Irradiation of Tropical Fruit

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Research background

Gamma ray

2003

project project project project

Research Fund

International Atomic

nergy Agency : IAEA)

2008

project project project project project project project project

Shipment .. USA

(Mango, Mangosteen)

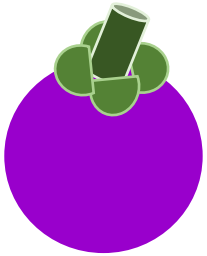
2018

project

Electron beam

(E – Beam)

Postharvest treatment for mangosteen



Sepal

cut / non cut

Waxing

(Gustec)

Gamma

irradiated / non irradiated

(400 gray)

Cooling down& Storage at 13°C

On shelf at 20°C

Non-irradiated fruit

Non waxing

Waxing : Dipped in Gustec at 50 mL/L

Fruit were stored at 13ºC for 10 + 5 days at 20ºC

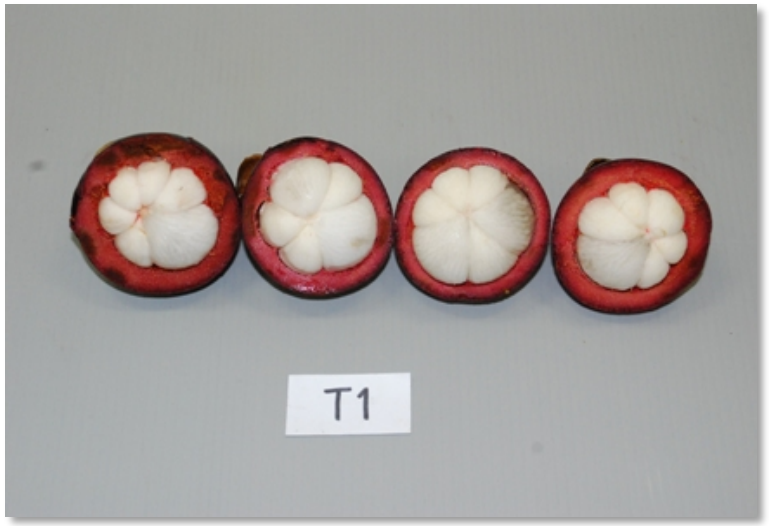
Gamma irradiated fruit

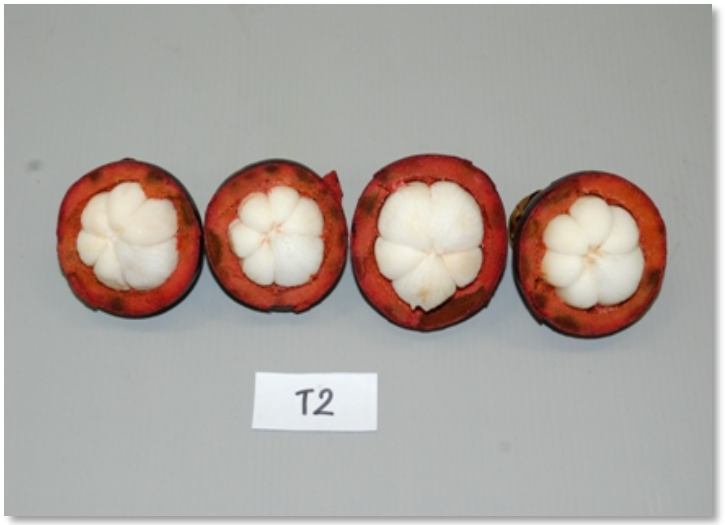
Non waxing

Waxing : Dipped in Gustec at 50 mL/L

Fruit were stored at 13ºC for 10 + 5 days at 20ºC

Non-Irradiated fruit





Gamma Irradiated fruit

All fruit were stored at 13ºC for 10 + 5 days at 20ºC

Effect of fruit maturity on colour development

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Shipment to the USA

Raw Mango cv. Nam Dok Mai

ไม่ฉายรังสี 400 เกรย์ 700 เกรย์

After irradiation, fruit were stored at 13°C for 1 day

ไม่ฉายรังสี 400 เกรย์ 700 เกรย์

Irradiated fruit were stored at 13°C for 14 days

Non treated 400 Gy 700 Gy

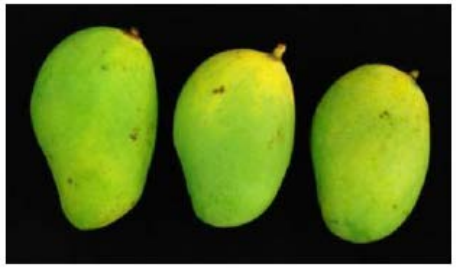
‘Chok-Anan’ mangoes irradiated with gamma ray at 0 (non-treated), 400 and 700 Gy

ไม่ฉายรังสี

400 เกรย์

700 เกรย์

Fruit were stored at 13°C for 1 day after treatment

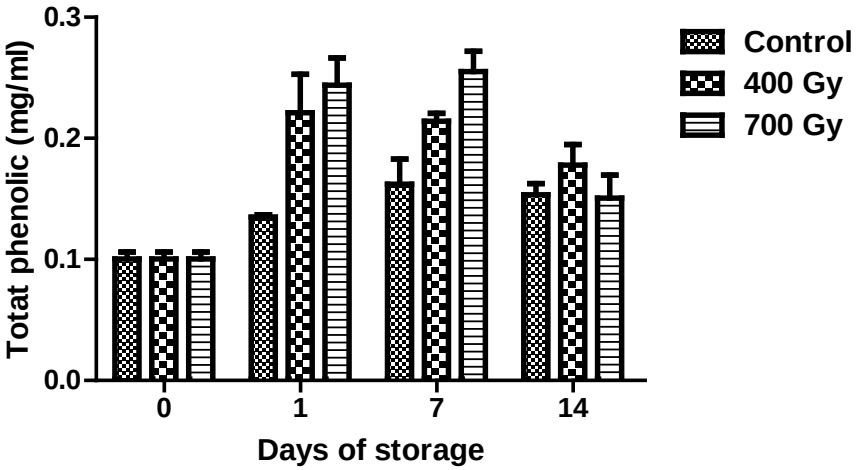


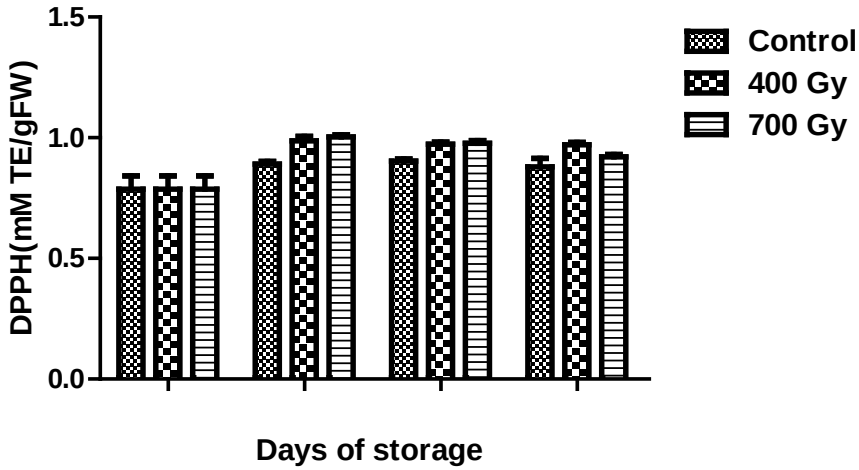
ไม่ฉายรังสี

400 เกรย์

700 เกรย์

Fruit were stored at 13°C for 14 day after treatment





Effect of irradiation dosage on total phenolics and DPPH of ‘Chok-Anan’ mango fruit

‘Nam Dok Mai’ mango

‘Maha-chanok’ mango

Control

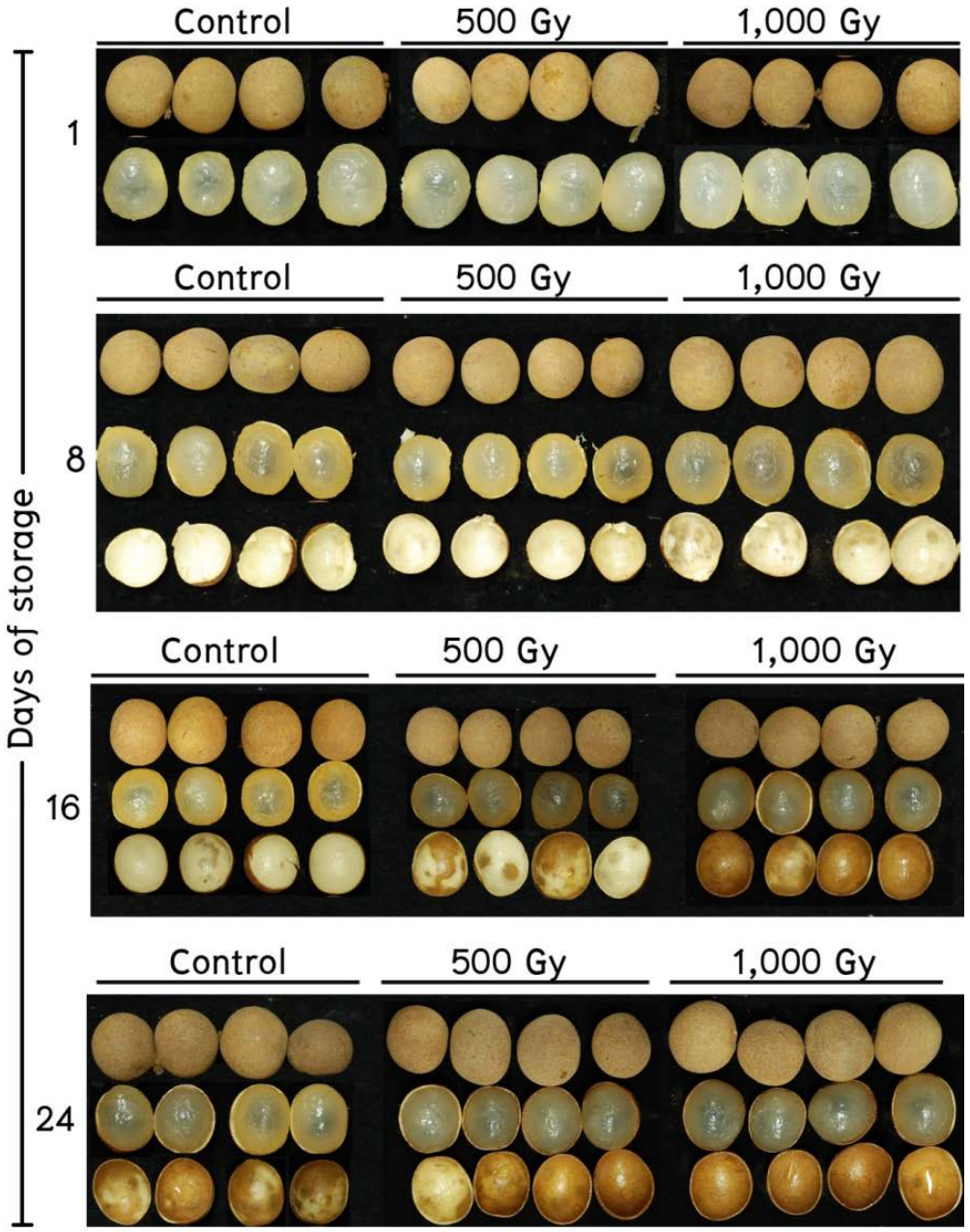
SR

PE

SR+ PE

'Daw' longan fumigated with SO_2 before irradiated with gamma ray at 400 Gy. All fruit were kept at 2°C

Longan cv. Pungthong



Dragon Fruit

3 days after blooming

- **T1** Non - treated
- **T2** Gibberellins (GA)
- **T3** Cytokinins (CK)
- **T4** GA + CK

1st Spray

2nd Spray

3rd Spray

Harvesting

Methods

Sorting

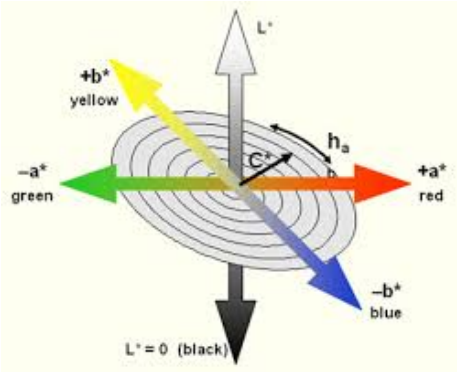
Washing with tap water

Gamma irradiation at 0.4 kGy. Fruit were stored at 13°C for 15 days

Parameters	After Harvest		Day of Storage at 13°C					
			3		9		15	
	T1	T4	T1	T4	T1	T4	T1	T4
Weight loss (%)			0.8	1.1	1.71	1.9	2.7	3.1
L* value of peel	38.9	39.5	43.3	45.7	42.0	43.5	39.4	41.4
a* value of peel	33.7	31.5	39.6	34.9	38.9a	34.1b	37.2a	33.8b
b* value of peel	9.6	10.6	12.5	12.1	10.5	12.0	11.3	12.7
H° of peel	17.2	19.2	17.7b	21.3a	13.7b	22.8a	16.1b	21.9a
Firmness (N)	3.3	3.3	2.7	2.8	2.6	2.5	2.1	2.3
Total soluble solids (°Brix)	12.2	12.4	14.3	13.2	13.7	13.5	15.2	16.2

T1: Non spray

T4: GA + CK



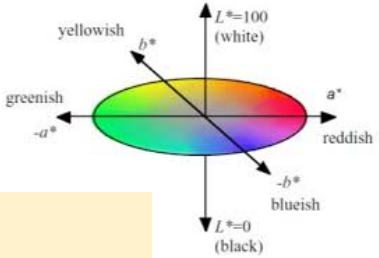
Appearance

	After harvest	Day 3	Day 9	Day 15
T1 Non - spray				
T4 GA + CK				

Pineapple

Storage at 13°C

Quality of ‘Pattavia’ pineapple after harvest

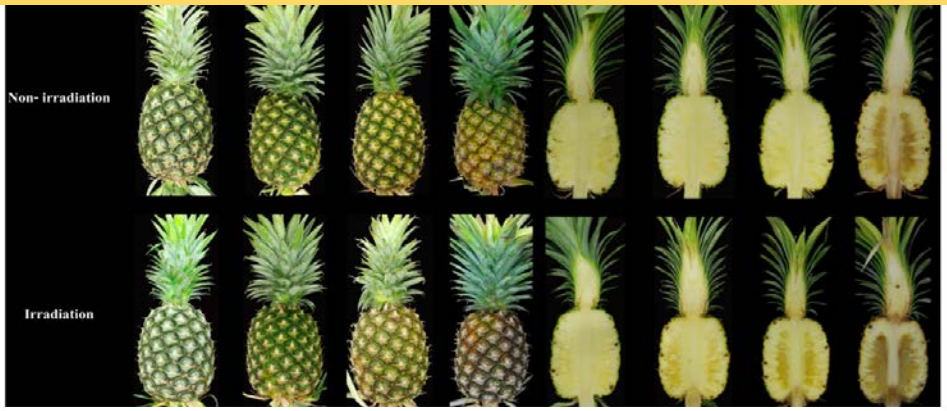


Parameters	Season		
	Summer	Rainy	Winter
L* value of peel	33.3b	30.2b	39.3a
a* value of peel	-2.7c	-1.5b	3.9a
b* value of peel	8.1b	8.6b	10.3a
Hue angle of peel	105.2a	100.3b	98.7c
DPPH (% inhibition)	22.6b	26.9a	22.9b
Ascorbic acid (mg/100g FW)	36.6b	33.4b	39.7a

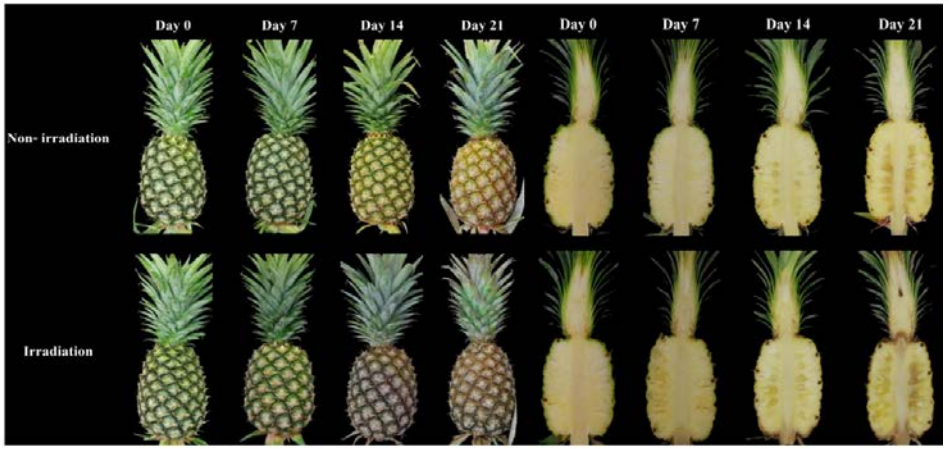
Effect of harvesting season on quality of gamma irradiated fruit during low temperature storage for 21 days

Parameters	Summer		Rainy		Winter	
	Non-IRR	IRR	Non-IRR	IRR	Non-IRR	IRR
Internal browning (score)	3 b	4 a	2.0	3.0	3.0b	5.0a
Translucency (score)	3.0b	4.0a	3.0b	4.0a	4.0	5.0
L* value of peel	40a	35b	36	33	46a	30b
a* value of peel	3.2	2.4	1.9b	2.8a	7.9a	6.8b
b* value of peel	21a	12b	17a	12b	24a	14b
Hue angle of peel	84a	76b	82a	76b	75a	67b
DPPH (% inhibition)	34	34	31a	27b	25a	19b
Ascorbic acid (mg/100g FW)	47	44	26	24	54	52

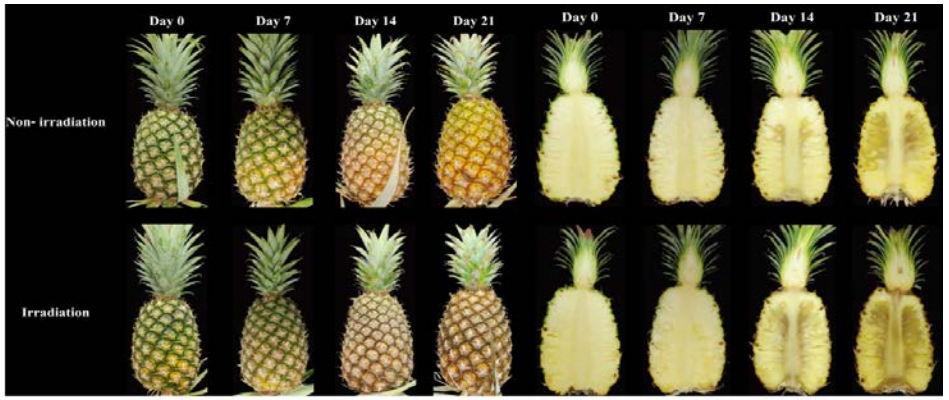
Effect of harvesting season on internal browning of gamma irradiated fruit



Summer

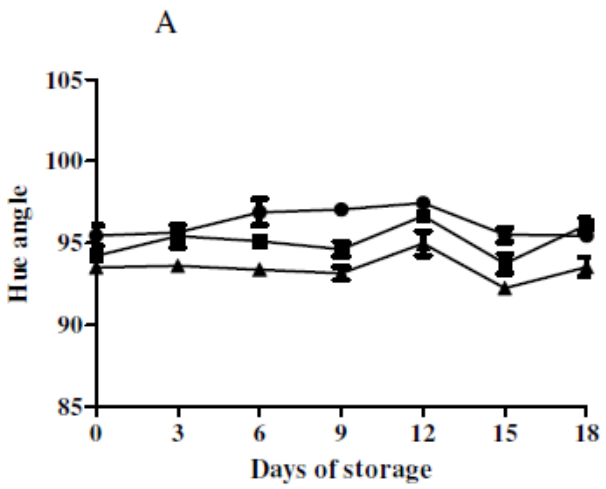


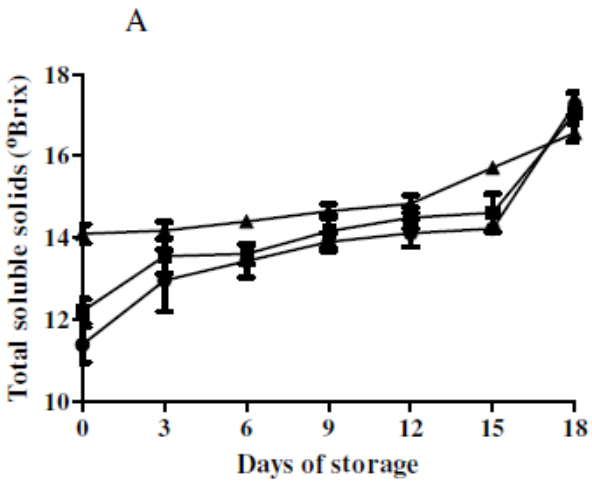
Rainy



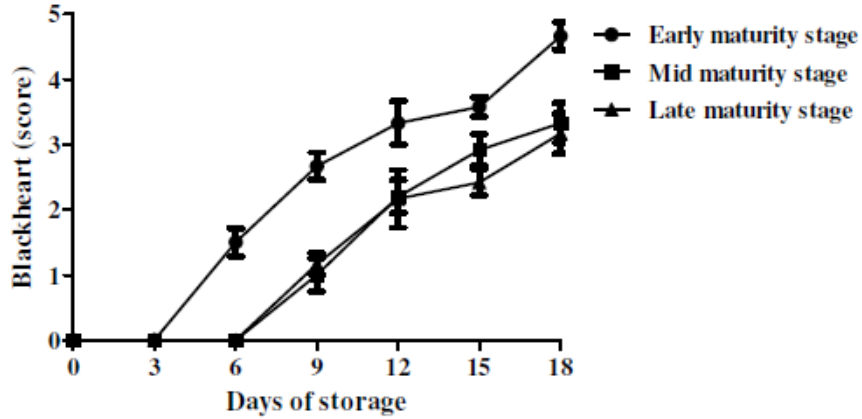
Winter

Effect of maturity on quality of pineapple cv. Trad Srithong irradiated with gamma ray at 0.3-0.6 kGy during storage at 13°C





Control

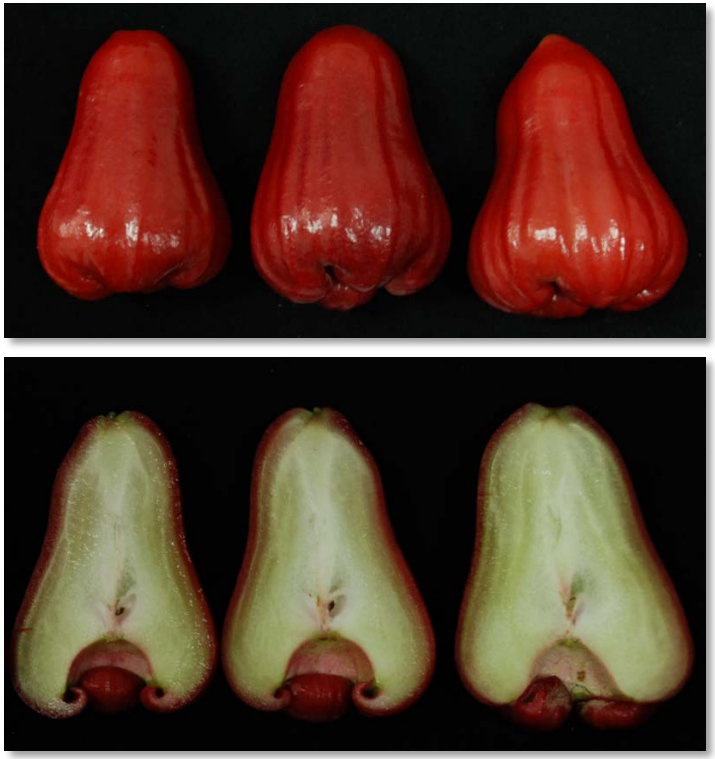


Treatment

Rose apple

After harvesting

Treated with gamma ray at 0.3 kGy



Day 1 **Day 3** **Day 6**

Conclusions

Fruit responded to gamma irradiation vary with cultivar and also maturity.

Pre and Postharvest treatments could reduce postharvest losses.

Gamma irradiation can be served as phytosanitary for tropical fruits with pre and postharvest management.

Acknowledgements

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