
Actiflex
Intelligent Packaging
Powered by
PERFTEC
BEST FOR FRESHNESS

# ABOUT US

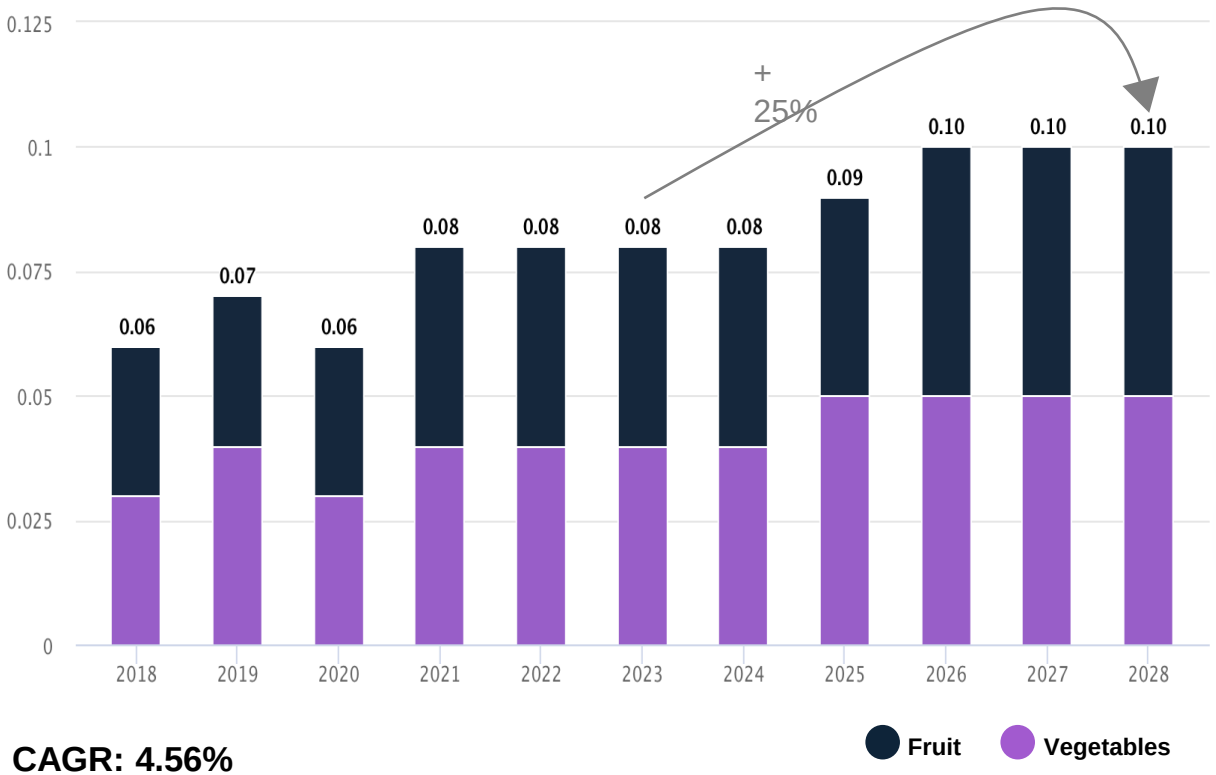
Actiflex is a leading provider of cutting-edge Intelligent Packaging solutions for the horticulture & floriculture industries based in Nairobi, Kenya. At Actiflex, our mission is to revolutionize the preservation and transportation process for our customers through Modified Atmosphere Packaging (MAP). We are deeply committed to minimizing food waste and ensuring optimum freshness for agricultural products (fruits, vegetables, and fresh flowers) leveraging special patented technology.

MAP post-harvesting technologies have been perfected by PerfoTec for nearly two decades. By managing the respiration rate of harvested agricultural produce using laser perforations on packaging, our technology effectively extends the shelf life of agricultural products- often doubling it. Actiflex & PerfoTec bring the hardware, the software, and the expertise.

# GROW WITH THE MARKET

At the forefront of industry evolution, the global Agriculture (Fruit & Vegetables) market anticipates a remarkable 25% growth by 2028. The Middle East & North Africa (MENA), fueled by the National Food Security Strategy 2051, is on track to surpass these expectations with a 5.70% CAGR. Join us on this journey – not just to adapt but to lead in a landscape defined by growth and conscientious innovation.

## Global Gross Production Value in trillion USD (US$)

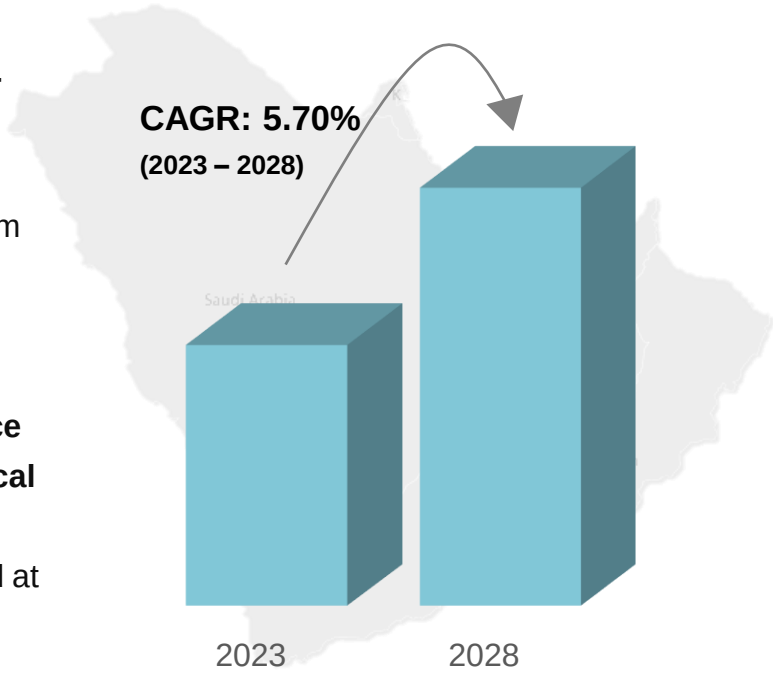



**CAGR: 4.56%**
**(2023 – 2028)**

## MENA Regional Growth

Two main trends contribute significantly to strong growth observed in this region:

1. **Striving for Food Self-Sufficiency** – MENA region faces food insecurity stemming from extreme weather conditions (aridity, heat, drought).
2. **The increasing reliance on imports to meet local demand** is prompting various initiatives aimed at reversing this pattern.

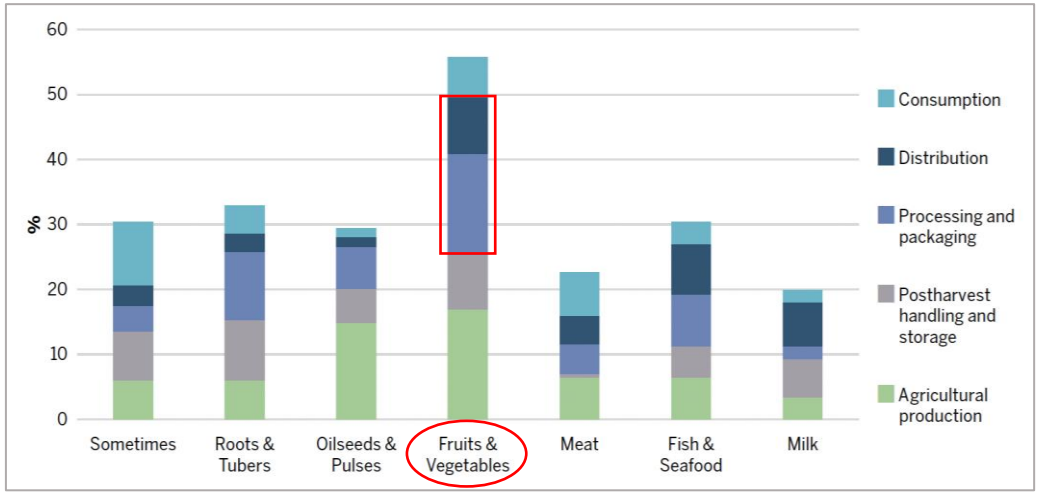


# FOOD WASTE IN GCC

According to the Food and Agriculture Organization (FAO) of the United Nations, one-third of all food produced around the world is wasted- roughly 1.3 billion tonnes estimated at $2.3 trillion. The GCC has been identified as one of the largest contributors to global food waste. Both the UAE and Saudi Arabia pledged to cut down 50% of their food waste and loss by 2030, aligning their policies with the United Nations' 12.3 Sustainable Development Goal.

| Country | Household food waste estimate, 2021 (tonnes/ year)* | Population, 2021 (millions) | Household food waste estimate, 2021 (kg/ capita)* |
|---|---|---|---|
| **GCC Region** | **5,869,704** | **55.37** | **106** |
| *Bahrain* | 216,161 | 1.53 | 141 |
| *Kuwait* | 397,727 | 3.03 | 131 |
| *Oman* | 470,322 | 3.69 | 127 |
| *Qatar* | 267,739 | 2.48 | 108 |
| *Saudi Arabia* | 3,594,080 | 34.78 | 103 |
| *UAE* | 923,675 | 9.86 | 94 |
| **United Kingdom** | **5,199,825** | **67.08** | **78** |
| **United States of America** | **19,359,951** | **335.00** | **58** |

**Excludes Food Service & Retail sectors*




In West Asia (inc. GCC), Fruits and Vegetables had the highest food waste during Processing & packaging and Distribution (~25%), indicating a large opportunity to curtail waste through MAP


During production and distribution, Actiflex solutions are able to tackle food loss and waste across 2 major segments of the food supply chain:

1. Processing & Packaging
2. Distribution & Retail

# ONE SOLUTION TO MANY CHALLENGES


## 1. Sustainability Pressures

*Balancing profitability with environmental responsibility*

## 2. Supply Chain Inefficiencies

*Challenges in maintaining the quality of harvested fruits, vegetables, and flowers during transportation and storage*

## 3. Competitive Market Environment

*Need to differentiate from competitors with quality and variety*

## 4. Short shelf life of Fresh Agricultural Products

*Rapid spoilage leads to increased waste and economic losses*


# WHAT IS THE PROBLEM?

The countdown begins as soon as fruits, vegetables, and flowers are harvested. Within moments, the following effects take place:

### Immediate Physical Effects:

- Mechanical shock to tissue – *Bruises, cracks, fractures in tissue*
- Removal of protective epidermal layer – *Alters gas diffusion, Provides substrate for microbes*
- Cell fluids on the cut surface – *Reduced Gas Diffusion, Provides substrate for microbes*
- Exposure to contaminants – *Microbial, Chemical*

### Biological Processes:

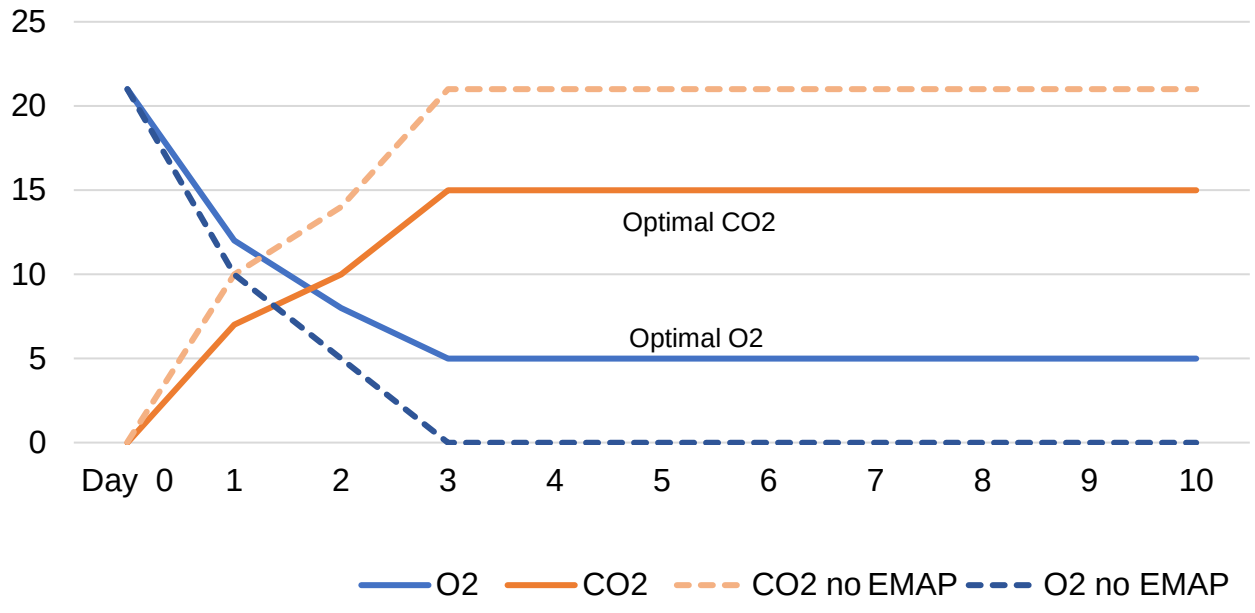
- The product continues to respire
- Ethylene Synthesis
- Ripening
- Deterioration
- Microbial Growth
- Transpiration – *Loss of moisture in the product*

***These processes contribute to the rotting and deterioration of agricultural products once harvested. However, we have the solution…***

# E.M.A.P.

## Equilibrium Modified Atmosphere Packaging

### O2 / CO2 LEVELS INSIDE PACKS




### HOW IS E.M.A.P. ACHIEVED?

- E.M.A.P. is a technology that modifies the gas atmosphere in a package such that its composition differs from that of regular air. This is done by adjusting the permeability of the film used for packaging to match the respiration rate of the product packaged inside
- The aim is to optimize the Oxygen and Carbon Dioxide concentration in the package to specific levels tailored for each type of agricultural product → **Equilibria**
- Optimizing Oxygen and Carbon Dioxide concentrations enables the product to live longer by slowing respiration, ripening, & ethylene production. This in turn reduces enzyme browning, retards textural softening, preserves vitamins & extends the overall freshness of the packaged produce → **Increased Shelf Life**

# RESPIRATION VARIABILITY IN PRODUCE

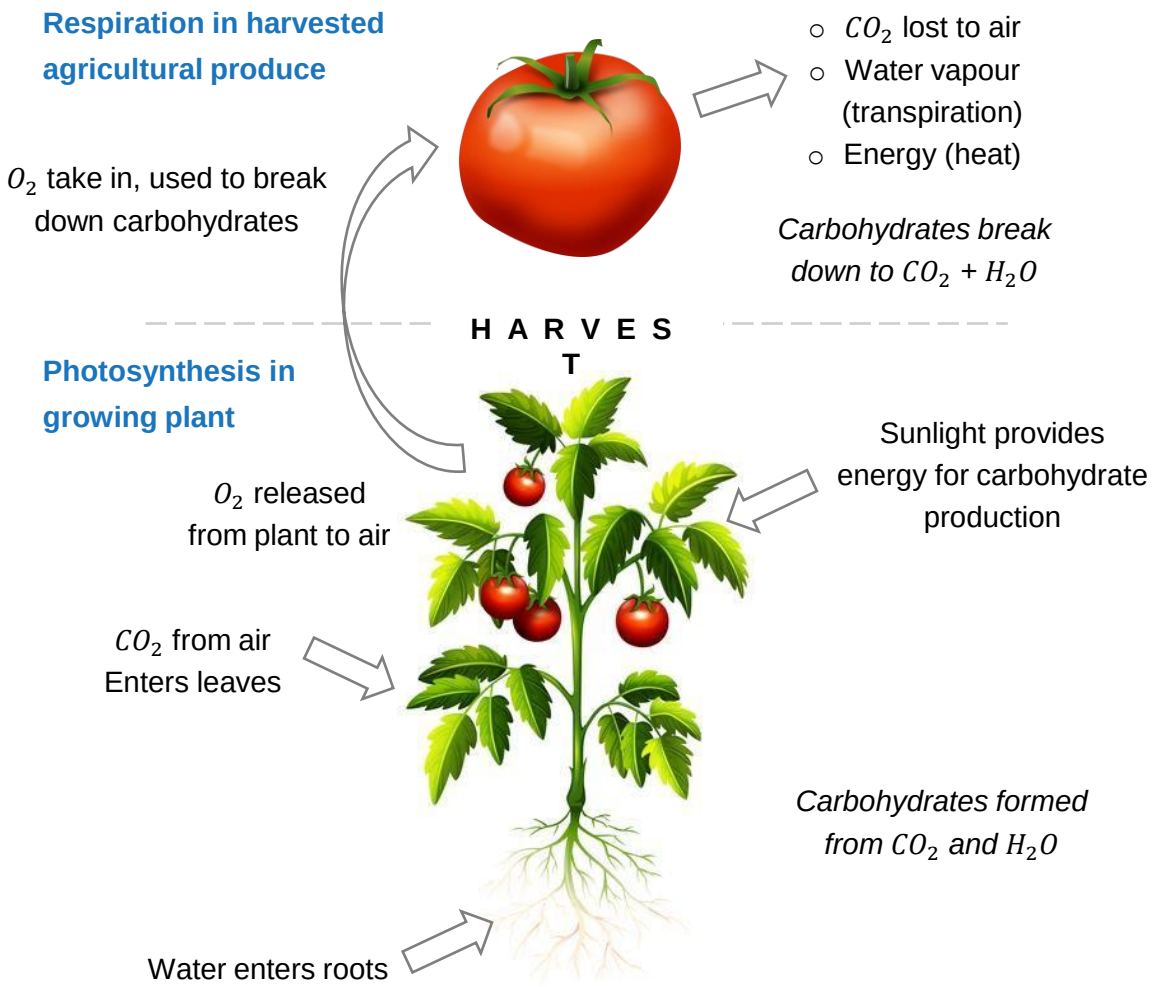
We have spent two decades accumulating knowledge in the field of produce respiration. This knowledge is housed in our online platform

**Key Points:**

1. Different types of produce have varying respiration rates
    - Different types and even varieties of produce can exhibit significantly different respiration rates

2. Seasonal Influence:
    - Respiration rates change throughout the year
    - Produce tends to respire more during warmer months and less during colder months

3. Geographic Impact:
    - Geographic location plays a big role in respiration rates
    - Factors like local climate, altitude, and environmental conditions influence how produce breathes



# MAP: HOW DOES IT WORK?

# PERFOTEC'S PATENTED SOLUTIONS

## Fast Respiration Meter

*Measures agricultural produce respiration rate*

## Online Laser System


*Fine-tune package permeability*

## $O_2$ Control

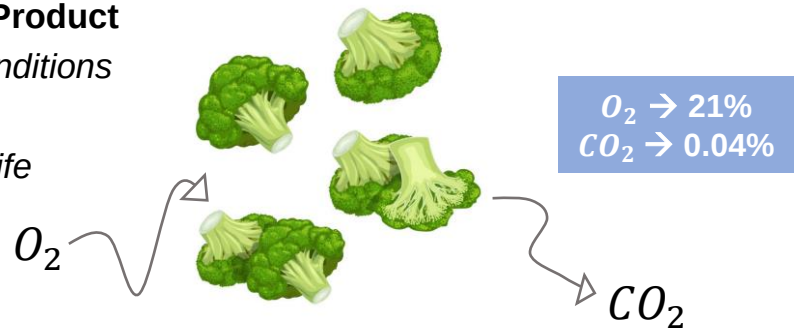

*Gas flush package to optimal gas levels*

## Liner Bag/ Films

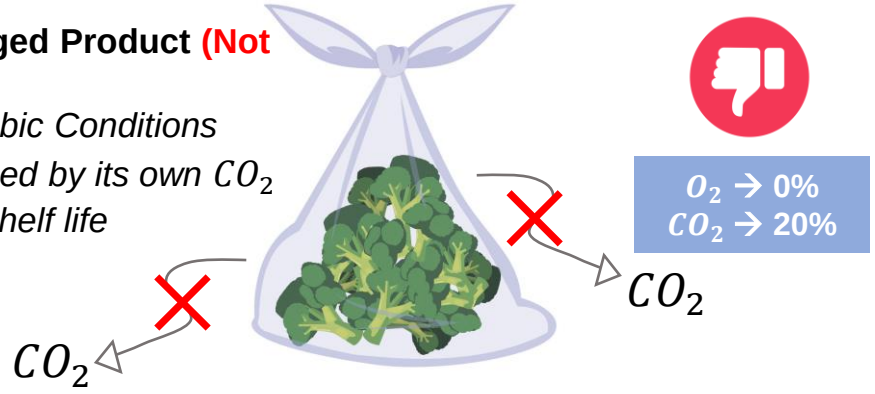
*Fully tuned package for fresh agricultural produce*

# BENEFITS OF MAP

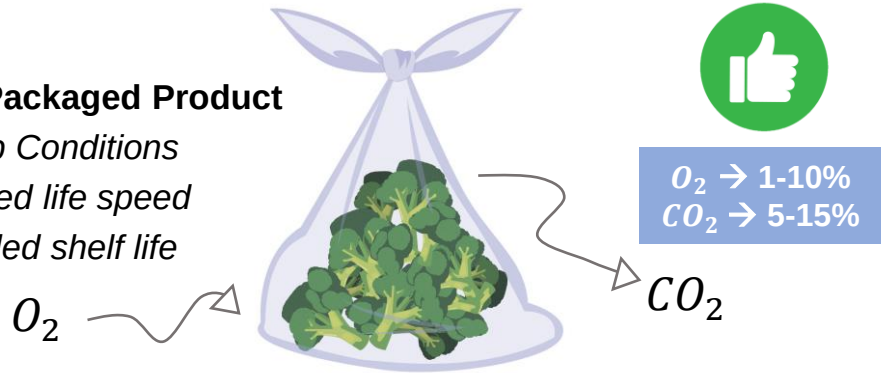
**Unpacked Product**
*Ambient Conditions*
*Living Fast*
*Short shelf life*




**Packaged Product (Not MAP)**
*Anaerobic Conditions*
*Damaged by its own $CO_2$*
*Short shelf life*




**MAP Packaged Product**
*Superb Conditions*
*Reduced life speed*
*Extended shelf life*




## 1. Preservation Capabilities

MAP technology extends the shelf life of fresh agricultural produce through a controlled atmosphere

## 2. Quality Retention

Maintaining freshness, flavor, and nutritional value for an extended period of time

## 3. Food Safety

It can enhance food safety by inhibiting the growth of harmful microorganisms and pathogens, thereby reducing the risk of foodborne illnesses.

## 4. Reduction in Food Waste

Significantly reduces food wastage during transportation and storage by extending the shelf life

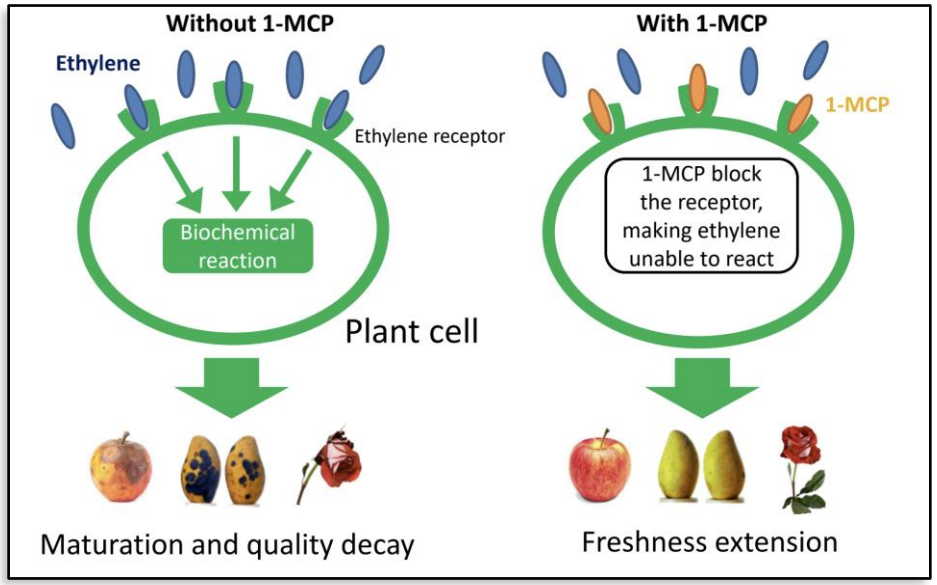
## 5. Cost Effectiveness

MAP packaging offers a cost-effective & intelligent solution for long distance transportation

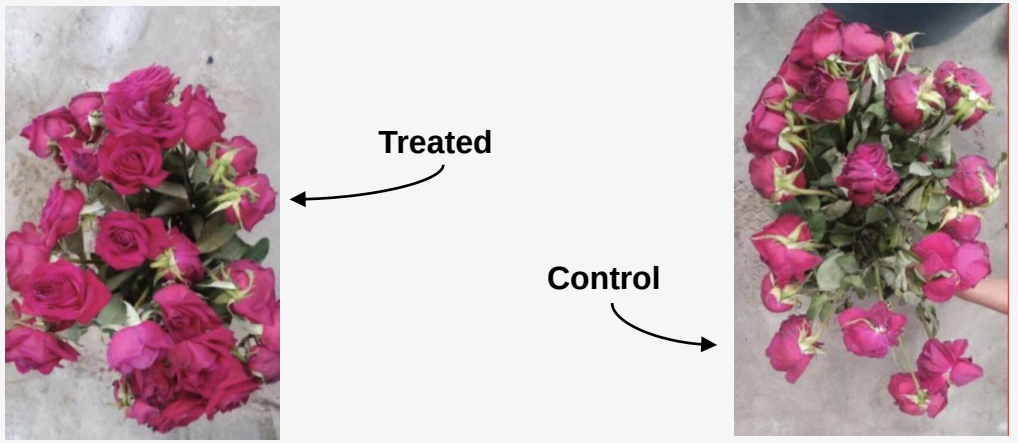
# ETHYLENE: THE SILENT KILLER

During the postharvest phase of cut fruits, vegetables, and flowers, the effect of Ethylene is almost always negative and drastically reduces the quality, taste, and ornamental value of agricultural produce.

Patented technology allows us to significantly prolong shelf life by inhibiting the degradation caused by Ethylene ($C_2H_4$). By obstructing Ethylene receptors in plant cells, this process effectively prevents deterioration without harming the plant.




## ROSES PACKAGED WITH ETHYLENE INHIBITING TECHNOLOGY (1 WEEK AFTER BEING IN A VASE)




## BROCCOLI IN MEXICO PACKAGED WITH ETHYLENE INHIBITING TECHNOLOGY FOR 40 DAYS AT 32-34°F

**Treated** **Control**

# ETHYLENE INHIBITING TECHNOLOGY & MAP COMBINED DEMO IN NAIROBI, KENYA

## SUGARSNAP

## BROCCOLI

The Broccoli and Sugar Snap were packaged in MAP (containing patented ethylene inhibiting technology) featuring perforations customized to align with their respective respiration rates for the current season.

**The images on the left depict both products after undergoing a 35-day storage period in a sea container followed by an additional 15-day extension in shelf life beyond the container storage**

# MAP PACKAGING ACROSS THE GLOBE

PERFTEC BEST FOR FRESHNESS

Actiflex Intelligent Packaging

## Agricultural Produce from Global Retailers packaged in MAP packaging:














# PERFOTEC PATENTED BIOBASED LINERBAG

The characteristics of the patented PerfoTec LinerBag create an important packaging solution for the transport and storage of bulk fresh agricultural produce. This is the only compostable Liner in the market.

## Key Features

- Made from natural potato starch & biologically sourced polymers
- Compostable & certified by TUV Austria
- Ideal oxygen and carbon dioxide transmission
- High water vapor transmission

## Benefits

- Extends freshness and shelf life
- Prevents product dehydration while keeping it dry
- Ideal for bulk fresh agricultural produce storage
- Supports sea transport, cost reduction & sustainability

# ASPARAGUS DEMO

## Green Asparagus - Air (standard) vs. Sea (PerfoTec) freight at 3°C

*Origin: Peru*

**Conventional Packaging**

**Shipped by AIR**

**DAY 13**

**With PerfoTec Laser Micro Perforation**

**Shipped by SEA**

**DAY 33**

PERFOTEC LINERBAG
BEST FOR FRESHNESS

# PAPAYA DEMO

**Papaya - 21 days at 11°C**

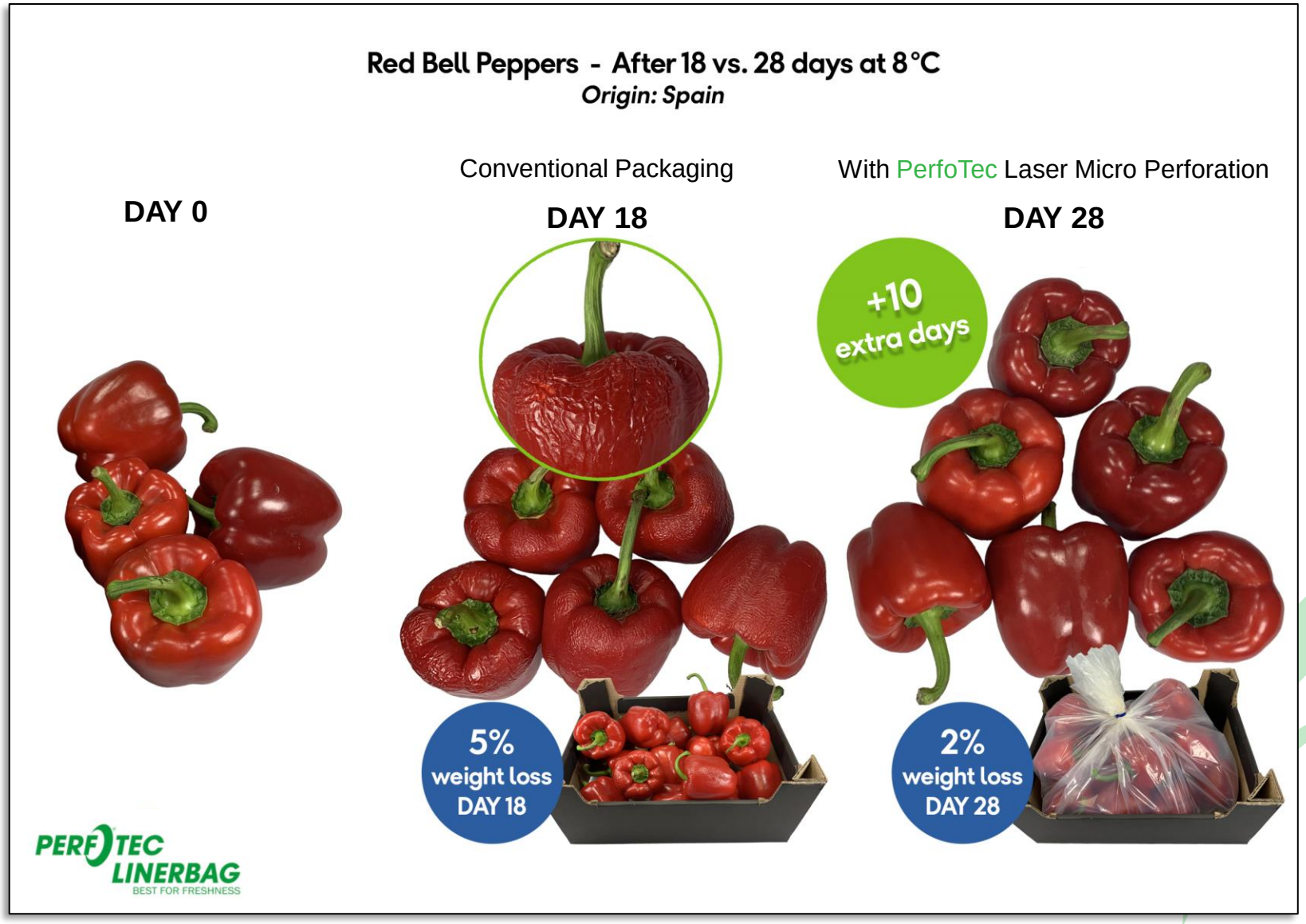
*Origin: Brazil Variety: Formosa*

**Convention packaging – open box**


**with PerfoTec Laser Micro Perforation**


PERFOTEC LINERBAG
BEST FOR FRESHNESS

# RED BELL PEPPER DEMO



# AVOCADO DEMO

**Avocado - Shipment +50 days at 5°C**

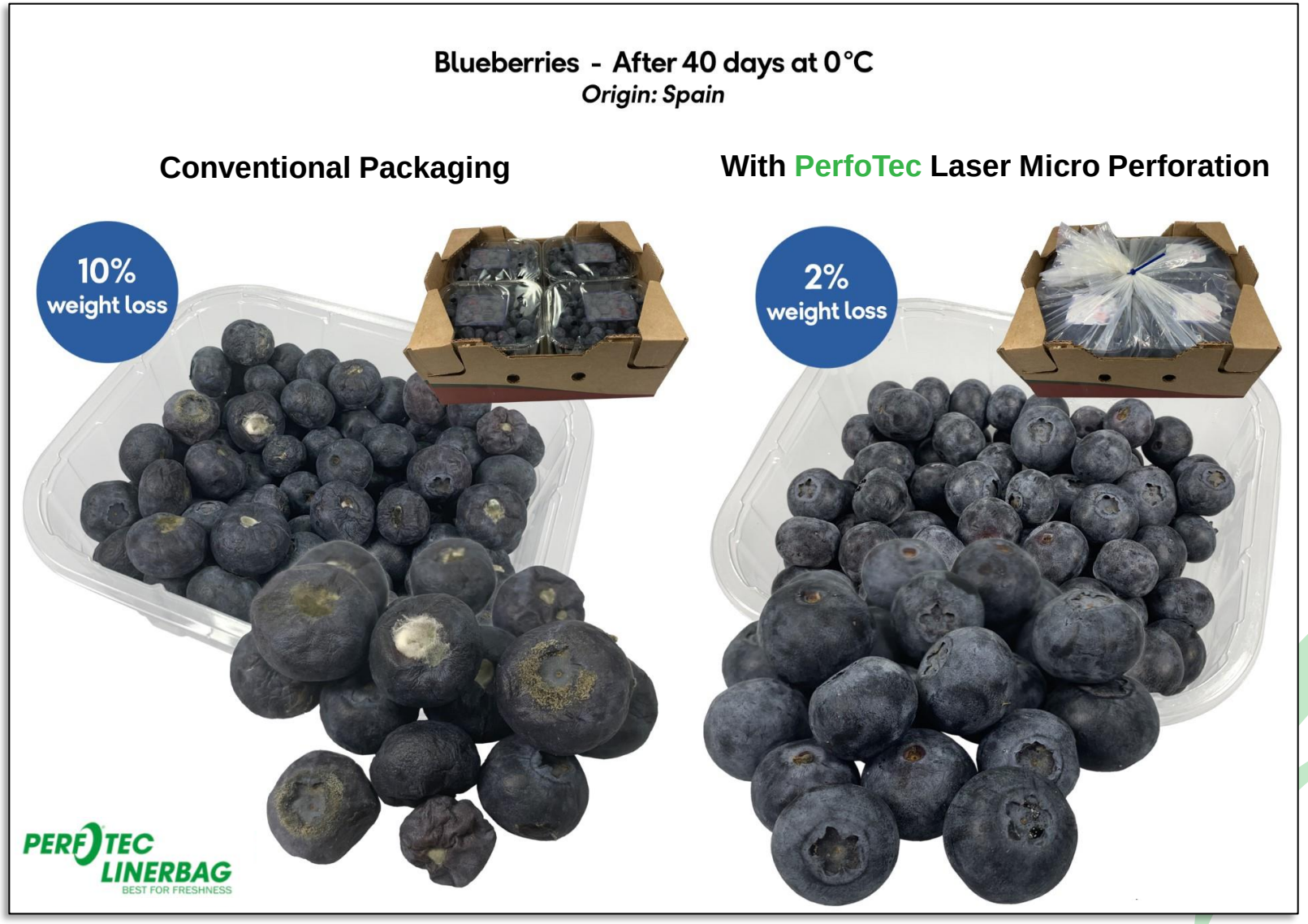
*Origin: Colombia Variety: Hass*

**Conventional packaging – open box**


**With PerfoTec Laser Micro Perforation**


PERFOTEC LINERBAG
BEST FOR FRESHNESS

# BLUEBERRY DEMO



# OUR COMMITMENT TO SUSTAINABILITY

01

## Waste Reduction

By slowing down the deterioration process, MAP significantly reduces food spoilage and waste along the supply chain. This helps in preserving more agricultural produce and minimizes the volume of discarded or unsold fruits, vegetables, or flowers, thus contributing to lower food waste.

02

## Sustainable Film Developments

Our certified compostable LinerBag, crafted from natural potato starch and biologically sourced polymers, reduces waste and environmental impact. Additionally, our recyclable films, are up to 40% thinner than conventional options.

03

## Minimized use of Preservatives

With MAP, there's reduced reliance on chemical preservatives or additives to maintain the freshness of agricultural produce. The controlled atmosphere within MAP packaging relies on natural mechanisms, such as adjusting gas composition, to preserve freshness.

04

## Enhanced Resource Efficiency

MAP packaging optimizes resource efficiency by customizing materials for preservation, minimizing waste through tailored packaging for various agricultural produce types, ensuring minimal material use and optimal resource utilization.

# CASE STUDY – A&W GOOD FARMS

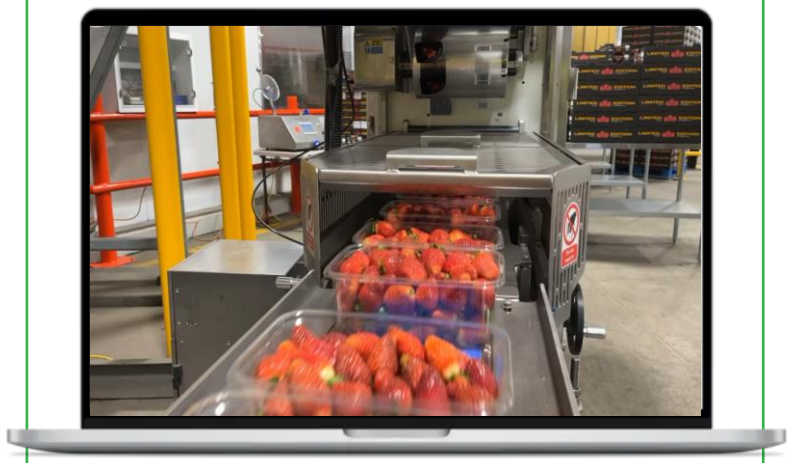
**Location:** California, USA
**Years in Partnership:** 6
**Agricultural Produce Packaged:** Strawberries, Blueberries, Raspberries

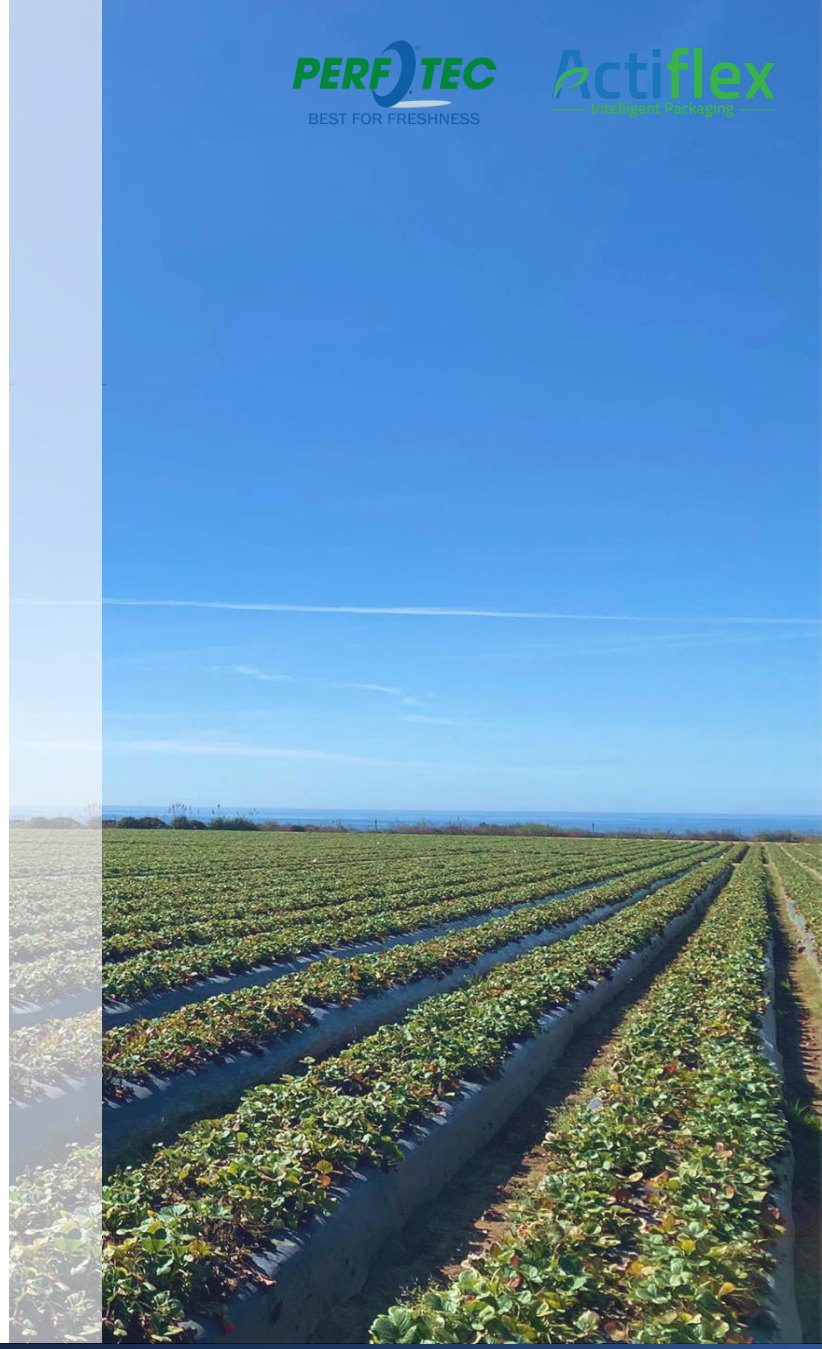
> “In my decades of being in the berry business, I have never seen technology that has made such a difference in product life. We know that we are lowering food waste by giving the whole system more time to deliver fresh, wholesome products that the consumer can use in their home.”

## KEY FACTS

- Top seal solution for strawberries
- Double shelf-life, from 8 to 16 days
- The Modified Atmosphere positively impacts the taste, making the strawberries more sweet

## PRODUCT HIGHLIGHT: STRAWBERRIES





# CASE STUDY – GREEN FACTORY

**Location:** Załuski, Poland
**Years in Partnership:** 2
**Agricultural Produce Packaged:** Kale, Spinach, Rucola, Iceberg lettuce, Radicchio

“As the number 1 producer of Fresh Produce in the Central and Eastern European Market, we find PerfoTec combined solution of Map control and laser micro perforation, a breakthrough in the industry, because it can guarantee an extension of the quality of the final product, which means loosen the tight industry supply chain timings, contributing in that way for the global waste reduction.”

## KEY FACTS

- Largest Fresh Produce supplier in Eastern Europe
- Green Factory utilizes the combination O2Control–Laser to prevent oxidation and extend freshness

## PRODUCT HIGHLIGHT: LEAFY GREENS


# CASE STUDY – E-FLORA

**Location:** Aalsmeer, the Netherlands
**Years in Partnership:** 9
**Agricultural Produce Packaged:** Many types of bouquets, Letterbox Flowers

"E-flora is part of the Dutch Flower Group (DFG). The DFG is one of the world's largest and most prominent flower and plant trading companies. It's based in the Netherlands and has a significant presence in the global floral industry. DFG is known for its wide range of flowers, plants, and related products, as well as its distribution and supply chain capabilities."

## KEY FACTS

- Combination Online Laser and Biobased Film
- Results: 10 days storage + 8 days high-quality vase life
- No water necessary during transportation
- Excellent consumer rating
- Supplies across Europe

## PRODUCT HIGHLIGHT: ROSES


# THANK YOU

## Get in Touch


Unit 20, Venus Business Park Off Thika Road, Nairobi, Kenya

+254 796 331 403
+254 791 623 424

www.actiflex.com

info@actiflex.com