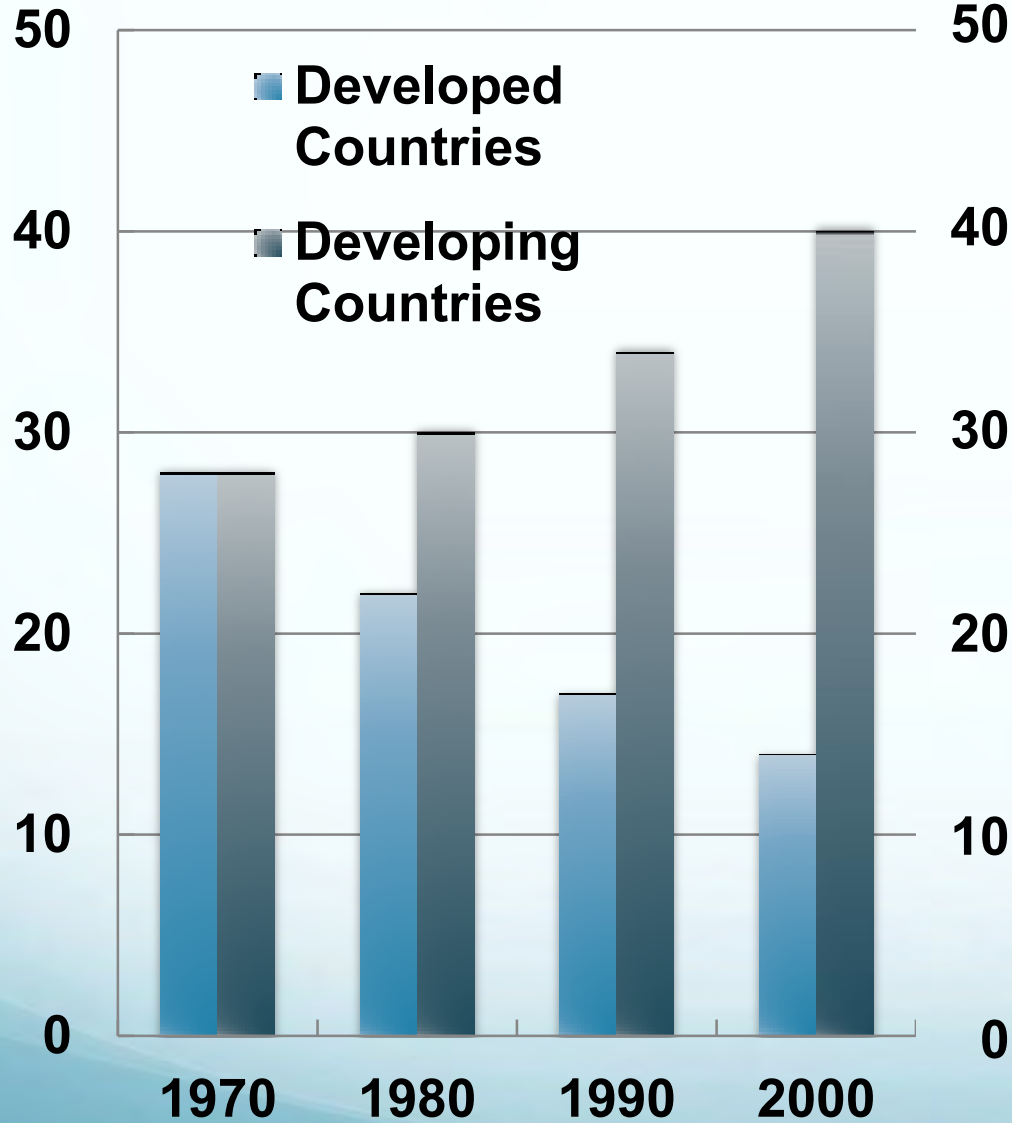




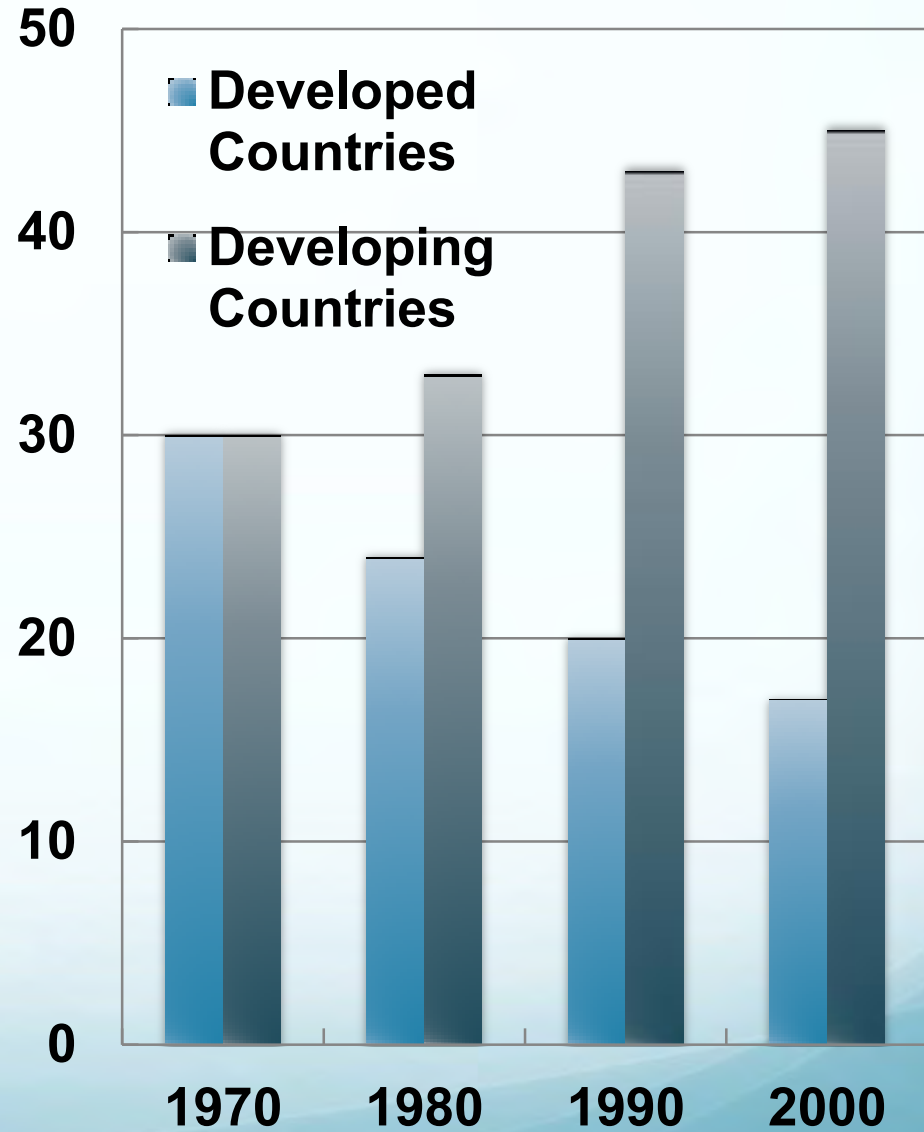
How Modified Atmosphere Packaging (MAP) can reduce fresh crops losses and maintain quality

Prof. Nouredine Benkeblia

FRUITS



VEGETABLES



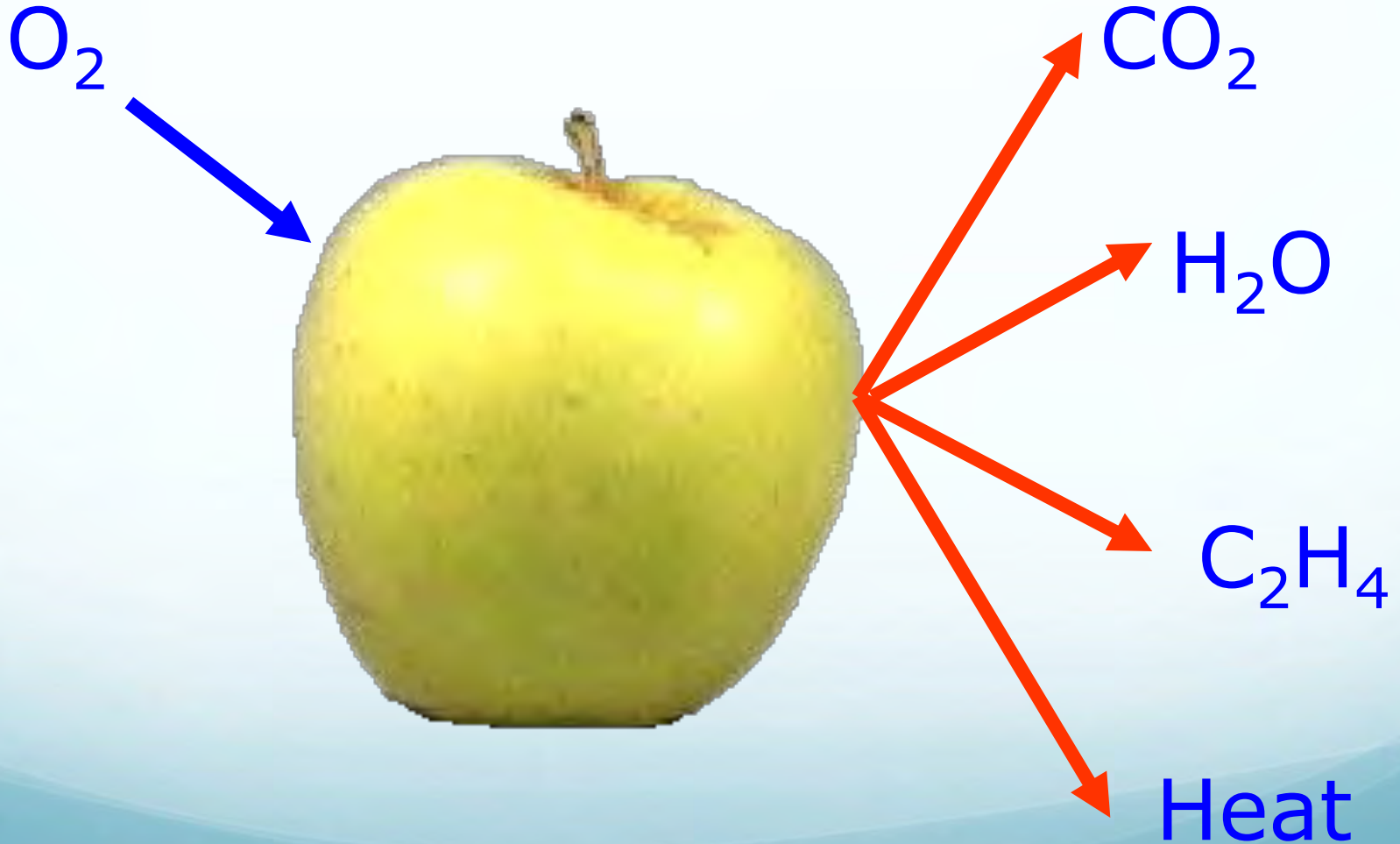
Estimated postharvest losses of fresh produce in developed and developing Countries

Product	Developed Countries		Developing Countries	
	Range (%)	Mean (%)	Range (%)	Mean (%)
From production to retail sites	2 – 23	12	5 – 50	22
At retail, foodservice and consumer sites	5 – 30	20	2 – 20	10
Cumulative Total	7 - 53	32	7 - 70	42

THE TYPES OF ATMOSPHERE MANIPULATION INSIDE THE PACKAGE ARE:

- 1. Controlled Atmosphere Packaging
(CAP)**
- 2. Modified Atmosphere Packaging
(MAP)**
- 3. Vacuum Packaging**

Fresh CROP is STILL ALIVE →
Respiratory activity of a fresh harvested produce



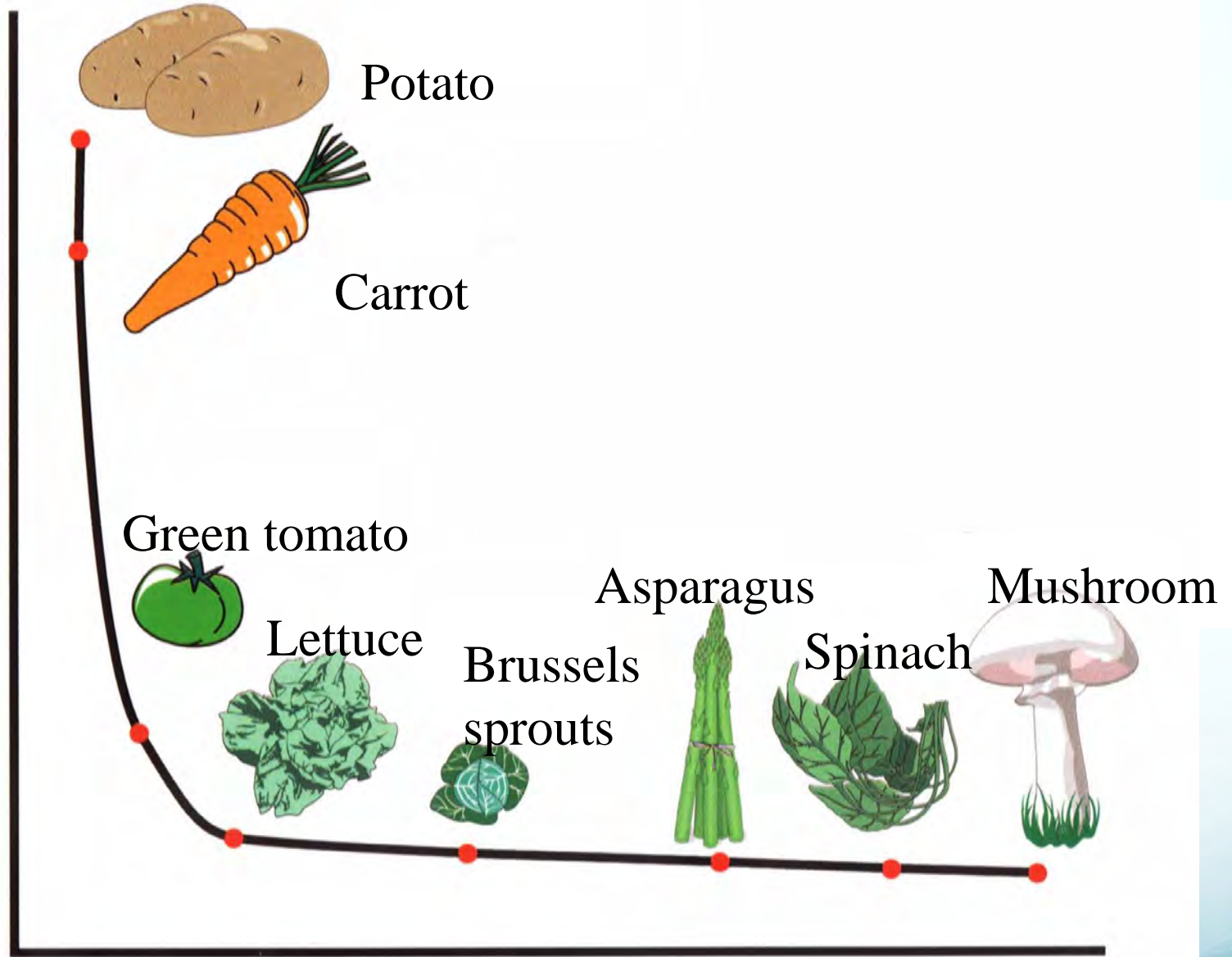
MODIFIED ATMOSPHERE PACKAGING (MAP)

- The initial application of an atmosphere other than air with no further control of the atmosphere**

APPLICATION

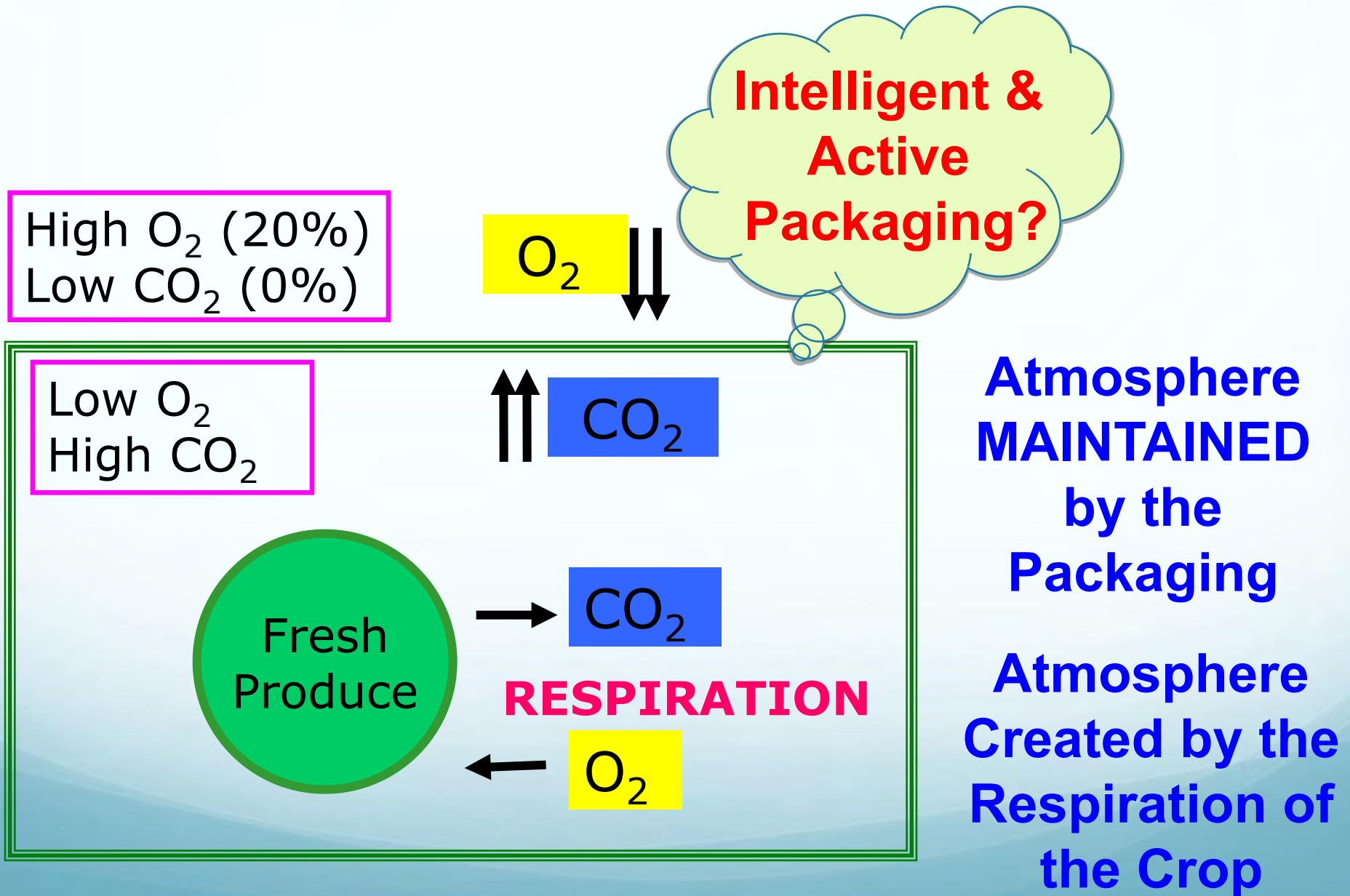
- Quantities of fresh vegetables and fruits are transported under modified atmosphere condition**

Storage potential

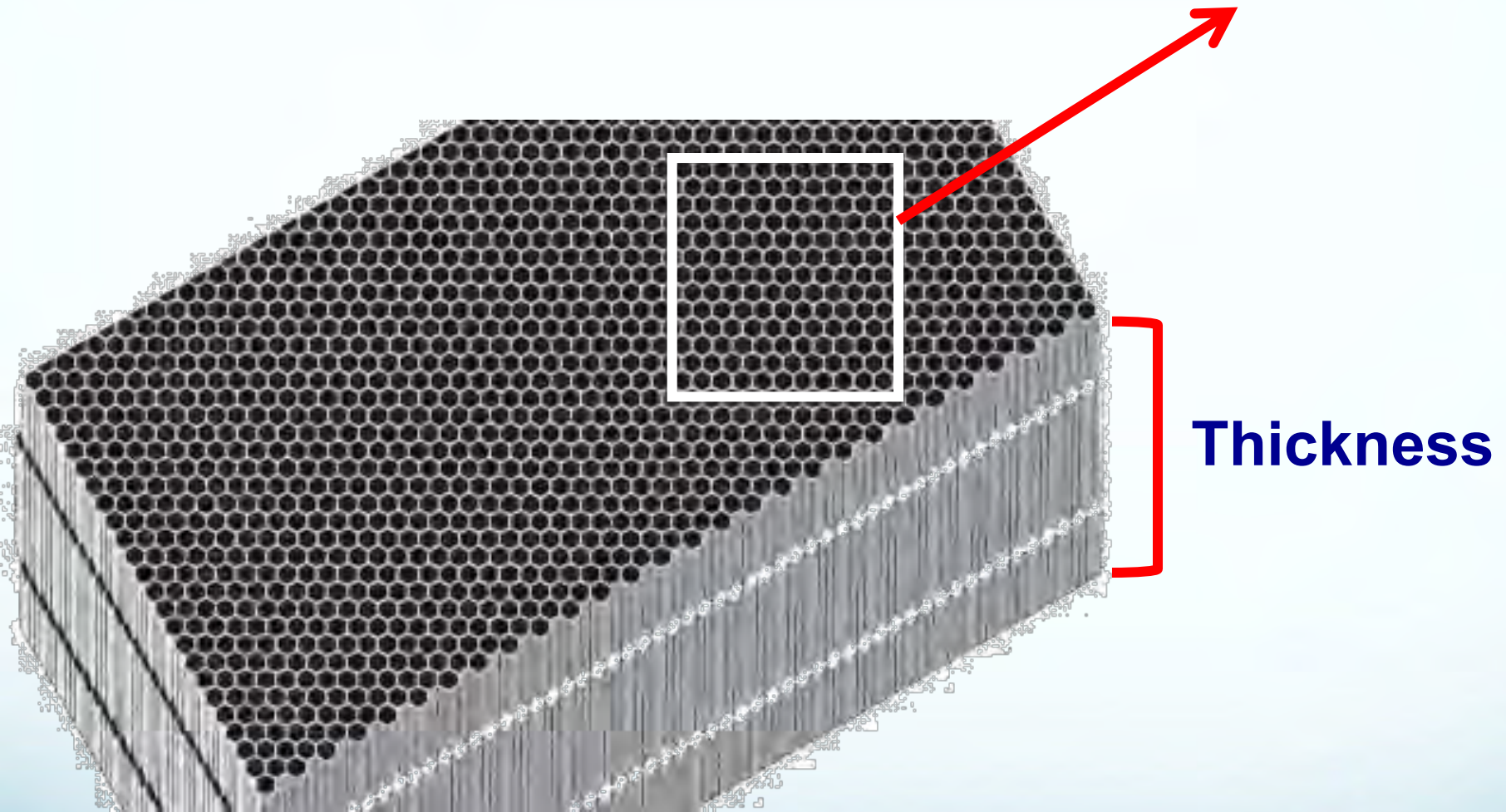


Initial respiration rate at 15° C

Gas diffusion in and out of a MA package



Number of Perforations per cm²



- More Pores → Higher is the Gas Diffusion
- Thicker is the film → Lower is the Gas Diffusion

Principles of MAP Preservation

- Reduce Microbiological growths
- Reduce spoilage
- Reduce respiration rate
- Reduce Browning application of heat

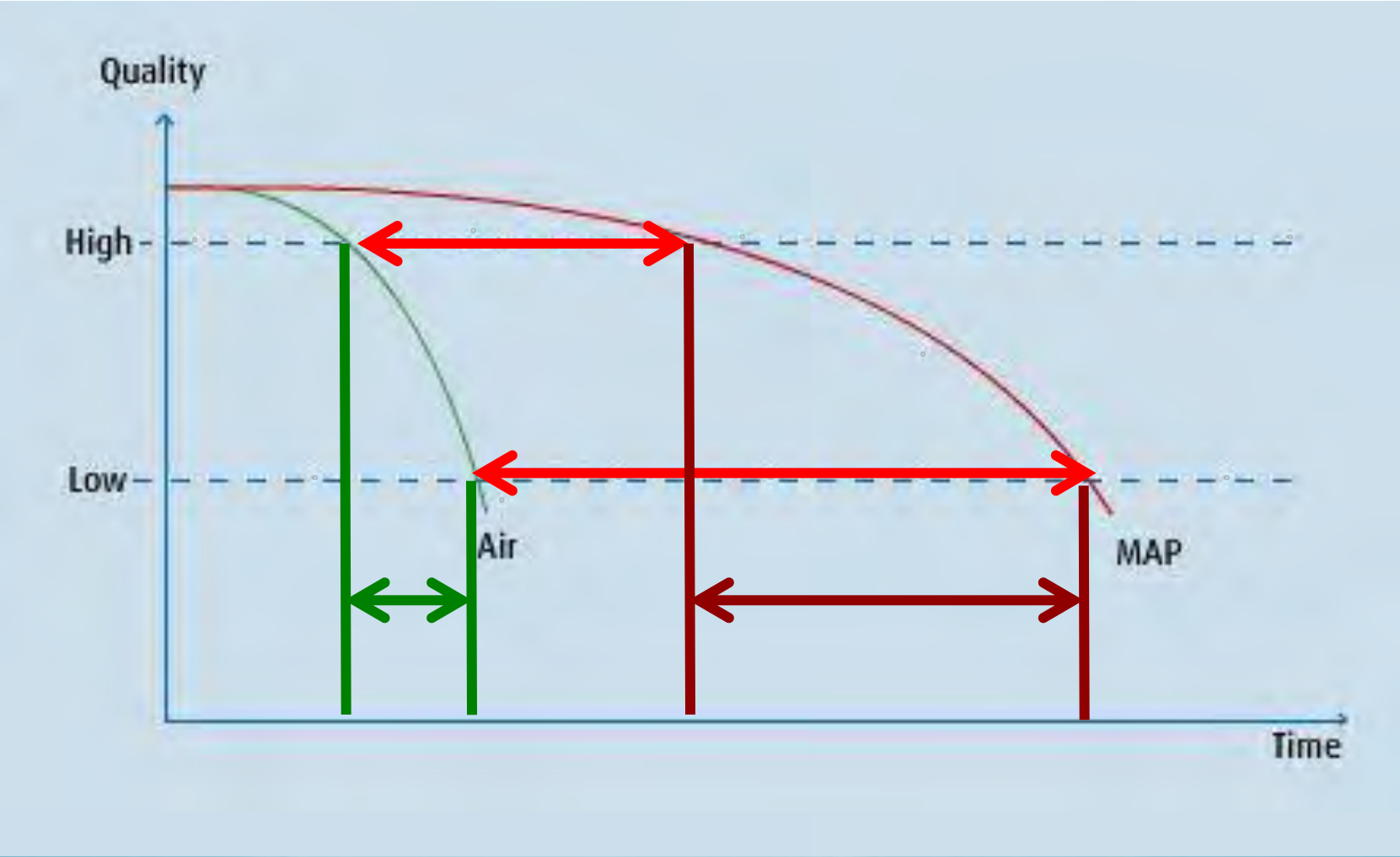
Condition: the temperature of storage the lower the better

Storage Life

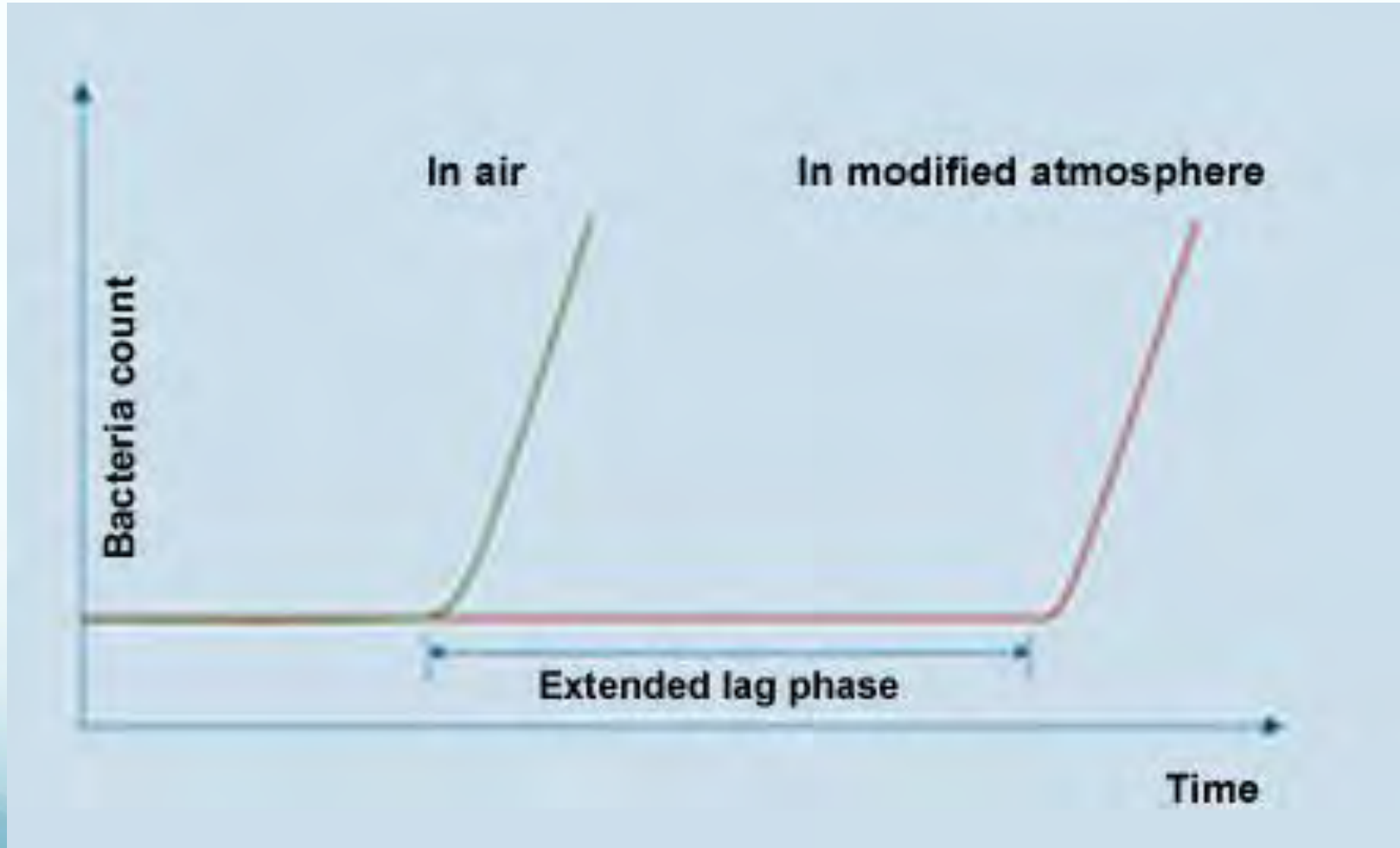
2 times in room temperature + MAP

4 times in refrigerated temperature + MAP

MAP and Shelf-Life Extension of Fresh Crops



MAP and Shelf-Life Extension of Fresh Crops



Recommended conditions of MAP

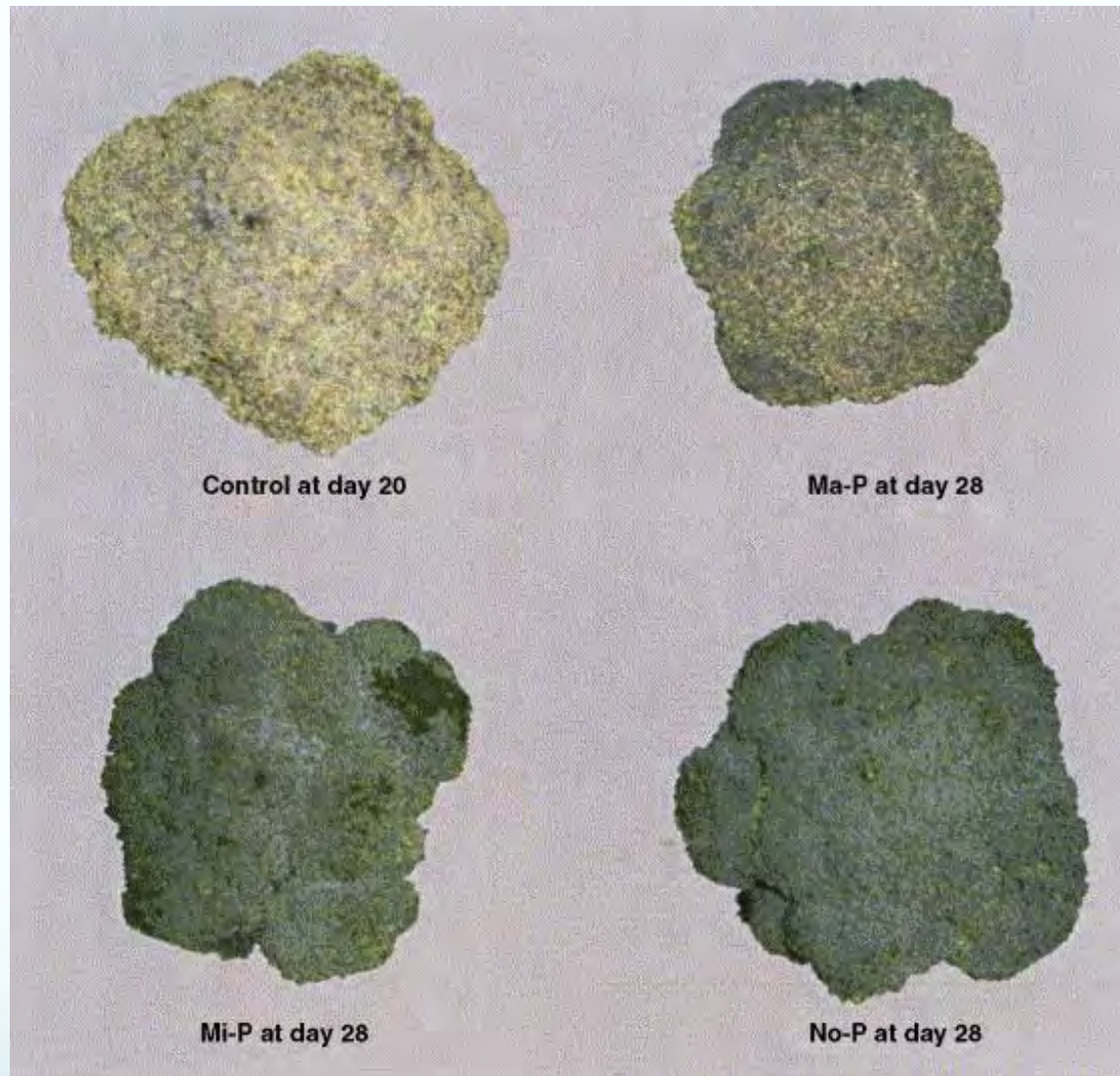
Product	Temperature (°C)	O₂ (%)	CO₂ (%)	N₂ (%)
Apple	0 – 5	2 – 3	1 – 2	Rest
Broccoli	0 – 5	1 – 2	5 – 7	Rest
Tomato	8 – 12	3 – 5	0	Rest
Banana	12 – 15	2 – 5	2 – 5	Rest



4.5 Months at 5° C + MAP



**4.5 Months with
normal PE film**



Cold storage of Broccoli as affected by modified atmosphere packaging



Cold storage of fresh-cut lettuce as affected by modified atmosphere



Xtend®
47 days



Control
47 days



Xtend® 4°C
10 days



Control 4°C
10 days

Reduce weight loss and shriveling



Reduce crown and fruit decay after 4 months storage



Internal quality and taste are preserved



4.5 months @ 8°C in Xlend

Decrease of skin blemishes and create superior marketability



72 days @ 8°C in bag +
4 days @ 20°C without bag



72 days @ 8°C in bag +
4 days @ 20°C without bag

You good
now?

Yeh Mon,
THANK YOU
for keeping me
Fresh as Fresh

