



Commercial handling of rambutan for local & export markets

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TFNet 2009



Coverage of presentation:



1. Introduction
2. R&D activities

- *packing system
- Storage temperatures



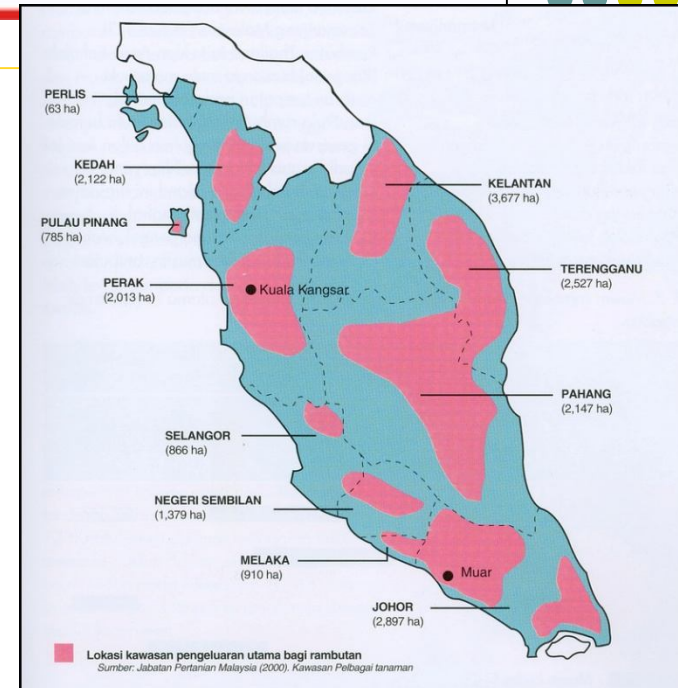
3. Handling operations for local & export markets



Rambutan

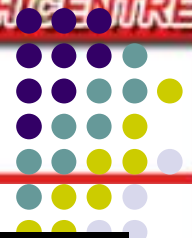


- Presently grown in many ASEAN regions
- Popular variety: R162
- Malaysia – Growing areas 26,000 ha (2005)
32,000 ha (2010)
- 2010 - export value RM 7million.
Trading: *Singapore*
» *Europe & Middle East*





Rambutan



(Nephelium lappaceum Linn.)

Delicious fruits:

Blend of sweet and sour taste

with 85% water,

Vit C, \pm 39-60 mg/100g

TTS (15-17° Brix), pH (4-5)





Problems : ⇒

Rapid skin browning-
makes the fruits
unattractive, although the
arils remains edible



Short storage life 2-3 days at ambient

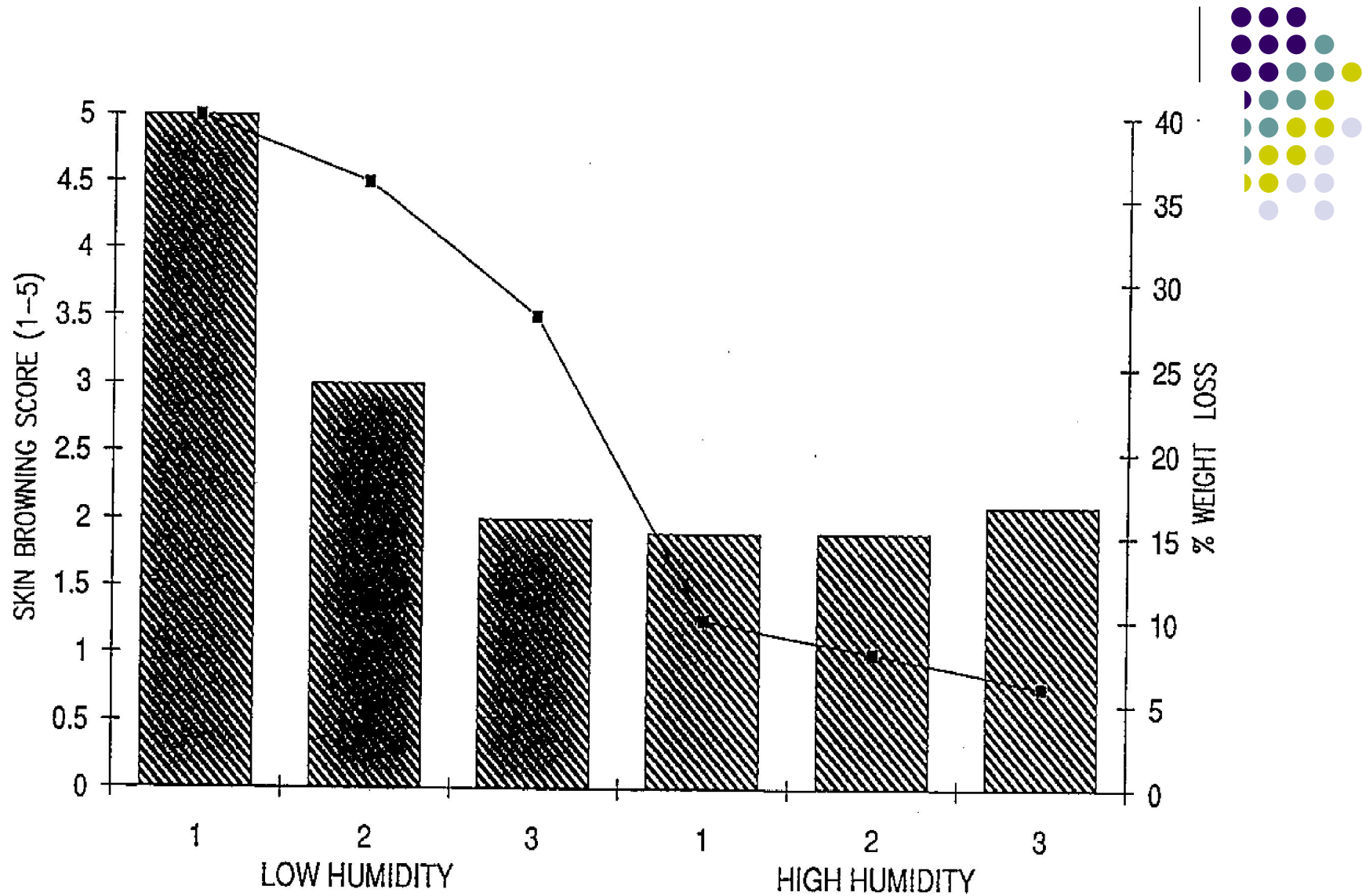
Deterioration



Browning -of the peel, which starts at the top of the spintern and progress on to its base.



•**Browning** –associated with desiccation & is aggravated by mechanical injury



Wt loss merely accelerate the occurrence of browning



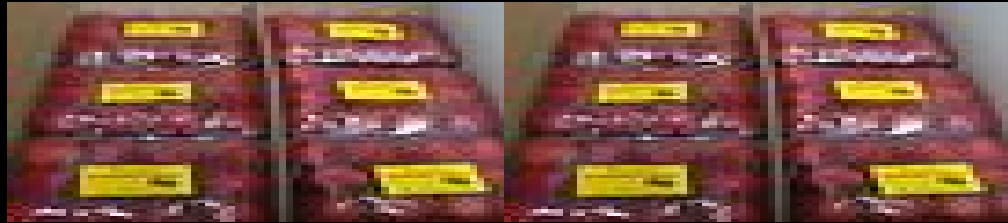
**Typical fungus infection-
Penicillium spp. – cause
serious damage of blue- &
green mould rot**



Treatments to improve shelflife



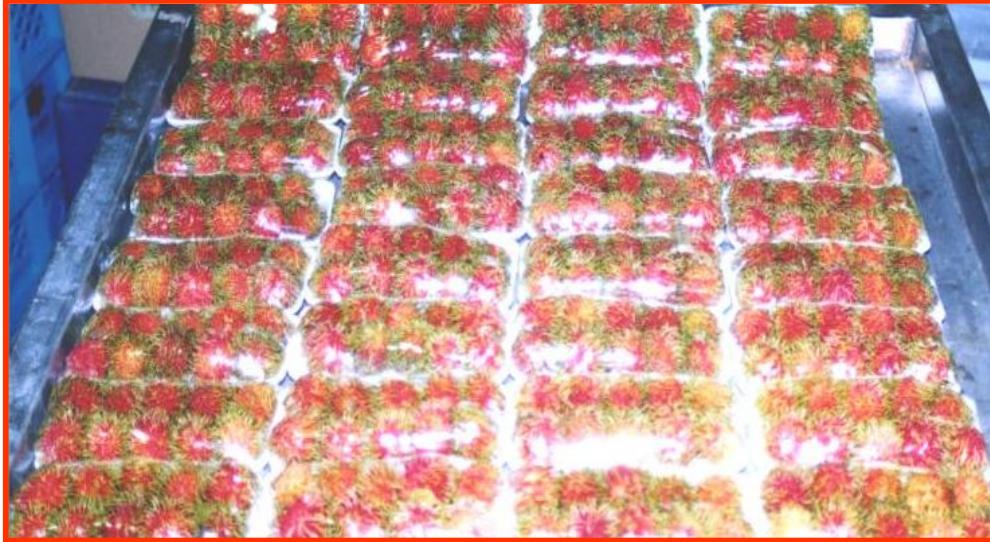
- » Leon (1982) -----Calcium chloride
- » Mohamed et al. (1988) – Calcium chloride + sodium metabisulphite
- » O’Hare and Johnson (1992) – Sodium metabisulfit
- » Latifah et al. 2001) – Calcium chloride
- » Latifah et. al. (2001)- Coating
- » Lam et al. 1987- MAP
- » Latifah et. al. (2004-2006)- MAP



Common MAP : LDPE, PVC films, Rigid containers:



Effective for controlling the weight loss at low temperatures



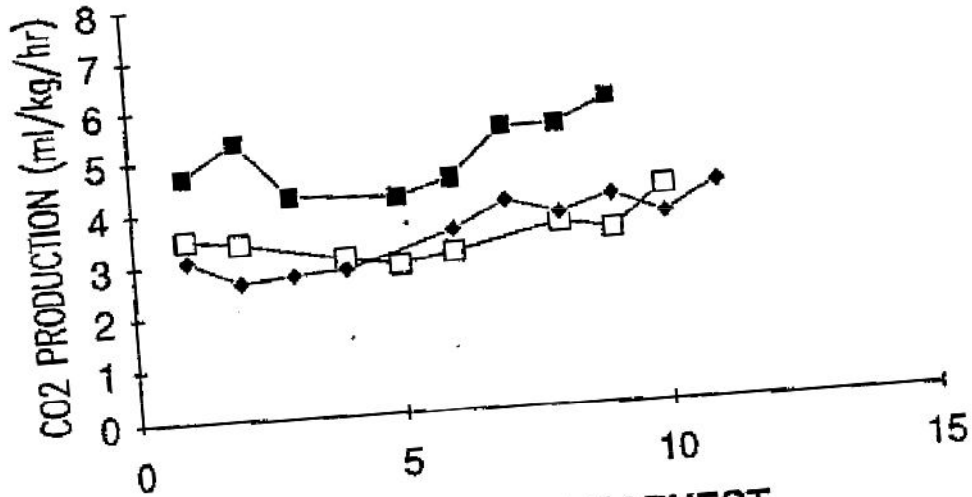
Stretch film wrapping



PE bag

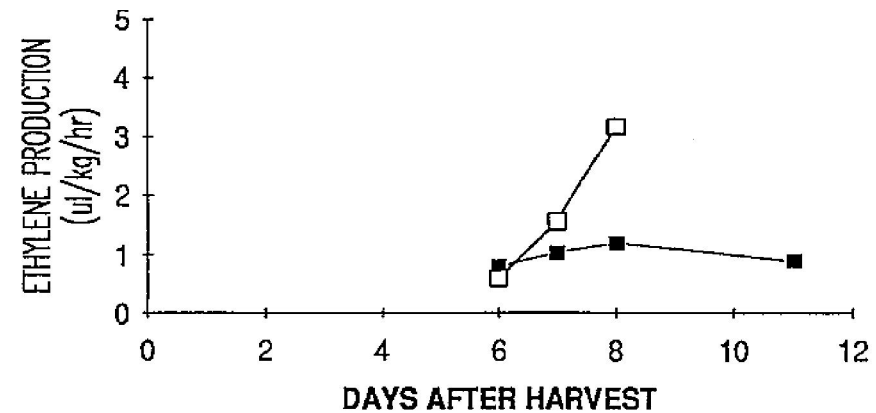
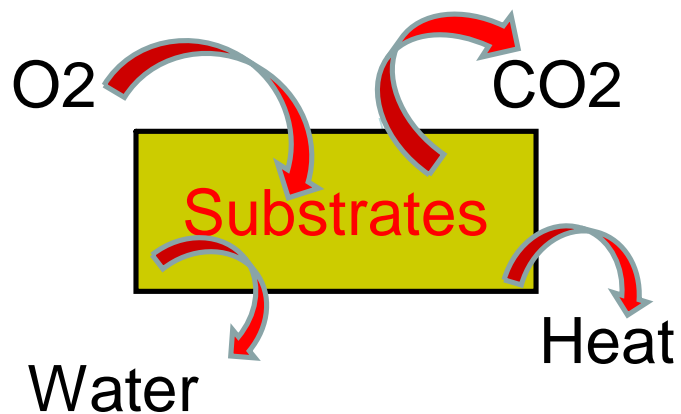
Beneficial effect of MAP:

- * *Reduction in the rate of respiration*
- *Inhibition of ethylene production*
- *maintaining nutritional quality*



Non-climacteric fruits

Useful guide to the potential storage life





R&D : Packing treatments



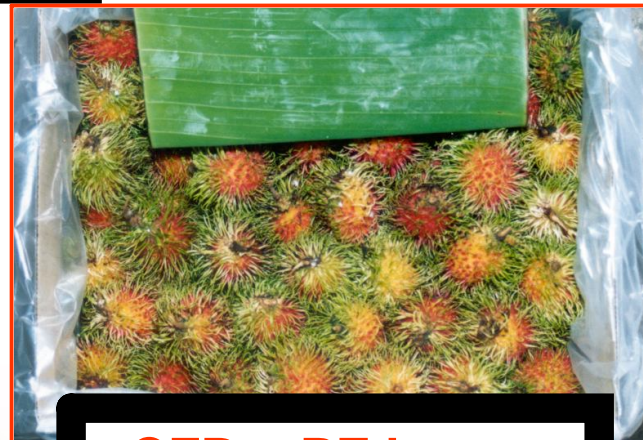
Insulated box + frozen gel



CFB + PE bag



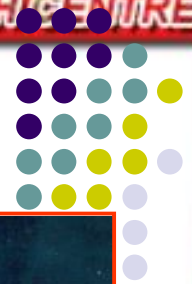
Stretch film wrapping



CFB + PE bag + banana leaves liner



Cont. Results



Rambutan in PE bag after day 2.

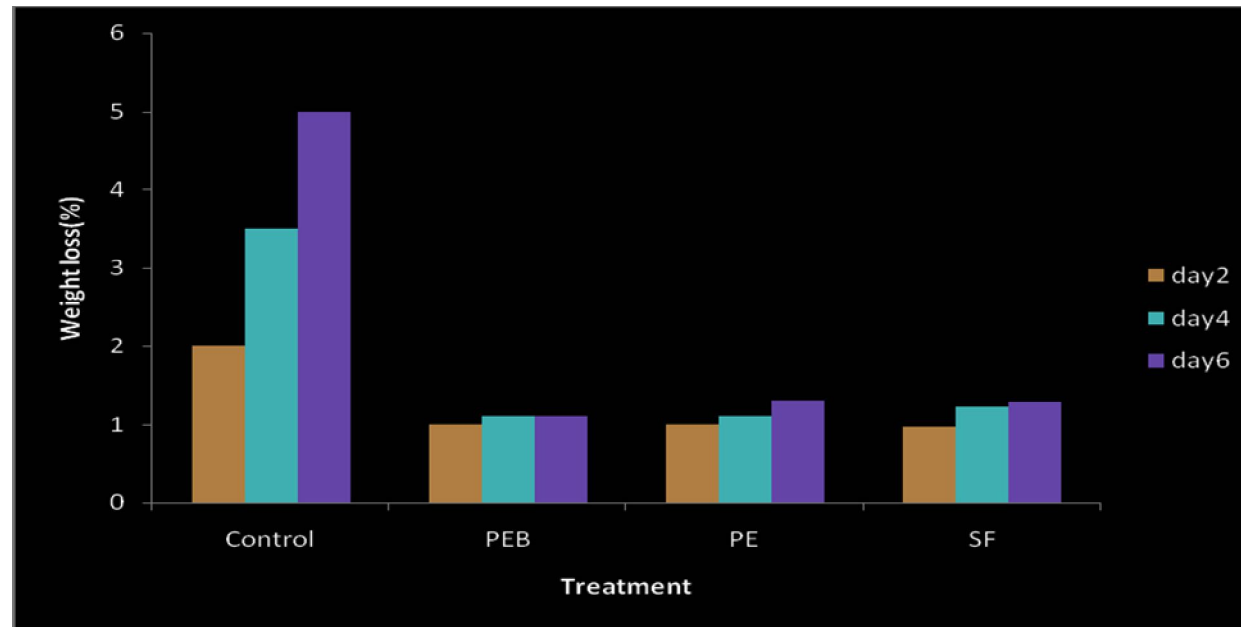


Results



After 6 days at 25 °C: Fruits packed using PE bag + banana leaves liner exhibited better red colour and MORE fresher





The weight loss of the control samples increased markedly from 2.% to 5% on day 6 of storage. Water loss – occurs largely through the spinterns which have the stomata density \pm 5 times greater than the fruit body. When the weight loss is 5% the spinsterns desiccate & turned to brownish black colour seriously



Cont. Results

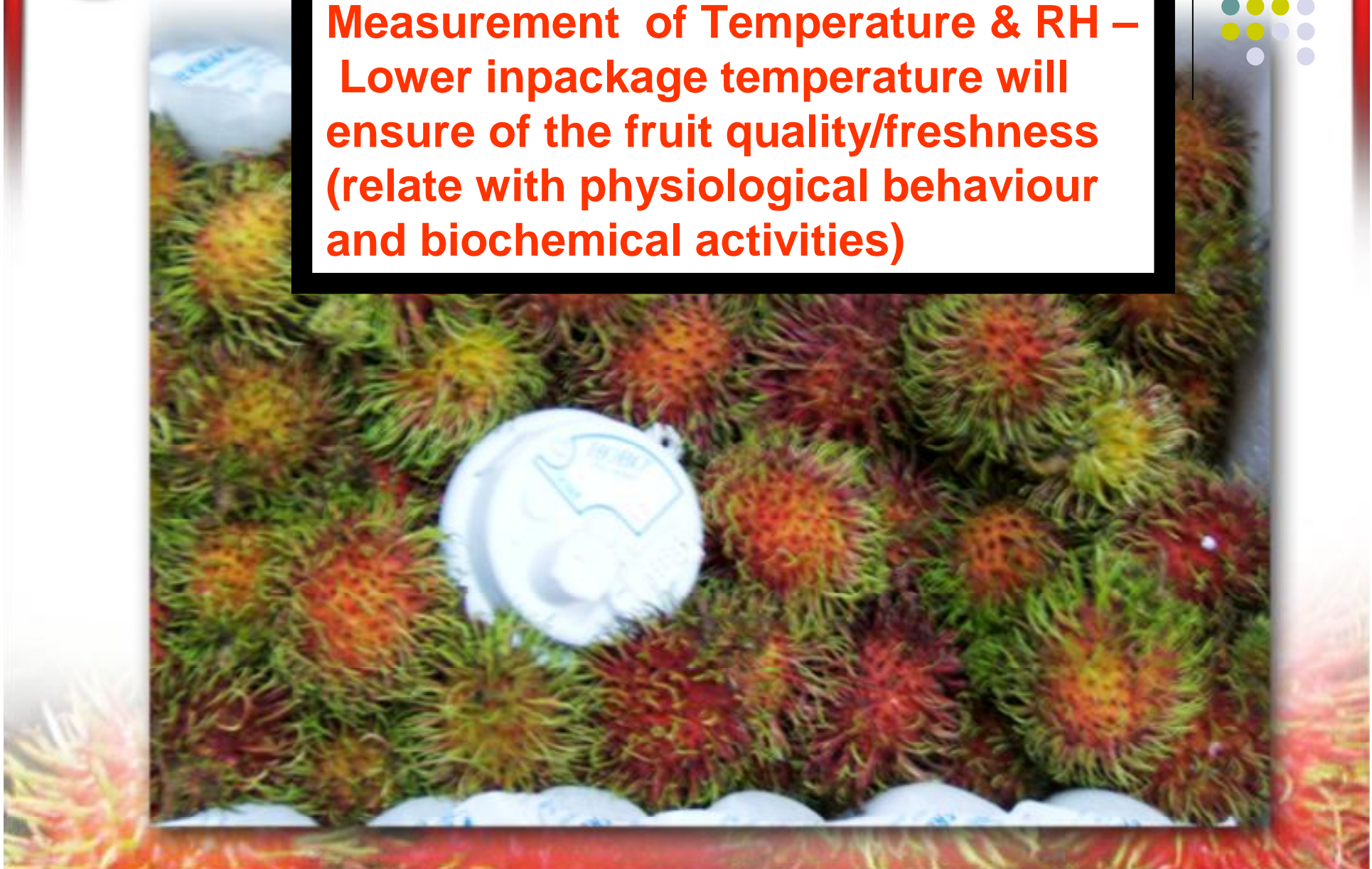


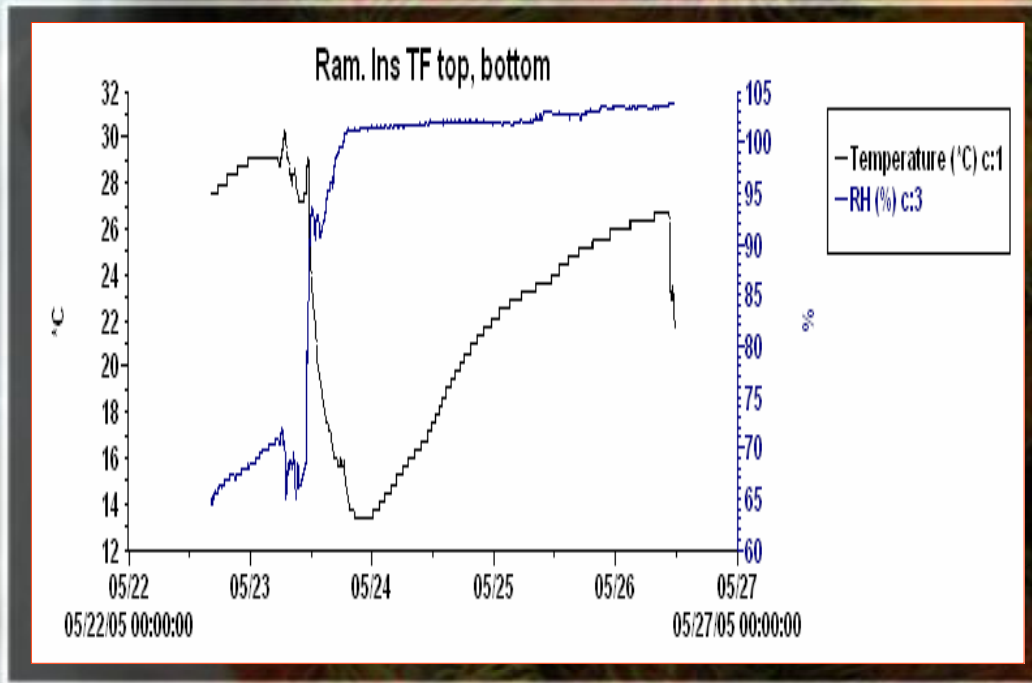
Rambutan packed using insulated box lined PE film + frozen gel –after 7 days still good

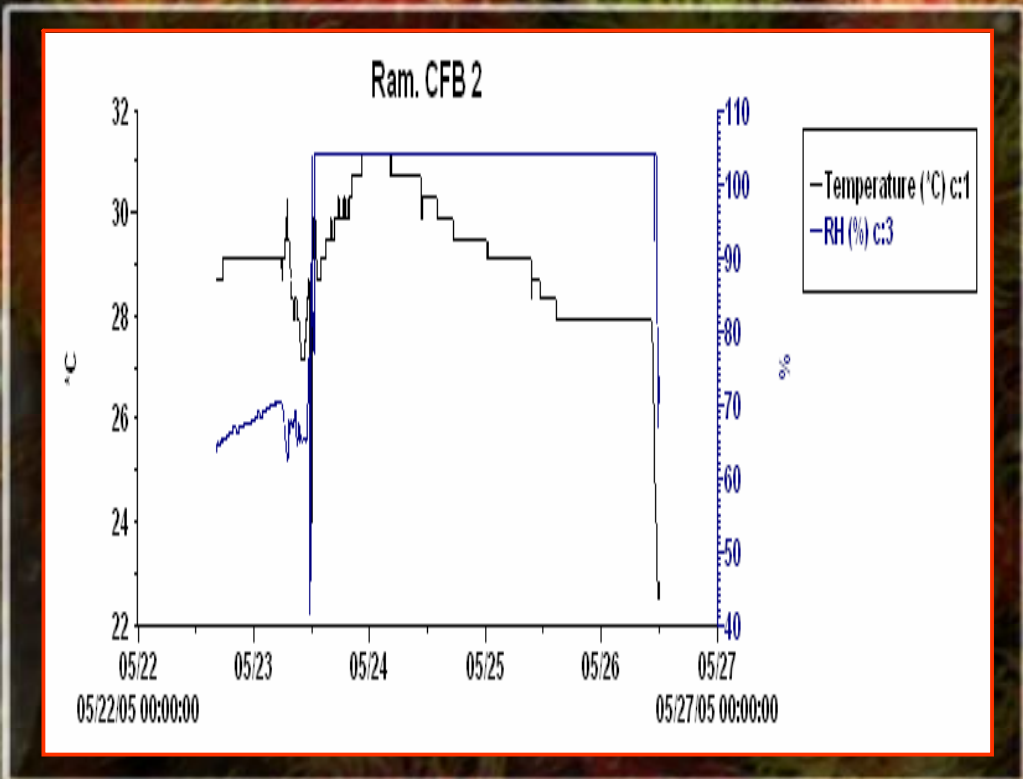


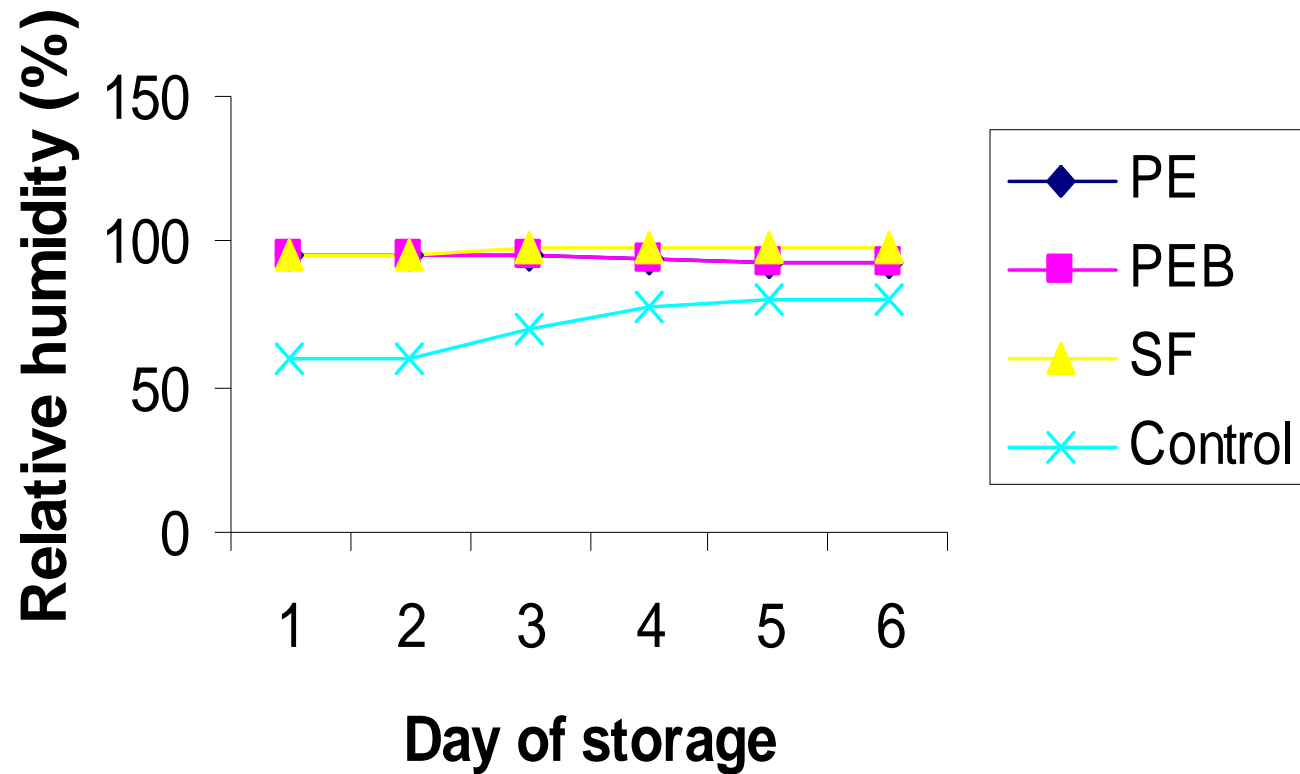


**Measurement of Temperature & RH –
Lower inpackage temperature will
ensure of the fruit quality/freshness
(relate with physiological behaviour
and biochemical activities)**









HIGHER RH in the packed fruits

Control fruits – RH **increases with duration of storage.**



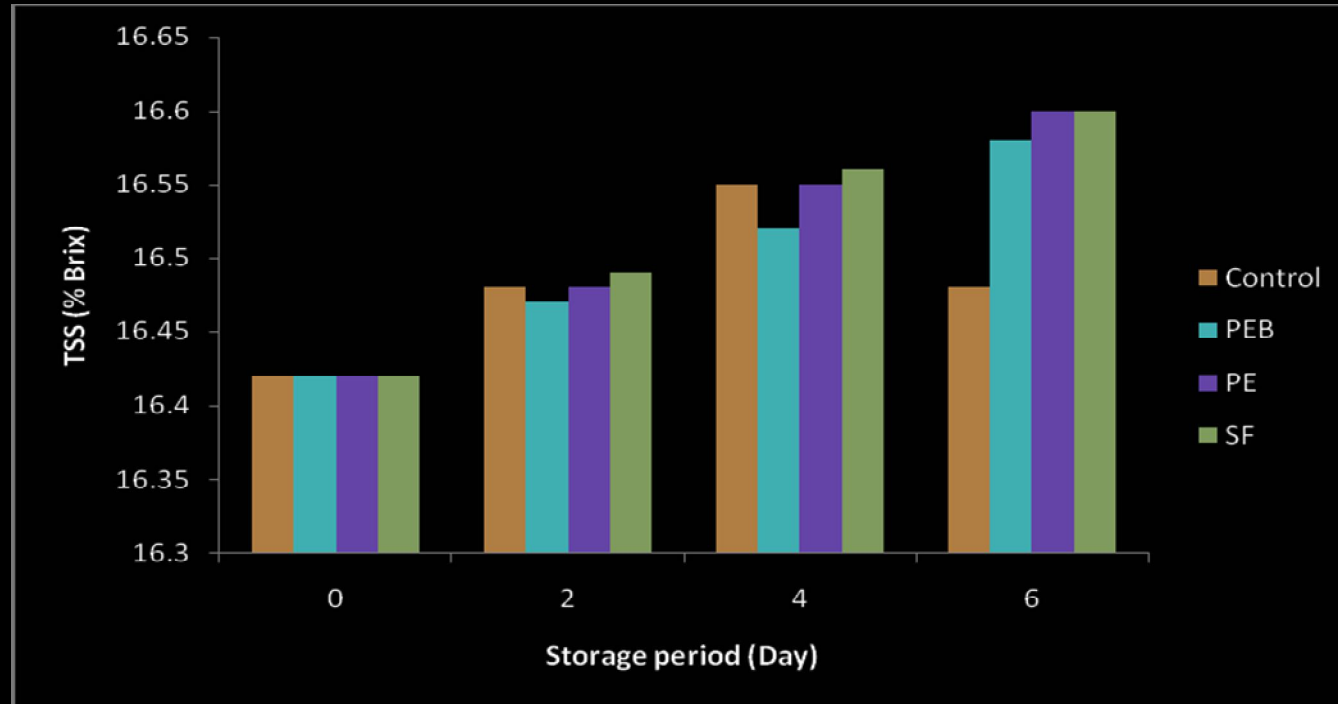
Table 1: Occurance of diseases to rambutan in different packing systems

Day	Treatment	0% - Nil	Trace to 5%	6 - 30%	31- 50%	>50%
0	SF PE PEB FG Control	√ √ √ √ √				
2	SF PE PEB FG Control	√ √ √ √	√			
4	SF PE PEB FG Control		√ √ √ √	√		
6	SF PE PEB FG Control		√ √	√ √	√	



**Trace to 5%
browning &
disease on day 4
to the packed
fruits**





**Gradual ↑ trend in the TSS value during 6 days storage.
TSS of the control fruits ↓ after day 4**



Steady increased in the TSS value to rambutan packed using frozen gel & PE bag + banana leaves





Storage temperature:

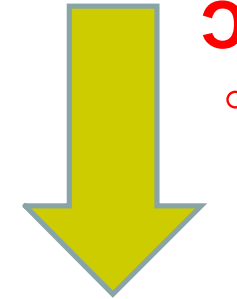
Storing in sealed polyethylene bags at **10° C** and **95% relative humidity** has preserved the rambutan fruits in fresh condition for **± 10 days.**

Cold chain

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MAP at 10C-



25°C

**Chilling injury-
sudden skin
browning**

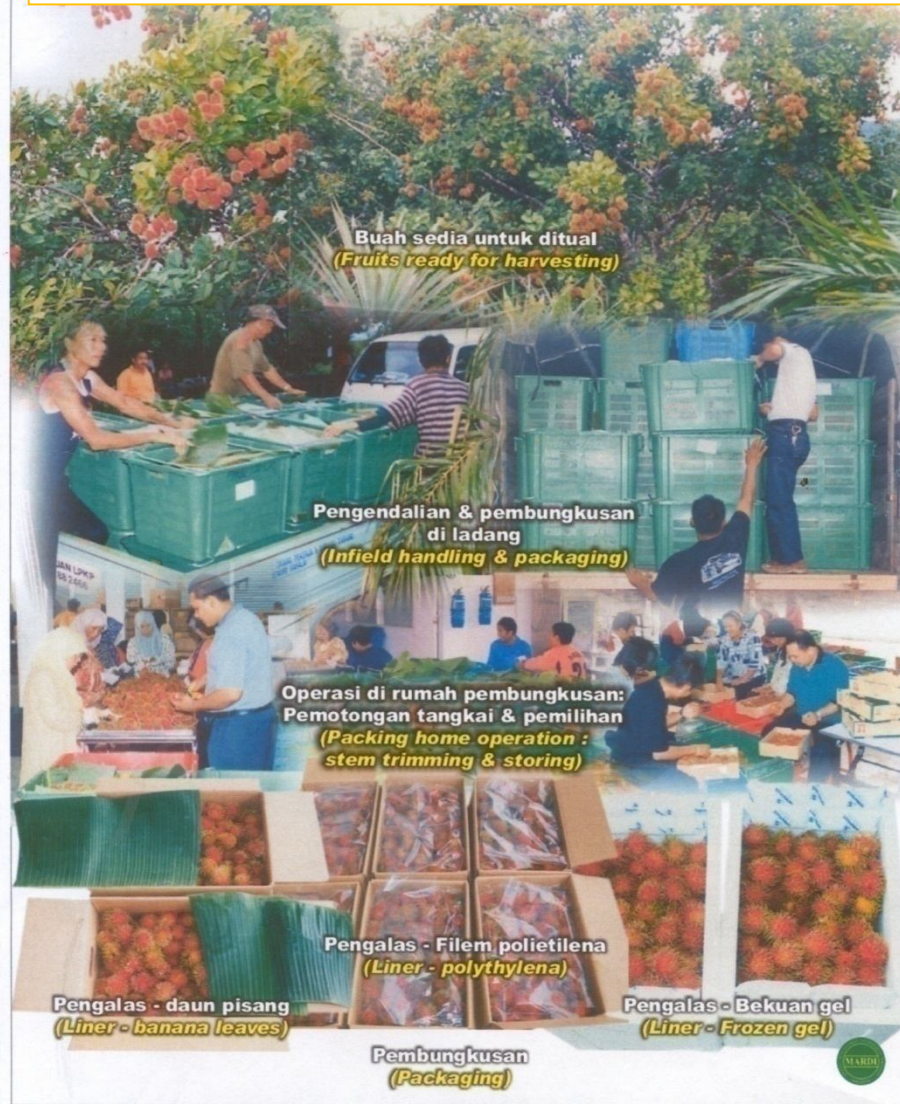
No storage at 5°C-



**serious chilling injury-
blackening of the
spinterns & fruit body**



Commercial handling



-Air 2002/2006:
London &
Netherlands

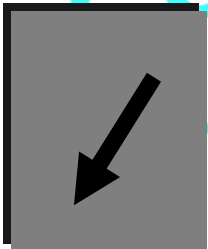
-Road 2004:
Langkawi to Kuala
Lumpur

-Sea 2006:
Sarawak to Port
Klang/Selangor)



Harvested fruits are still living, continue to respire & lose water as long as they are attached to the parent plant.

Postharvest handling



harvesting, infield handling, handling operations : (sorting, stem cutting, **washing, cleaning, drying, postharvest treatments**), grading, packing, storage and transportation

The only difference between fruits that lose are not placed.

The fruits therefore suffer detrimental changes after harvest.

Thus appropriate postharvest handling is needed esp for commercial activities

Fruit colour is often used as a guide for harvesting. Problems – fruit within a tree, and even within a cluster is not uniform





Fruit harvesting Sorting & stem cutting



Rough handling causes wounding, stimulate respiration & ethylene production & may induce physiological disorder & fungal rot





Infield handling ; Proper packaging



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Infield packaging – use of basket-
proper stacking

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Washing : + -







NW-DP R11
26/1/06

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Air drying





SF wrapping



PE bag

Condensation problem to fruits using SF & PE bag
⇒ favour the microbial growth & disease infections



Pe bag + banana leaves



Provide good aeration.
Proper stacking to avoid impact
damage





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For local markets :

Plactic baskets vs bamboo baskets

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**BETTER
QUALITY**



**After day 2 at
25°C**

**Road
transportation**

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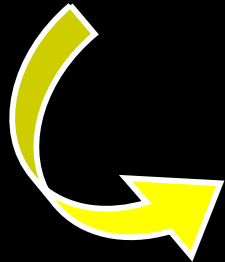
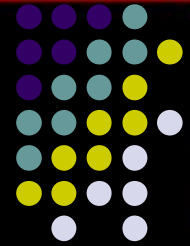
Export markets: By road & air



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Conclusion



Still fresh even after day 6 at 25 °C and 2 weeks at 10 °C.



CFB + PE bag +
banana leaves liner
local hypermarkets/
air shipments



Insulated box + frozen
gel –local markets/
sea shipments

Acknowledgement



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- * Cosmo Fruitrade Sdn. Bhd

- * All Postrharvest staffs – MARDI, Serdang



Thank You
Terima Kasih

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