 kilogram/hour
  1 MIT 2,000 kilogram/hour
- **Dimension (L x W x H)**
- 1 MIT (13910 + 620) x 1830 x 2200 mm
- 1 MIT (17710 + 620) x 1830 x 2200 mm

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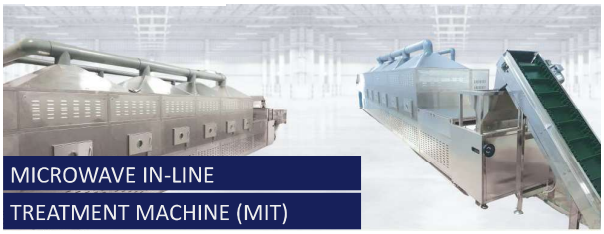
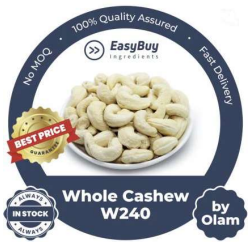
PETERSON EcO2



GLOBAL PROJECT

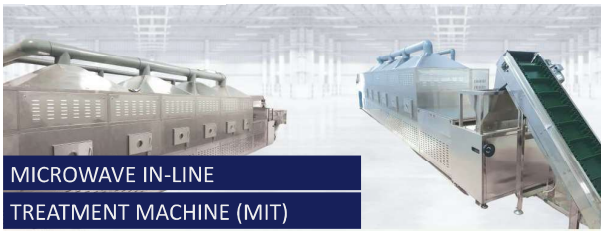


Olam Ivoire S.A

- Project lead time: 2024
- Location: Ivory Coast
- Productivity: 1 MIT 2,000 kilogram/hour
- Dimension (L x W x H):
- 1 MIT (17710 + 620) x 1830 x 2200 mm

www.eco2.nl +84 (0) 274 3567973 Ho Chi Minh City, Vietnam

PETERSON EcO2



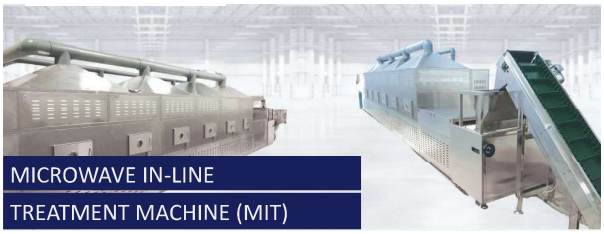
MICROWAVE IN-LINE
TREATMENT MACHINE (MIT)

LOCAL PROJECT

Ngoc Chau Co., Ltd

- **Project lead time**: 2022 - 2024
- **Location**: Viet Nam
- **Productivity:** 1 MIT 1,500 kilogram/hour
  1 MIT 2,000 kilogram/hour
- **Dimension (L x W x H)**
- 1 MIT (13910 + 620) x 1830 x 2200 mm
- 1 MIT (17710 + 620) x 1830 x 2200 mm

PETERSON EcO2



MICROWAVE IN-LINE
TREATMENT MACHINE (MIT)

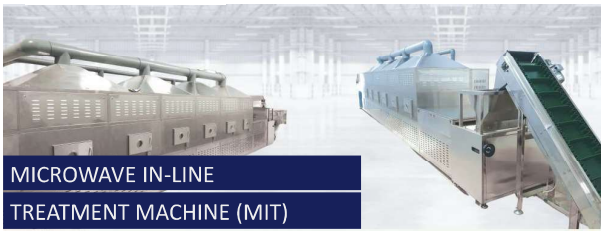
LOCAL PROJECT

MINH LOAN CO.,LTD

- **Project lead time**: 2022 - 2024
- **Location**: Viet Nam
- **Productivity:** 1 MIT 1,500 kilogram/hour
  1 MIT 2,000 kilogram/hour
- **Dimension (L x W x H)**
- 1 MIT (13910 + 620) x 1830 x 2200 mm
- 1 MIT (17710 + 620) x 1830 x 2200 mm

www.eco2.nl +84 (0) 274 3567973 Ho Chi Minh City, Vietnam

PETERSON EcO2



MICROWAVE IN-LINE
TREATMENT MACHINE (MIT)

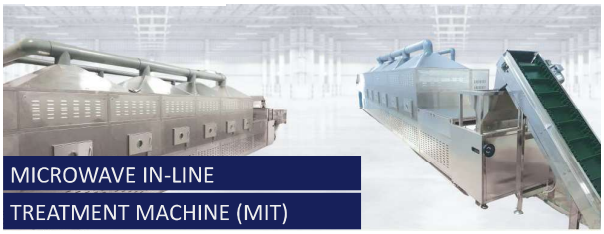
GLOBAL PROJECT

DORADO IVORY

- **Project lead time**: 2023
- **Location**: Côte d'Ivore
- **Productivity:** 1 MIT 2000 kilogram/hour
- **Dimension (L x W x H)**
- 1 MIT (17710 + 620) x 1830 x 2200mm

www.eco2.nl +84 (0) 274 3567973 Ho Chi Minh City, Vietnam

PETERSON EcO2



MICROWAVE IN-LINE
TREATMENT MACHINE (MIT)

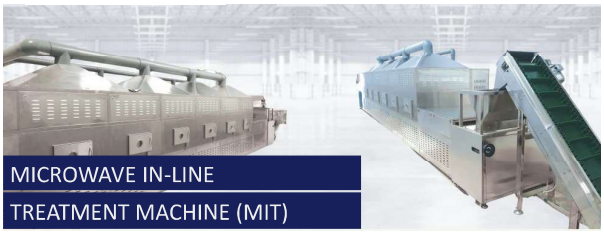
LOCAL PROJECT

TRỤ LÀNH CO., LTD

- **Project lead time**: 2023
- **Location**: Viet Nam
- **Productivity:** 1 MIT 2000 kilogram/hour
- **Dimension (L x W x H)**
- 1 MIT (17710 + 620) x 1830 x 2200mm

www.eco2.nl +84 (0) 274 3567973 Ho Chi Minh City, Vietnam

PETERSON EcO2



MICROWAVE IN-LINE
TREATMENT MACHINE (MIT)

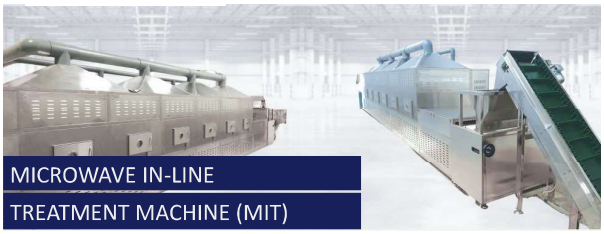
LOCAL PROJECT

HOÀNG LONG CO., LTD

- **Project lead time**: 2024
- **Location**: Viet Nam
- **Productivity:** 1 MIT 2000 kilogram/hour
- **Dimension (L x W x H)**
- 1 MIT (17710 + 620) x 1830 x 2200mm

www.eco2.nl +84 (0) 274 3567973 Ho Chi Minh City, Vietnam

PETERSON EcO2



MICROWAVE IN-LINE
TREATMENT MACHINE (MIT)

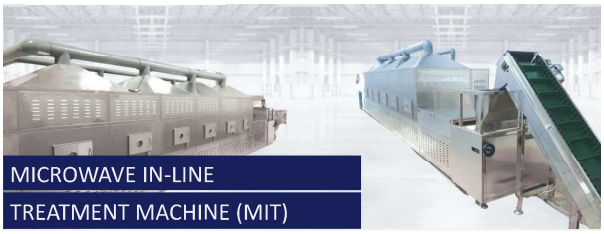
LOCAL PROJECT

THIÊN KỲ BP CO., LTD

- **Project lead time**: 2023
- **Location**: Viet Nam
- **Productivity:** 1 MIT 2000 kilogram/hour
- **Dimension (L x W x H)**
- 1 MIT (17710 + 620) x 1830 x 2200mm

www.eco2.nl +84 (0) 274 3567973 Ho Chi Minh City, Vietnam

PETERSON EcO2



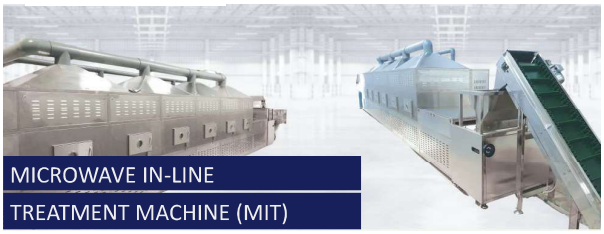
MICROWAVE IN-LINE
TREATMENT MACHINE (MIT)

LOCAL PROJECT

LIÊN VIỆT CO., LTD

- **Project lead time**: 2024
- **Location**: Viet Nam
- **Productivity:** 1 MIT 2000 kilogram/hour
- **Dimension (L x W x H)**
- 1 MIT (17710 + 620) x 1830 x 2200mm

PETERSON EcO2



MICROWAVE IN-LINE
TREATMENT MACHINE (MIT)

LOCAL PROJECT

VINH PHƯỢNG CO., LTD

- **Project lead time**: 2024
- **Location**: Viet Nam
- **Productivity:** 1 MIT 1500 kilogram/hour
- **Dimension (L x W x H)**
- 1 MIT (13910 + 620) x 1830 x 2200mm

www.eco2.nl +84 (0) 274 3567973 Ho Chi Minh City, Vietnam

Peterson-EcO2 CONTROLLED ATMOSPHERE
INVESTMENT COST

Investment cost: bases on quantity of product or particularly demand, we will design or advise appropriate solution

Mission: Promote local support and contribute to enhance value of client product.

For more information contact us at:

salesvn@eco2.vn

info@eco2.nl

Thanks for your attention!

TOAN PHAT
IRRADIATION

TREATING FRESH FRUIT FOR EXPORTATION BY USING IRRADIATION

PRESENTATION

Monday, May 13th , 2024

www.chieuxatoanphat.vn

TREATING FRESH FRUIT FOR EXPORTATION BY USING IRRADIATION

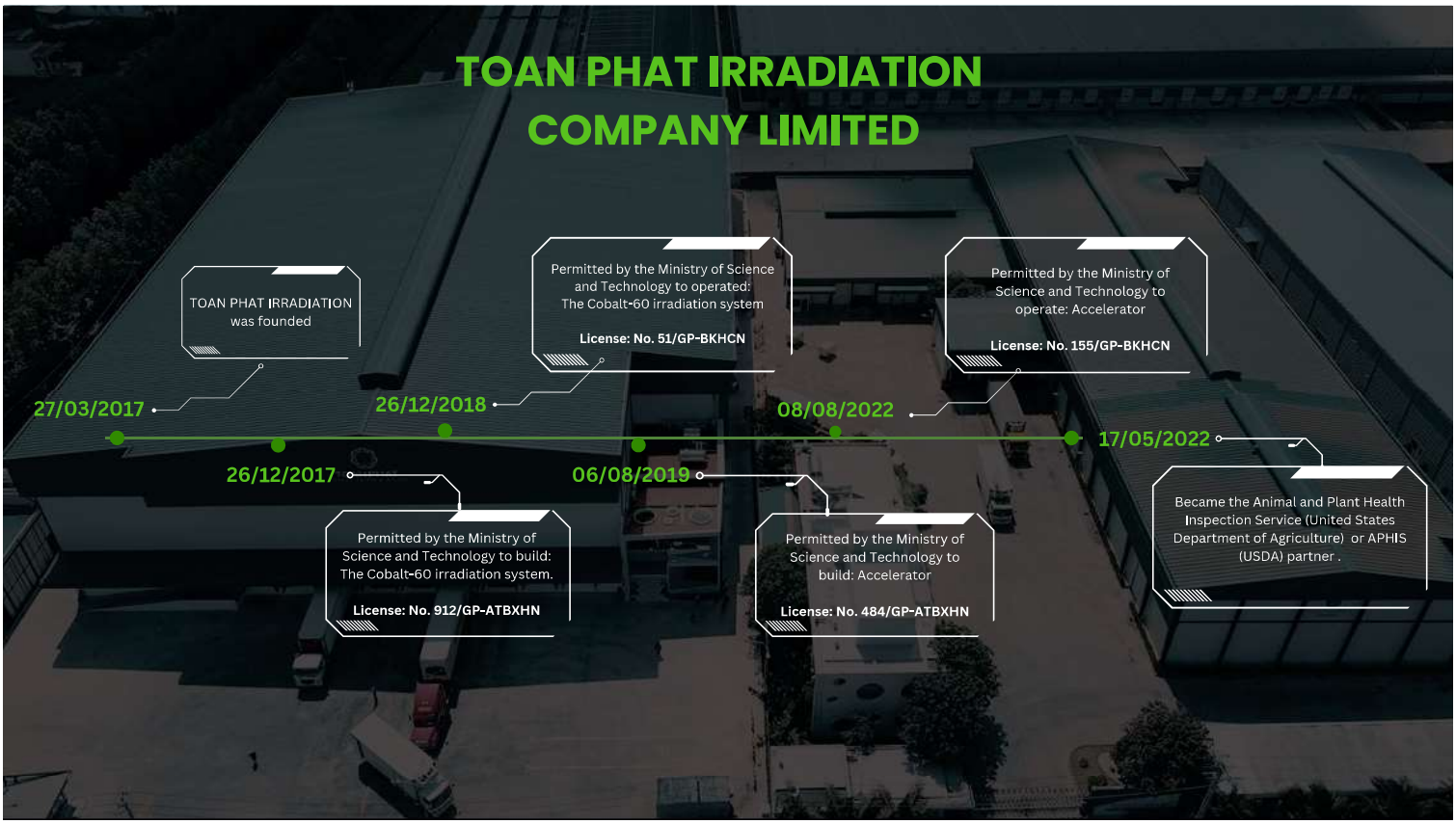
Part 1
General features of Toan Phat irradiation company

Part 2
The irradiation technologies being applied at TPI company

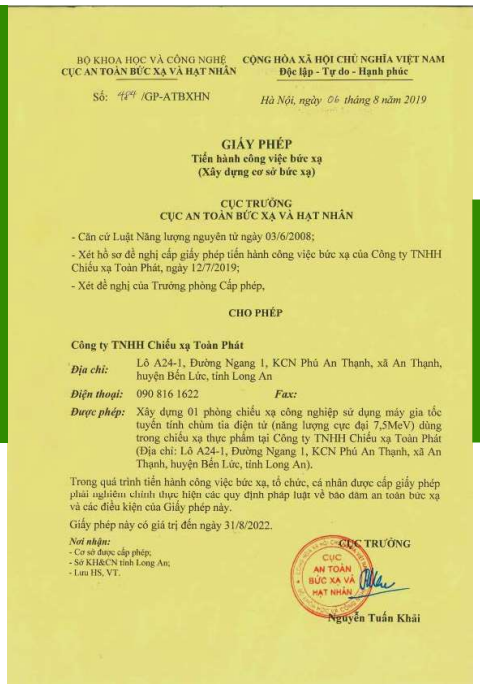
Part 3
The products being irradiated at TPI, focusing mainly on fresh fruit being exported to difficult markets.

Part 4
The difficulties and advantages that the irradiation industry has been facing until now.

TOAN PHAT IRRADIATION COMPANY LIMITED



CERTIFICATE FOR ACCELERATOR



BỘ KHOA HỌC VÀ CÔNG NGHỆ
CỤC AN TOÀN BỨC XẠ VÀ HẠT NHÂN

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Số: 464 /GP-ATBXHN

Hà Nội, ngày 06 tháng 8 năm 2019

GIẤY PHÉP
Tiến hành công việc bức xạ
(Xây dựng cơ sở bức xạ)

CỤC TRƯỞNG
CỤC AN TOÀN BỨC XẠ VÀ HẠT NHÂN

- Căn cứ Luật Năng lượng nguyên tử ngày 03/6/2008;
- Xét hồ sơ đề nghị cấp giấy phép tiến hành công việc bức xạ của Công ty TNHH Chiếu xạ Toàn Phát, ngày 12/7/2019;
- Xét đề nghị của Trưởng phòng Cấp phép,

CHO PHÉP

Công ty TNHH Chiếu xạ Toàn Phát

Địa chỉ: Lô A24-1, Đường Ngang 1, KCN Phú An Thạnh, xã An Thạnh, huyện Bến Lức, tỉnh Long An

Điện thoại: 090 816 1622 ***Fax:***

Được phép: Xây dựng 01 phòng chiếu xạ công nghiệp sử dụng máy gia tốc tuyến tính chùm tia điện tử (năng lượng cực đại 7,5MeV) dùng trong chiếu xạ thực phẩm tại Công ty TNHH Chiếu xạ Toàn Phát (Địa chỉ: Lô A24-1, Đường Ngang 1, KCN Phú An Thạnh, xã An Thạnh, huyện Bến Lức, tỉnh Long An).

Trong quá trình tiến hành công việc bức xạ, tổ chức, cá nhân được cấp giấy phép phải nghiêm chỉnh thực hiện các quy định pháp luật về bảo đảm an toàn bức xạ và các điều kiện của Giấy phép này.

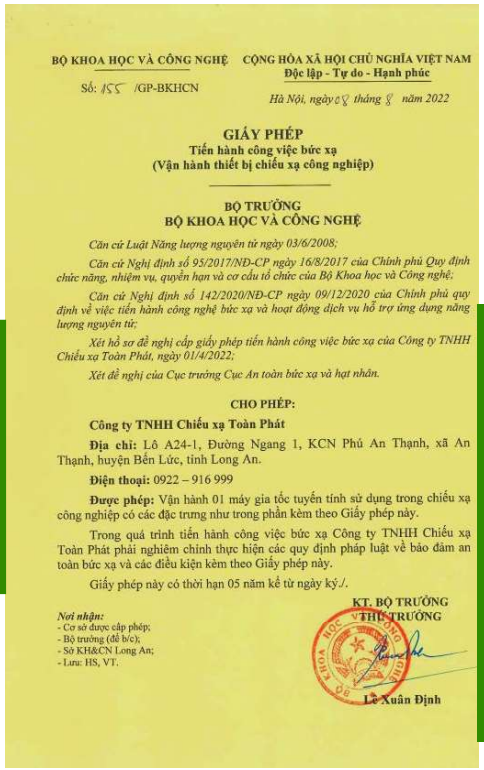
Giấy phép này có giá trị đến ngày 31/8/2022.

Nơi nhận:
- Cơ sở được cấp phép;
- Sở KH&CN tỉnh Long An;
- Lưu HS, VT.

CỤC TRƯỞNG

CỤC AN TOÀN BỨC XẠ VÀ HẠT NHÂN

Nguyễn Tuấn Khải



BỘ KHOA HỌC VÀ CÔNG NGHỆ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Số: 155 /GP-BKHCN

Hà Nội, ngày 08 tháng 8 năm 2022

GIẤY PHÉP
Tiến hành công việc bức xạ
(Vận hành thiết bị chiếu xạ công nghiệp)

BỘ TRƯỞNG
BỘ KHOA HỌC VÀ CÔNG NGHỆ

Căn cứ Luật Năng lượng nguyên tử ngày 03/6/2008;

Căn cứ Nghị định số 95/2017/NĐ-CP ngày 16/8/2017 của Chính phủ Quy định chức năng, nhiệm vụ, quyền hạn và cơ cấu tổ chức của Bộ Khoa học và Công nghệ;

Căn cứ Nghị định số 142/2020/NĐ-CP ngày 09/12/2020 của Chính phủ quy định về việc tiến hành công nghệ bức xạ và hoạt động dịch vụ hỗ trợ ứng dụng năng lượng nguyên tử;

Xét hồ sơ đề nghị cấp giấy phép tiến hành công việc bức xạ của Công ty TNHH Chiếu xạ Toàn Phát, ngày 01/4/2022;

Xét đề nghị của Cục trưởng Cục An toàn bức xạ và hạt nhân.

CHO PHÉP:

Công ty TNHH Chiếu xạ Toàn Phát

Địa chỉ: Lô A24-1, Đường Ngang 1, KCN Phú An Thạnh, xã An Thạnh, huyện Bến Lức, tỉnh Long An.

Điện thoại: 0922 – 916 999

Được phép: Vận hành 01 máy gia tốc tuyến tính sử dụng trong chiếu xạ công nghiệp có các đặc trưng như trong phần kèm theo Giấy phép này.

Trong quá trình tiến hành công việc bức xạ Công ty TNHH Chiếu xạ Toàn Phát phải nghiêm chỉnh thực hiện các quy định pháp luật về bảo đảm an toàn bức xạ và các điều kiện kèm theo Giấy phép này.

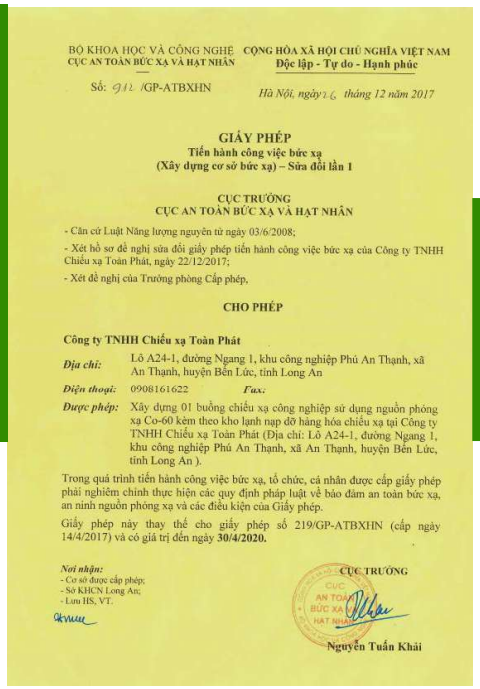
Giấy phép này có thời hạn 05 năm kể từ ngày ký./.

Nơi nhận:
- Cơ sở được cấp phép;
- Bộ trưởng (để b/c);
- Sở KH&CN Long An;
- Lưu: HS, VT.

KT. BỘ TRƯỞNG
THỨ TRƯỞNG

Lê Xuân Định

CERTIFICATE FOR COBALT-60 SYSTEM



BỘ KHOA HỌC VÀ CÔNG NGHỆ
CỤC AN TOÀN BỨC XẠ VÀ HẠT NHÂN

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Số: 912 /GP-ATBXHN

Hà Nội, ngày 26 tháng 12 năm 2017

GIẤY PHÉP
Tiến hành công việc bức xạ
(Xây dựng cơ sở bức xạ) – Sửa đổi lần 1

CỤC TRƯỞNG
CỤC AN TOÀN BỨC XẠ VÀ HẠT NHÂN

- Căn cứ Luật Năng lượng nguyên tử ngày 03/6/2008;
- Xét hồ sơ đề nghị sửa đổi giấy phép tiến hành công việc bức xạ của Công ty TNHH Chiếu xạ Toàn Phát, ngày 22/12/2017;
- Xét đề nghị của Trưởng phòng Cấp phép,

CHO PHÉP

Công ty TNHH Chiếu xạ Toàn Phát

Địa chỉ: Lô A24-1, đường Ngang 1, khu công nghiệp Phú An Thạnh, xã An Thạnh, huyện Bến Lức, tỉnh Long An

Điện thoại: 0908161622 *Fax:*

Được phép: Xây dựng 01 buồng chiếu xạ công nghiệp sử dụng nguồn phóng xạ Co-60 kèm theo kho lạnh nạp dỡ hàng hóa chiếu xạ tại Công ty TNHH Chiếu xạ Toàn Phát (Địa chỉ: Lô A24-1, đường Ngang 1, khu công nghiệp Phú An Thạnh, xã An Thạnh, huyện Bến Lức, tỉnh Long An).

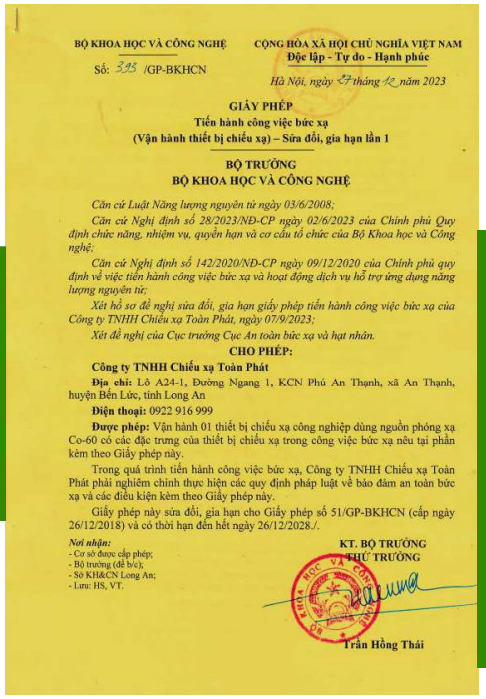
Trong quá trình tiến hành công việc bức xạ, tổ chức, cá nhân được cấp giấy phép phải nghiêm chỉnh thực hiện các quy định pháp luật về bảo đảm an toàn bức xạ, an ninh nguồn phóng xạ và các điều kiện của Giấy phép.

Giấy phép này thay thế cho giấy phép số 219/GP-ATBXHN (cấp ngày 14/4/2017) và có giá trị đến ngày **30/4/2020.**

Nơi nhận:
- Cơ sở được cấp phép;
- Sở KHCN Long An;
- Lưu HS, VT.

CỤC TRƯỞNG

Nguyễn Tuấn Khải



BỘ KHOA HỌC VÀ CÔNG NGHỆ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Số: 335 /GP-BKHCN

Hà Nội, ngày 27 tháng 12 năm 2023

GIẤY PHÉP
Tiến hành công việc bức xạ
(Vận hành thiết bị chiếu xạ) – Sửa đổi, gia hạn lần 1

BỘ TRƯỞNG
BỘ KHOA HỌC VÀ CÔNG NGHỆ

Căn cứ Luật Năng lượng nguyên tử ngày 03/6/2008;

Căn cứ Nghị định số 28/2023/NĐ-CP ngày 02/6/2023 của Chính phủ Quy định chức năng, nhiệm vụ, quyền hạn và cơ cấu tổ chức của Bộ Khoa học và Công nghệ;

Căn cứ Nghị định số 142/2020/NĐ-CP ngày 09/12/2020 của Chính phủ quy định về việc tiến hành công việc bức xạ và hoạt động dịch vụ hỗ trợ ứng dụng năng lượng nguyên tử;

Xét hồ sơ đề nghị sửa đổi, gia hạn giấy phép tiến hành công việc bức xạ của Công ty TNHH Chiếu xạ Toàn Phát, ngày 07/9/2023;

Xét đề nghị của Cục trưởng Cục An toàn bức xạ và hạt nhân.

CHO PHÉP:

Công ty TNHH Chiếu xạ Toàn Phát

Địa chỉ: Lô A24-1, Đường Ngang 1, KCN Phú An Thạnh, xã An Thạnh, huyện Bến Lức, tỉnh Long An

Điện thoại: 0922 916 999

Được phép: Vận hành 01 thiết bị chiếu xạ công nghiệp dùng nguồn phóng xạ Co-60 có các đặc trưng của thiết bị chiếu xạ trong công việc bức xạ nêu tại phần kèm theo Giấy phép này.

Trong quá trình tiến hành công việc bức xạ, Công ty TNHH Chiếu xạ Toàn Phát phải nghiêm chỉnh thực hiện các quy định pháp luật về bảo đảm an toàn bức xạ và các điều kiện kèm theo Giấy phép này.

Giấy phép này sửa đổi, gia hạn cho Giấy phép số 51/GP-BKHCN (cấp ngày 26/12/2018) và có thời hạn đến hết ngày 26/12/2028./.

Nơi nhận:
- Cơ sở được cấp phép;
- Bộ trưởng (để b/c);
- Sở KH&CN Long An;
- Lưu: HS, VT.

KT. BỘ TRƯỞNG
THỨ TRƯỞNG

Trần Hồng Thái

CERTIFICATE OF APPROVAL

Certicicate of Qualified Treatment Pratice for Regulated Articles

BỘ NÔNG NGHIỆP VÀ PHÁT TRIỂN NÔNG THÔN
MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT
CỤC BẢO VỆ THỰC VẬT
PLANT PROTECTION DEPARTMENT

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
SOCIALIST REPUBLIC OF VIETNAM
Độc lập - Tự do - Hạnh phúc
Independence - Freedom - Happiness

GIẤY CHỨNG NHẬN
HÀNH NGHỀ XỬ LÝ KIỂM DỊCH THỰC VẬT
Certificate of Qualified Treatment Practice for Regulated Articles
Số (No.): 04/IRR/BVTV-KD

Tổ chức *(Service provider)*: Công ty TNHH Chiếu xạ Toàn phát

Địa chỉ *(Address)*: Lô A24-1 Đường Ngang 1, KCN Phú An Thạnh, xã An Thạnh, huyện Bến Lức, tỉnh Long An

Biện pháp xử lý *(Treatment method)*: Chiếu xạ

Phạm vi *(Scope of services)*: Quả tươi xuất khẩu

Quy mô *(Scale)*: 10.000 tấn/năm

Có giá trị đến ngày *(Date of expiry)*: 28/01/2024

Ngày cấp (Date of issue): 28/01/2019

CỤC TRƯỞNG

CỤC BẢO VỆ THỰC VẬT

Hoàng Trung

MAY 17th, 2022

Became the APHIS (USDA) partner and irradiated the first fruit cargo exported to the United States market

CERTIFICATE OF APPROVAL

The Animal and Plant Health Inspection Service (APHIS) under the United States Department of Agriculture (USDA) recognizes Toan Phat Irradiation as eligible to perform irradiation on fresh fruits for the US market.

USDA

United States Department of Agriculture

Animal and Plant Health Inspection Service

Plant Protection And Quarantine

Certificate of Approval

For: Irradiation
Type of Facility

This treatment facility and associated equipment have been examined and found acceptable for use in the treatment of articles regulated under the provisions of quarantines and regulations administered by Plant Protection and Quarantine.

Toan Phat Irradiation — Name of Facility
Mr. Vuong Dinh Khoat — Technical Director

Location: LÔ A24-1, Đường Ngang 1, Khu công nghiệp Phú An Thạnh, An Thạnh, Bến Lức, Long An, Vietnam

Conditions of Approval:

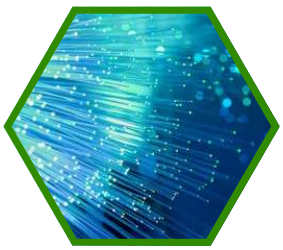
1. The facility must operate under the conditions specified in the compliance agreement,operational work plan, addenda, treatment manual and 7 CFR 305.9
2. Treatments must follow approved process configurations.
3. See compliance agreement for conditions under which recertification is required.
4. Certified boxes and packing material should be used for phytosanitary treatments.

May 17, 2022 — Date Approved
Dejen Mengis — Certifying Official
None — Expiration Date

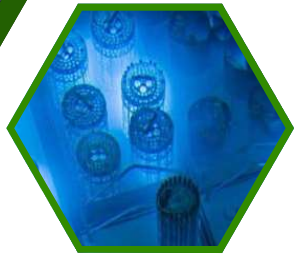
Foreign Program Specialist — Title

IRRADIATION TECHNOLOGIES AT TPI

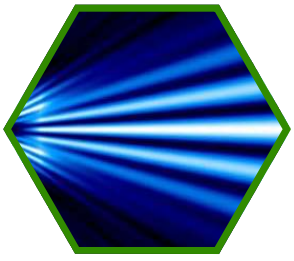
TOAN PHAT IRRADIATION



E-beam irradiation technology



Gramma ray irradiation technology



X-rays irradiation technology

IRRADIATION TECHNOLOGIES AT TPI

The first line is an irradiation line using accelerator to emit electron beam, and X-ray for treat ment. it is ordered to be produced in Europe in accordance with international standards and imported to Vietnam for reassembly, operation, transfer technology.

This irradiation line has a maximum projection capacity up to 100 tons/day.

Useful energy: 7.5 MeV – 10 MeV.

Irradiation line with Accelerator

IRRADIATION TECHNOLOGIES AT TPI

The second line: an industrial irradiation line using cobalt 60 source that emit gamma ray for treatment.

Maximum capacity reaches from 80 -120 tons/day.

This line is a 100% localized one that fully meets the requirements of the International Energy Agency licensed by the Ministry of Science and Technology of Vietnam.

Source capacity: 350.000 Ci – 400.000 Ci.

Irradiation line with COBALT-60

IRRADIATION TECHNOLOGIES AT TPI

In fact, we have only used the Cobalt 60 line for fresh fruit irradiation at TPI.

We are doing the necessary procedures to add X-ray lines to serve fresh fruit irradiation, expected time is 2025. In order to prepare in advance for the coming years, it is possible that the vollume of fresh fruits with irradiation demand will increase.

Irradiation line with X-ray

FRESH FRUITS HAVE BEEN TREATING AT TPI

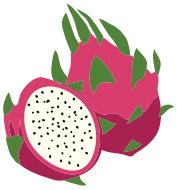
The fresh fruits being irradiated at TPI for export to the US, New Zealand, and Australian markets.

01

02

03

THE UNITED STATES MARKET



Dragon fruit

Mango

Longan

Pumelo

Leechy

Rambutan

Star apple

TOAN PHAT

TRUST ▸ SAFETY ▸ QUALITY

ID	Code	Commodity	Configuration Name	Box Name	Box / Basket Dimensions Length x Width x Height (cm)	Net Weight (kg)	Individual Fruit Weight MIN – MAX	Gross Weight MIN – MAX	Size (Fruit Per box)	Science Name	Vietnamese Name	Fruits per Carrier
1	TPI-070360 Dragon Fruit BASKET	Dragon Fruit	12	Basket	42 x 32 x 12	4.5	331.6 gr - 804.7 gr	4.69 kg - 5.13 kg	7,8,9,10, 11,12	Hylocereus Spp.	Thanh long	35
2	TPI-070360 Dragon	Dragon Fruit		Carton	42 x 31 x 12	4.5	381.5 gr - 798.1 gr	5.11 kg - 5.32 kg	7,8,9,10, 11,12	Hylocereus Spp.	Thanh long	30
3	TPI-070360 Rambutan (4kgs)	Rambutan	10	Basket	41 x 31 x 10	4.0	x	4.25 kg - 4.55 kg	x	Nephelium lappaceum	Chôm chôi	40
4	TPI-070360 Rambutan	Rambutan		Carton	30 x 22 x 9	2.0	x	2.22 kg - 2.37 kg	x	Nephelium lappaceum	Chôm chôi	90
5	TPI-070360 Longan	Longan	10	Basket	41 x 31 x 10	5.0	x	5.16 kg - 5.46 kg	x	Dimocarpus Longan	Nhãn	40
6	TPI-070360 Longan BASKET	Longan	12	Basket	42 x 32 x 12	5.0	x	5.16 kg - 5.76 kg	x	Dimocarpus Longan	Nhãn	35
7	TPI - Litchi BASKET (12CM)	Litchi	12	Basket	42 x 32 x 12	5.0	x	5.36 kg - 5.92 kg	x	Dimocarpus Longan	Vải	35
8	TPI Litchi Basket (10CM)	Litchi	10	Basket	41 x 31 x 10	5.0	x	5.16 kg - 5.76 kg	x	Dimocarpus Longan	Vải	40
9	TPI-070360 Star Apple BASKET	Star Apple	12	Basket	42 x 32 x 12	4.5	214.0 gr - 720.5 gr	4.81 kg - 5.17 kg	8 - 20	Chrysophyllum C. cainit	Vú sữa	35
16	TPI-070360 Star Apple	Star Apple		Carton	42 x 31 x 12	4.0	162.5 gr - 777.8 gr	4.59 kg - 4.93 kg	8 - 20	Chrysophyllum C. cainit	Vú sữa	30
11	TPI-070360 Mango Huge Size BASKET	Mango	Huge-12	Basket	42 x 32 x 12	5.0	579.3 gr - 1,334.4 gr	5.18 kg - 5.76 kg	5 - 8	Mangifera indica	Xoài	35
12	TPI-070360 Mango Tiny Size BASKET	Mango	Tiny-12	Basket	42 x 32 x 12	5.0	256.3 gr - 624.4 gr	5.16 kg - 5.65 kg	9 - 18	Mangifera indica	Xoài	35
13	TPI-070360 Mango (small size)	Mango	Small-10	Basket	41 x 31 x 10	5.0	308.4 gr - 636.3 gr	5.15 kg - 5.49 kg	x	Mangifera indica	Xoài	40
14	TPI-070360 Mango (Big size)	Mango	Big-10	Basket	41 x 31 x 10	5.0	619.8 gr - 1,138.7 gr	5.22 kg - 5.49 kg	x	Mangifera indica	Xoài	40
15	TPI-070360 Mango Huge Size	Mango	Huge	Carton	42 x 31 x 12	5.0	631.1 gr - 1,319.5 gr	5,33 kg - 5.89 kg	5 - 8	Mangifera indica	Xoài	30
16	TPI-070360 Mango Tiny Size	Mango	Tiny	Carton	42 x 31 x 12	5.0	216.4 gr - 674.9 gr	5.39 kg - 5.80 kg	9 - 18	Mangifera indica	Xoài	30
17	TPI-070360 Pumelo Big Size	Pummelo	Big	Carton	47 x 35 x 20	9.0	1,418.6 gr - 2,003.2 gr	9.80 kg - 10.60 kg	5,6,7	Citrus maxima	Bưởi	16
18	TPI-070360 Pumelo Small Size	Pummelo	Small	Carton	47 x 35 x 20	9.0	822.1 gr - 1,440.7 gr	9.70 kg - 10.50 kg	6,7,8	Citrus maxima	Bưởi	16
19	TPI-070360 Pumelo	Pummelo	Medium	Carton	51 x 41 x 21	11.0	1,164.0 gr - 1,800.8 gr	11.46 kg - 12.59 kg	6,7,8,9,10	Citrus maxima	Bưởi	12

DRAGON FRUIT

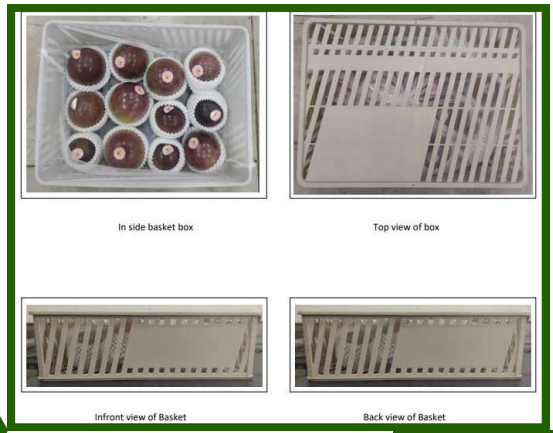
One type of carton

DRAGON FRUIT

One type of basket

STAR APPLE FRUIT

One type of carton



STAR APPLE FRUIT

One type of basket

LYCHEE

Two types of basket

NEW ZEALAND MARKET

For this market evreything is the same as the US market.

The items we have been treating and exporting to New Zealand market include the following configurations:

Pumelo

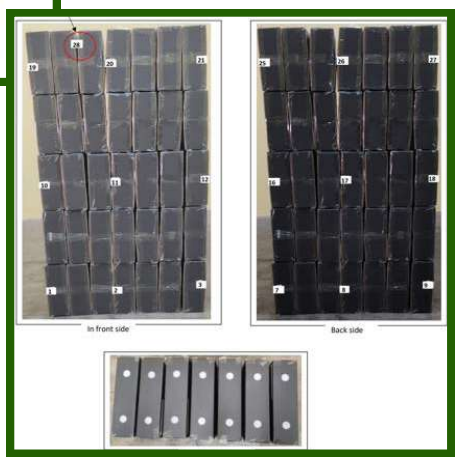
Lime

TOAN PHAT
TRUST ▸ SAFETY ▸ QUALITY

ID	Code	Commodity	Configuration Name	Box Name	Box / Basket Dimensions Length x Width x Height (cm)	Net Weight (kg)	Individual Fruit Weight MIN - MAX	Gross Weight MIN - MAX	Size (Fruit Per box)	Science Name	Vietnamese Name	Fruits per Carrier
1	TPI-070360 Mango Huge Size BASKET	Mango	Huge-12	Basket	42 x 32 x 12	5.0	579.3 gr - 1,334.4 gr	5.18 kg - 5.76 kg	5 - 8	Mangifera indica	Xoài	35
2	TPI-070360 Mango Tiny Size BASKET	Mango	Tiny-12	Basket	42 x 32 x 12	5.0	256.3 gr - 624.4 gr	5.16 kg - 5.65 kg	9 - 18	Mangifera indica	Xoài	35
3	TPI-070360 Mango (small size)	Mango	Small-10	Basket	41 x 31 x 10	5.0	308.4 gr - 636.3 gr	5.15 kg - 5.49 kg	x	Mangifera indica	Xoài	40
4	TPI-070360 Mango (Big size)	Mango	Big-10	Basket	41 x 31 x 10	5.0	619.8 gr - 1,138.7 gr	5.22 kg - 5.49 kg	x	Mangifera indica	Xoài	40
5	TPI-070360 Mango Huge Size	Mango	Huge	Carton	42 x 31 x 12	5.0	631.1 gr - 1,319.5 gr	5,33 kg - 5.89 kg	5 - 8	Mangifera indica	Xoài	30
6	TPI-070360 Mango Tiny Size	Mango	Tiny	Carton	42 x 31 x 12	5.0	216.4 gr - 674.9 gr	5.39 kg - 5.80 kg	9 - 18	Mangifera indica	Xoài	30
7	TPI-070360 Rambutan (4kgs)	Rambutan	10	Basket	41 x 31 x 10	4.0	x	4.25 kg - 4.55 kg	x	Nephelium lappaceum	Chôm chôm	40
8	TPI-070360 Rambutan	Rambutan		Carton	30 x 22 x 9	2.0	x	2.22 kg - 2.37 kg	x	Nephelium lappaceum	Chôm chôm	90
9	TPI-070360 Pumelo Big Size	Pummelo	Big	Carton	47 x 35 x 20	8, 9	1,418.6 gr - 2,003.2 gr	9.80 kg - 10.60 kg	5,6,7	Citrus maxima	Bưởi	16
10	TPI-070360 Pumelo Small Size	Pummelo	Small	Carton	47 x 35 x 20	8, 9	822.1 gr - 1,440.7 gr	9.70 kg - 10.50 kg	6,7,8	Citrus maxima	Bưởi	16
11	TPI-070360 Pumelo	Pummelo	Medium	Carton	51 x 41 x 21	10, 11	1,164.0 gr - 1,800.8 gr	11.46 kg - 12.59 kg	6,7,8,9,10	Citrus maxima	Bưởi	12
12	TPI-001 Lime	Lime		Carton	40 x 30 x 11.5	5.0	x	5.48 kg - 6.47 kg	x	Citrus	Chanh	35

PUMELO

Three types of carton



LIME

One type of carton

AUSTRALIA MARKET

The Work Plan "Export of Fresh Fruits from Vietnam to Australia"

Dose mapping of the following two fruits:

Longan

Mango

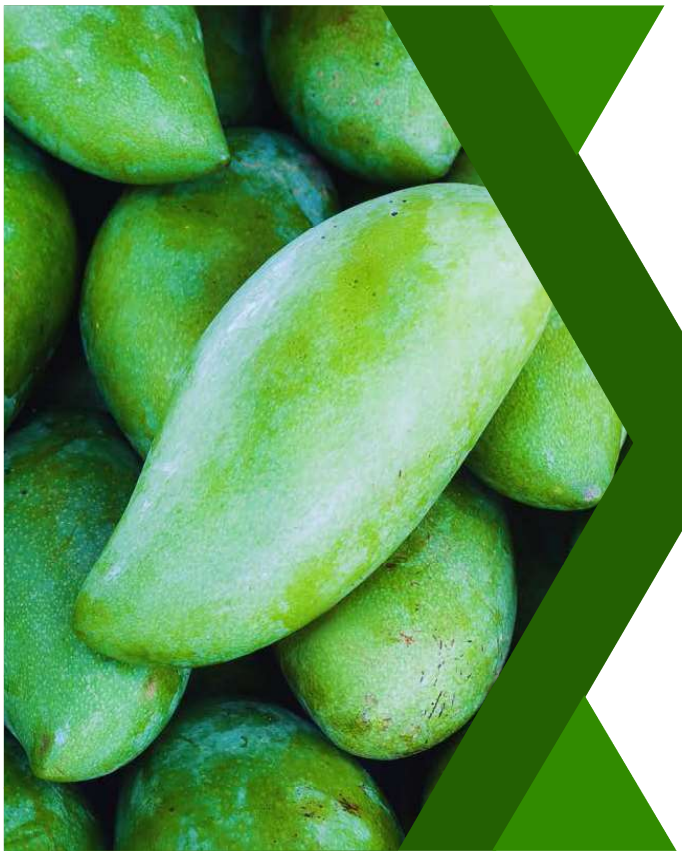
TOAN PHAT

TRUST ▸ SAFETY ▸ QUALITY

ID	Code	Commodity	Configuration Name	Box Name	Box / Basket Dimensions Length x Width x Height (cm)	Net Weight (kg)	Individual Fruit Weight MIN - MAX	Gross Weight MIN - MAX	Size (Fruit Per box)	Science Name	Vietnamese Name	Fruits per Carrier
1	TPI-002 Longan Basket 12cm	Longan	Longan Basket 12cm	Basket	42 x 32 x 12	5.0	x	5.17 kg - 5.72 kg	x	Dimocarpus Longan	Nhãn	35
2	TPI-003 Longan Basket 10cm	Longan	Longan Basket 10cm	Basket	42 x 32 x 10	5.0	x	5.16 kg - 5.69 kg	x	Dimocarpus Longan	Nhãn	40
3	TPI-004 Mango Basket Big size	Mango	Mango Basket Big size	Basket	42 x 32 x 12	5.0	285.70 gr - 1,361.40 gr	5.21 kg - 5.83 kg	5 - 20	Mangifera indica	Xoài	35
4	TPI-005 Mango Basket Small size	Mango	Mango Basket Small size	Basket	42 x 32 x 12	5.0	257.06 gr - 661.16 gr	5.18 kg - 5.68 kg	9 - 20	Mangifera indica	Xoài	35
5	TPI-006 Mango Carton Big size	Mango	Mango Carton Big size	Carton	42 x 31 x 12	5.0	255.63 gr - 1,356.33 gr	5.33 kg - 5.90 kg	5 - 20	Mangifera indica	Xoài	30
6	TPI-007 Mango Carton Small size	Mango	Mango Carton Small size	Carton	42 x 31 x 12	5.0	223.19 gr - 674.35 gr	5.37 kg - 5.81 kg	9 - 20	Mangifera indica	Xoài	30
7	TPI-008 Pummelo Carton	Pummelo	Pummelo Carton	Carton	51 x 41 x 21	11.0	707.30 gr - 2,002.46 gr	11.55 kg - 12.59 kg	5 - 14	Citrus maxima	Bưởi	12
8	TPI-001 Passion Fruit	Passion fruit	Passion fruit	Carton	40 x 30 x 8	2.5	79.70 gr - 157.0 gr	2.60 kg - 3.03 kg	22-26		Chanh dây	55

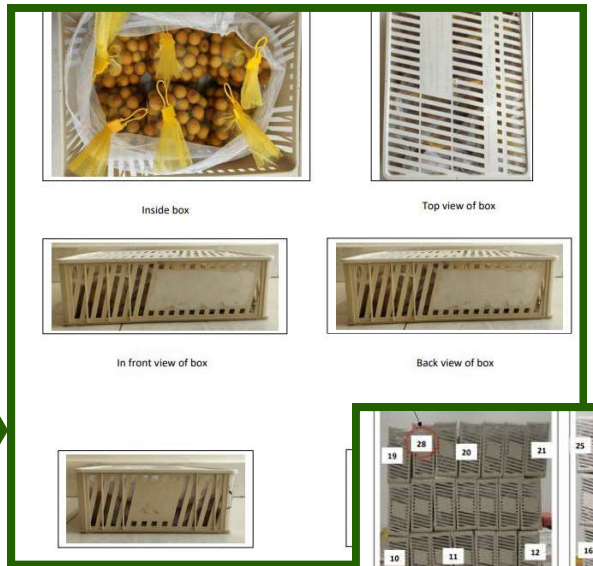
MANGO

Three types of basket



MANGO

Two types of carton



LONGAN

Two types of basket

DIFFICULTIES

- This is a new profession, so it is difficult to access and requires highly specialized human resources
- The policies regulating this special profession are quite complex and detailed.
- Irradiated goods must follow a chain of activities, not individual ones, including famers, package factories, irradiation factories, logistics, air and sea transport companies.
- Regarding irradiation factory , the initial investment cost is quite high, the time to build facilities is long, and the workforce has to work in a harsh environment.
- The above difficulties lead to a major obstacle in the future. If market demand increases unexpectedly, it will be difficult for us to keep up and meet that demand.

ADVANTAGES

- Ministry of Agriculture experts have mastered the steps to remove technical barriers to quickly meet the requirements of partners.
- The number of highly skilled workers trained in this field is increasing, which is also good news
- Speaking specifically about Toan Phat Irradiation Company, we have a technical force with experience in all 3 types of irradiation technologies, with over 10 years of working experience, which is a great advantage to be able to meet the requirements of the market.

TOAN PHAT
IRRADIATION

THANK YOU

FOR YOUR ATTENTION

Mr. VUONG DINH KHOAT - 0922.916.999

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