



## **Packaging developments for the meat industry**

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Sealed Air, Food Care R&D

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The background of the slide is a photograph of a wheat field under a clear blue sky. The wheat stalks are green and yellow, with some heads of wheat visible. A large, white, semi-transparent geometric shape, resembling a stylized 'S' or a series of overlapping planes, is overlaid on the image, creating a modern, architectural feel.

## VISION

**To create a better way for life**

## MISSION

**We Re-imagine™ the industries  
we serve to create a world that  
feels, tastes and works better.**

## How We Deliver Value

### Food Care

2015 Sales: \$3.3B

- Packaging/Hygiene Solutions
- Engineering Plant Designs
- Full Range of Equipment/Systems and Services
- Manage Water, Energy

### Diversey Care

2015 Sales: \$2.0B

- Building & Kitchen Care Services
- Infection Prevention
- Fabric Care
- Consulting Services & Consumer Brands

### Product Care

2015 Sales: \$1.5B

- Engineered Solutions & Packaging Systems
- Packaging Design & Testing
- Lean Six Sigma Expertise
- Service & Support

# FARM to FORK holistic approach



PREVENT CONTAMINATION

MAXIMIZE EFFICIENCY & VALUE

**CRYOVAC®**

PROTECT & ENHANCE

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## Food Care Focus

We address real challenges that our food and beverage customers face everyday:



FOOD SAFETY



OPERATIONAL  
EFFICIENCY



SHELF LIFE  
EXTENSION



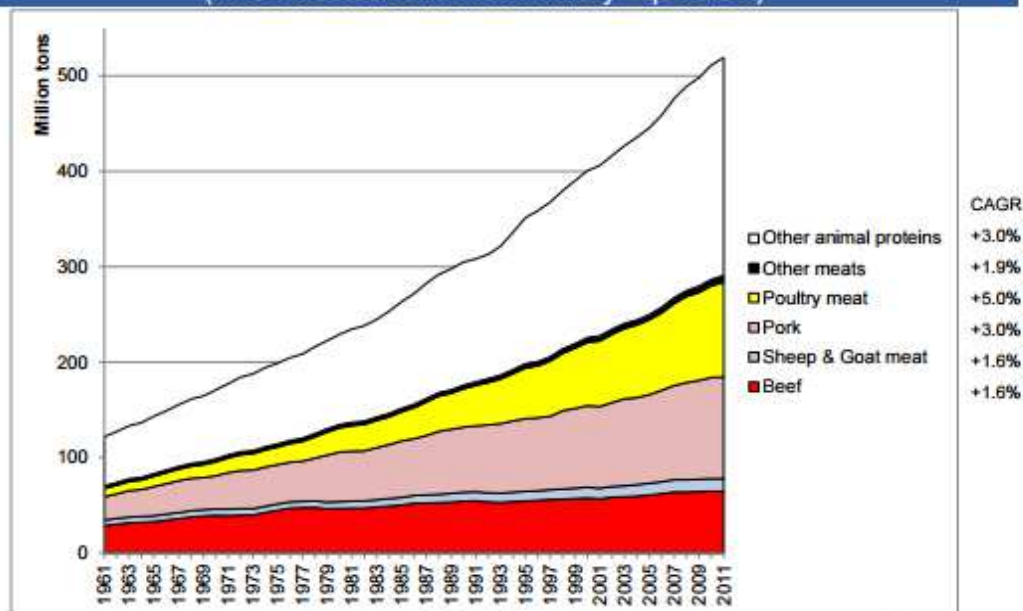
BRAND BUILDING

We deliver **purposeful innovation** that generates **measureable business results** throughout the value chain.

And sustainability is core to everything we do.

World animal protein consumption  
*Poultry records the strongest growth in meat*  
*Beef and sheep meat lag far behind*

World animal protein consumption, 1961-2011  
(FAO Livestock and Fish Primary Equivalent)



© Gira 2015



*World consumption continues to grow but EU total meat consumption remains flat after enlargements*

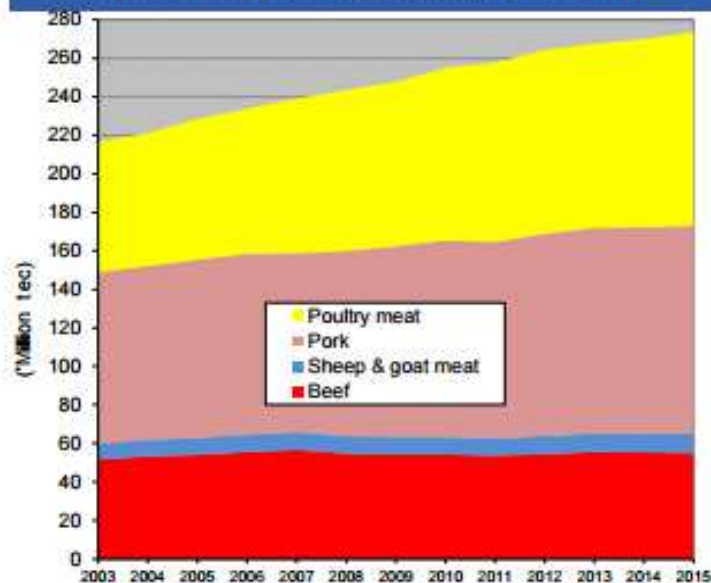
• CAGR World total consumption :

• Beef	+0.5%	→	54.9 m t cwe
• Sheep & Goat meat	+1.7%	→	9.8 m t cwe
• Pork	+1.6%	→	108.3 m t cwe
• Poultry meat	+3.3%	→	100.3 m t cwe
• Total	+2.0%	→	273.4 m t cwe

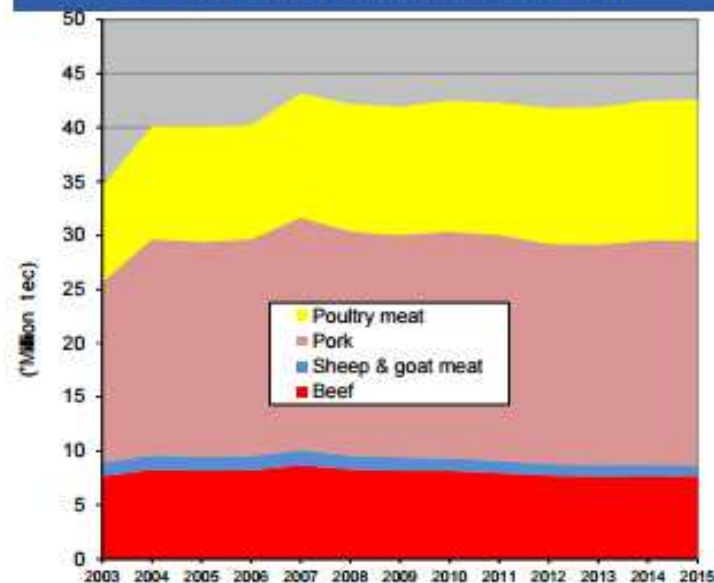
• CAGR EU total consumption:

• Beef	+0.0%	→	7.7 m t cwe
• Sheep & Goat meat	+1.8%	→	1.0 m t cwe
• Pork	+1.8%	→	20.8 m t cwe
• Poultry meat	+3.3%	→	13.0 m t cwe
• Total	+1.8%	→	42.6 m t cwe

World Total Meat Consumption, 2003-15f



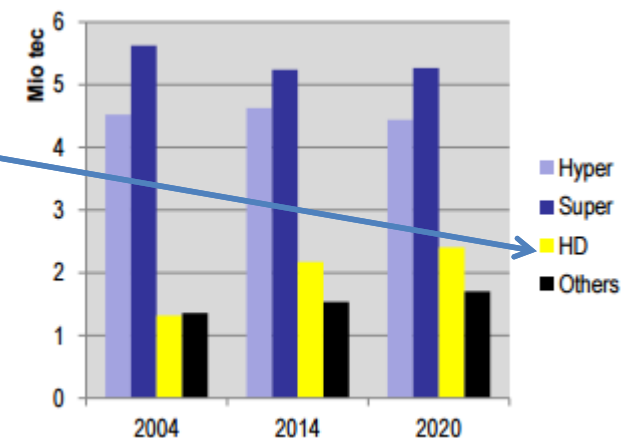
EU Total Meat Consumption, 2003-15f



# Why lower meat consumption in W Eu?

- Lost of confidence in Animal Health and Food Safety Crisis
- Optimize industry efficiency and power
- Economic crisis / BEEF is an expensive item... move to cheaper stores
- Active anti-meat lobbying
- Animal Welfare
- Ageing population, desire for food variety (ethnics food)
- Vegetarian and Flexitarians
- Individualism

Raw Meat Distribution Channels, EU-27, 2004/2014/2020





# Beef sales have shifted away from whole muscle roasts.

Several respondents referenced a trend towards *"the center of the animal."*

- Brazil appears to be an exception... driven by per pound price and current economic situation

"We're definitely selling less whole muscle roast than we used to. Beef is still the center-of-the-plate, but it has shifted to steaks and minced, not slow cooking cuts."

Cole's

"The traditional Sunday roast is becoming less and less popular. Our growth is in minced, steaks and diced."

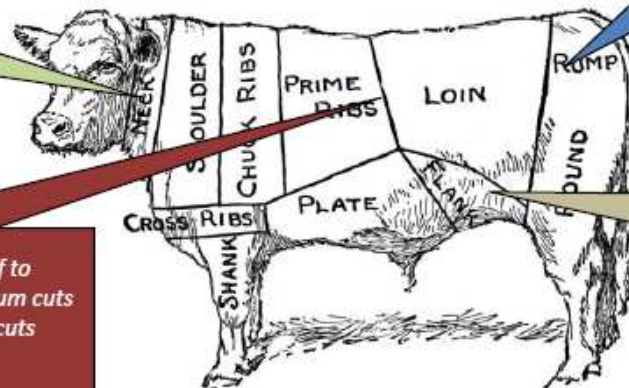
Lidl

"There is huge opportunity to sell more beef to Millennials, but they really only want the premium cuts from the middle of the animal. Selling end-cuts (roasts) to Millennials is very difficult."

Sam's Club

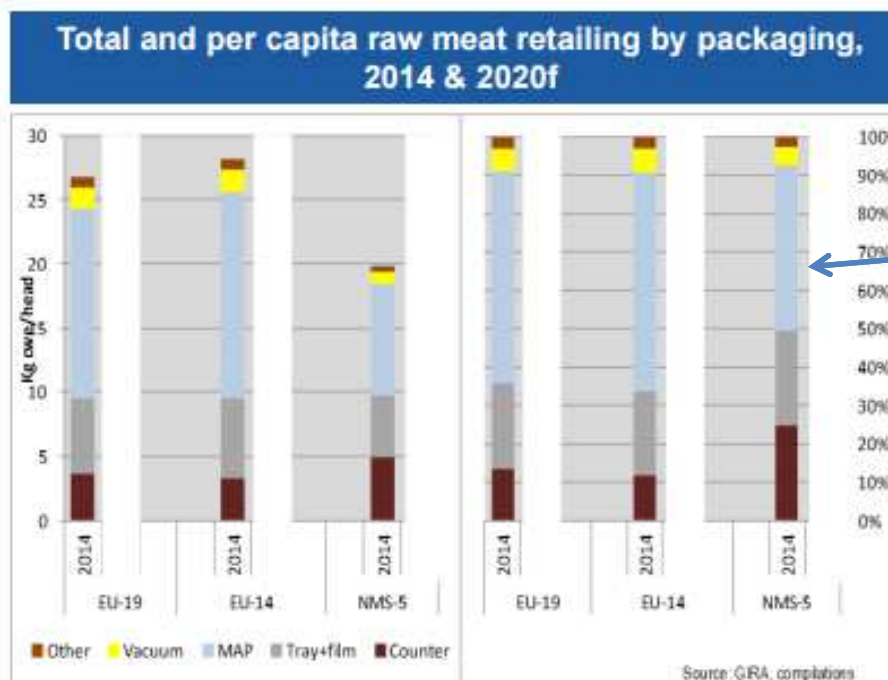
"We've seen a recent increase in whole muscle roasts. The price per pound is usually lower and people still want beef despite the current recession."

GPA



## MAP is the dominant packaging method

- Paper wrapping main (but not only) method for counter service
  - Higher share in the NMS-5
- Traditional tray+film survives very well despite its poor presentation
  - Favoured method for BSP, but also used at industrial level (although more in poultry than FRM)
- Vacuum to record the strongest future CAGR



Modified atmosphere pack.

**Very fast  
growth of  
SKIN**

## UK

- 10-15% overwrapped foam trays
- 30-40% MAP (*declining*)
- 30-40% VSP (*increasing*)
- 5-10% Vacuum pack

*"We're actually moving away from MAP. We've switched to skin pack for all of our steaks due to the increased shelf-life and better presentation."*

• Morrisons

*"10 years ago a majority of our beef was in MAP, it was better than overwrap, but still only extended shelf life to 8-9 days. Now, we're transitioning to skin pack and we're getting 21 days. Skin pack is widely used and accepted for everything except minced and diced beef."*

• Marks & Spencer

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# Fresh Protein packaging evolution

**AIR** → **MAP** → **VACUUM**



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MAP= modified atmosphere packaging



## MORE SKIN PACKS (VSP)



- Driven by retailers: more shelf-life, suitable for premium meats (lower turnover), less drip, shelf space optimisation (vertical shelving); but dearer.
- About 5% of all protein packaging in Europe and 80% of new packing machines.
- EBLEX's focus group research in France (unpublished) reveals that consumers believe the packaging is attractive, aesthetic, transparent but some believe perceived skinpack as overpackaged. Clear indication of the origin of the meat is needed. Cooking instructions are important.
- Research for Veronafiere in Italy shows that 56% of Italians are positive regarding the skinpacks. However, 66% did not feel that skinpacks "justified higher purchase costs or premium positioning". Recipes are requested.

More trading possibilities due to longer life

**KEY IN 2015:**

**MOVE TO SKIN**

**FROM NORTH**

**TO SOUTH**

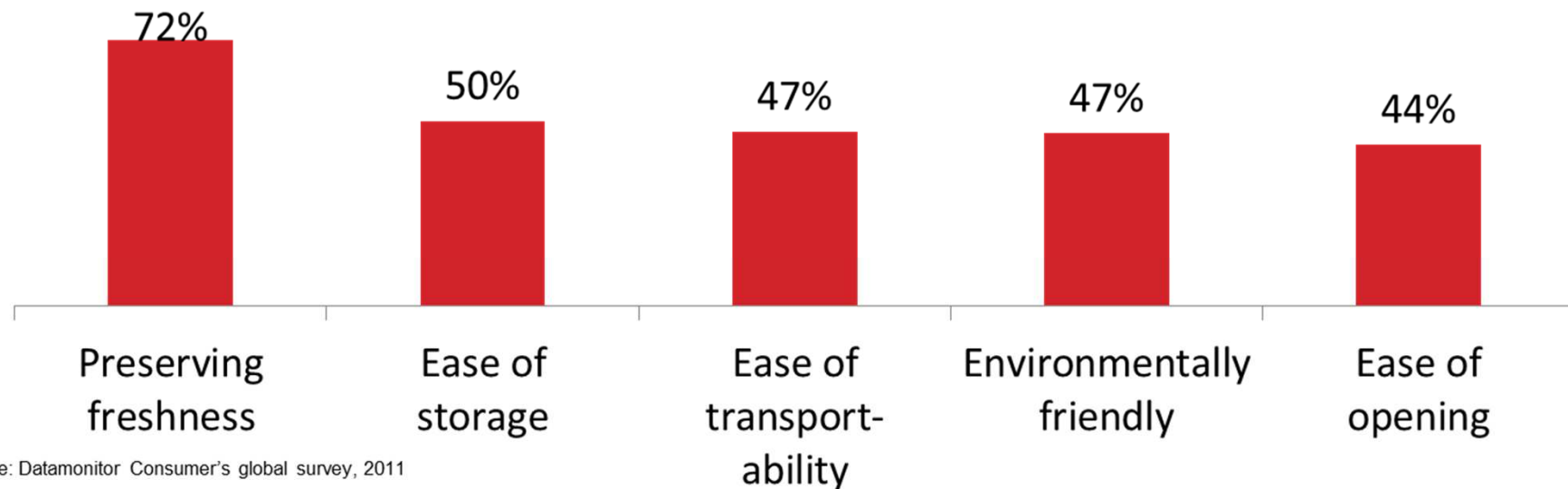
**EUROPE**

**CRYOVAC®**



## Convenient packaging can be highly influential

Europe: Consumers highly influenced by the following packaging functions when choosing grocery products:



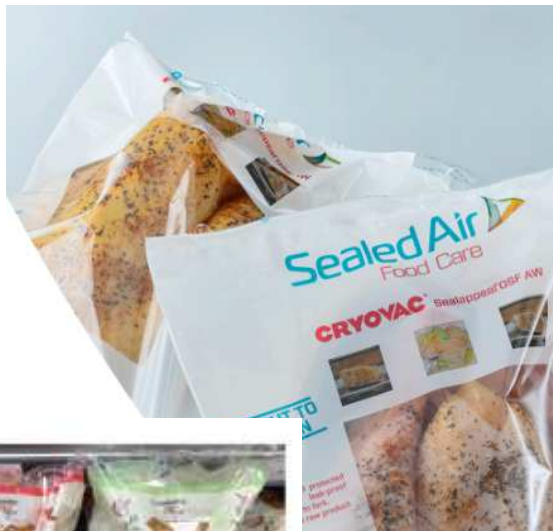
Source: Datamonitor Consumer's global survey, 2011

ovenable



# Cryovac® Sealappeal® OSF AW Film

Overwrap  
Modified  
Atmosphere  
Packaging



FOOD SAFETY



OPERATIONAL EFFICIENCY



SHELF LIFE EXTENSION



BRAND BUILDING



- Fresh poultry products protected in hermetic packs from factory to consumer;
  - No more handling-> reduce microbial contamination;
  - High O2 % control *Campylobacter* growth;
  - No preparation at home: it is done by processor;
  - No oven cleaning and reduced cooking time-> energy savings;
  - High speed machinability -> operating costs reduction;
  - Up to 12-15 days according to the type of modified atmosphere;
  - Improved taste and juiciness
  - Product offer segmentation through various seasoning
  - Pack communication – 8 colors
  - Unique self venting design eliminates the need to puncture the bag prior to roasting.
- Sustainability: less energy consumption; higher productivity; reduced cooking time and no oven cleaning.

Cook-in

# Cryovac® Oven Ease®



## Barrier Vacuum Packaging



**CRYOVAC®**



- Packaging runs on existing equipment, allowing processor to turn a commodity product into a value added product w/o additional capital expense;
- Promotes labor efficiencies by reducing preparation and clean uptime in food service or consumer kitchen;
- Offers labor and food safety benefits by simply placing the product directly into the oven;
- Hermetic, leak-resistant seals to protect the product during distribution;
- Eliminated liabilities associated with metal clips in foodservice or consumer kitchen;
- Excellent shelf life;
- No need to touch uncooked product, preventing cross contamination;
- Offers innovation and convenience in the fresh meat aisle: opportunity to develop a new market segment;
- Meets consumer demands for hassle free meat preparation and the convenience of unattended cooking;
- Expands ability to move certain products, encourages trial of products that shoppers may not know how to cook;
- Breadth of seasoning options.

### Sustainability:

- Saves energy and improves cooking yields by reducing cooking time<sup>16</sup>

Easy-open

# Grip & Tear®

Cryovac Grip & Tear® easy-open vacuum bag for for consumer convenience and maximum freshness.



FOOD SAFETY

- Eliminates need for knives to open package
- Reduces risk for cross contamination and injury



OPERATIONAL EFFICIENCY

- Reduces material used to package product
- Compatible with all Cryovac® semi-automatic and automatic bag loading equipment and existing Cryovac® VR and VS vacuum lines



SHELF LIFE EXTENSION

- The same shelf life advantages of vacuum shrink bags



BRAND BUILDING

- Offers superior visual appeal and a refined presentation for enhanced retail merchandising
- Skin-tight shrink provides outstanding product visibility free of pleats, folds or excessively large seal areas
- Works consistently and reliably every time

# Cryovac® OptiDure™

High shrinkable bag suitable for vacuum packaging in semi or fully automated systems.



## High pack security

- Unrivalled post transportation and export security thanks to high mechanical resistance;
- Outstanding shrinkability combined with a thin structure achieves same abuse resistance as a thicker materials, but with less environmental impact keeping the product safe in long distribution chains

## Increased productivity & automation suitability

- Reduced leakage thanks to excellent sealability through pleats;
- Drop-in solution for highly automated production lines;
- Increased output due to best in class overlap sealing ;

## Outstanding presentation

- Excellent brightness and transparency;
- No excess of plastic.

## Sustainability

- Reduction of energy consumption for product manufacturing. Total emission of Green House Gas favorable to this bag.

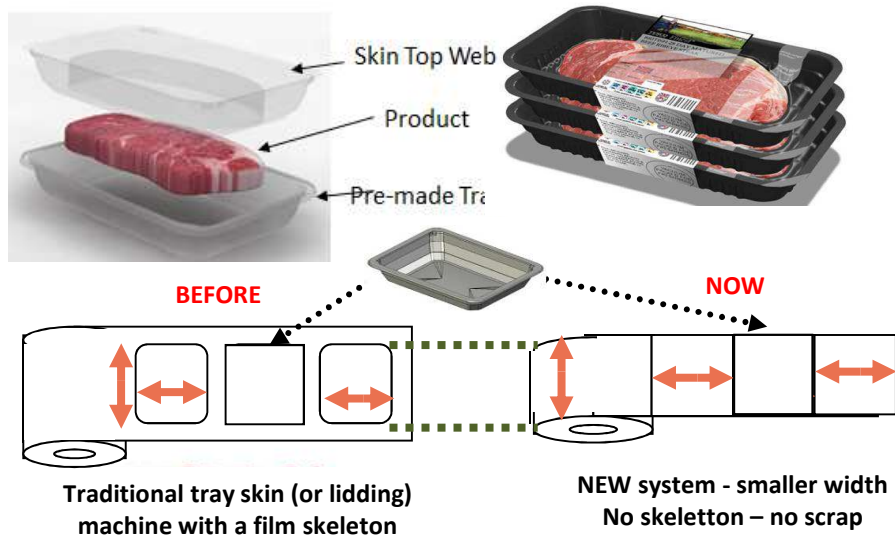
**CRYOVAC®**



# Cryovac® Darfresh® on Tray



A vacuum skin packaging system based on tray sealing technology with pre-made trays.



FOOD SAFETY



- Reduction of aerobic bacteria growth to maintain consistent quality;
- Natural meat maturation in the pack;
- Vacuum cooking and high pressure pasteurization possibilities

OPERATIONAL EFFICIENCY



- No skeleton film waste, with reduced film consumption
- Full system with easy integration within an off-line production process

SHELF LIFE EXTENSION



- Shelf life extension thanks to Darfresh\* skin process
- Total Darfresh\* seal concept to reduce drip
- Vertical facing with shelf optimization and added product differentiation

BRAND BUILDING



- Rigid pack with attractive skin tight product presentation

## Sustainability

- Reduction of food spoilage and waste

Odor Absorber

# Cryovac® Freshness Plus®

Vacuum Packaging in Shrink Barrier



FOOD  
SAFETY

- Combined Hygiene and Packaging approach helps to keep the product microbiologically safe.



OPERATIONAL  
EFFICIENCY

- Slaughtering operations reduced by up to 1 day - for poultry
- Frozen storage cost savings for poultry.
- Domestic and international sales extension.



SHELF LIFE  
EXTENSION

- 2 - 3 days shelf life extension versus both non-barrier and barrier bags for poultry.
- No unpleasant odour at the pack opening.



BRAND  
BUILDING

- Attractive product, reducing the risk of product returns .
- Consumption increase thanks to Aroma protection.
- 360° on the pack communication -10 colours.
- Easy opening with Grip & Tear features.

## Sustainability

- 10% packaging material thickness reduction for poultry.
- Spoilage and Food waste reduction in the stores.

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# How to extend shelf life tomorrow?

**ACTIVE PACKAGING**

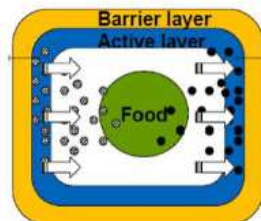


**NOVEL FOOD PROCESSING  
TECHNOLOGIES**

**CRYOVAC®**

# The future of packaging

## Active and Intelligent



Active

Interacts with  
Products

Enhance Food  
experience

Extension of  
protection  
function



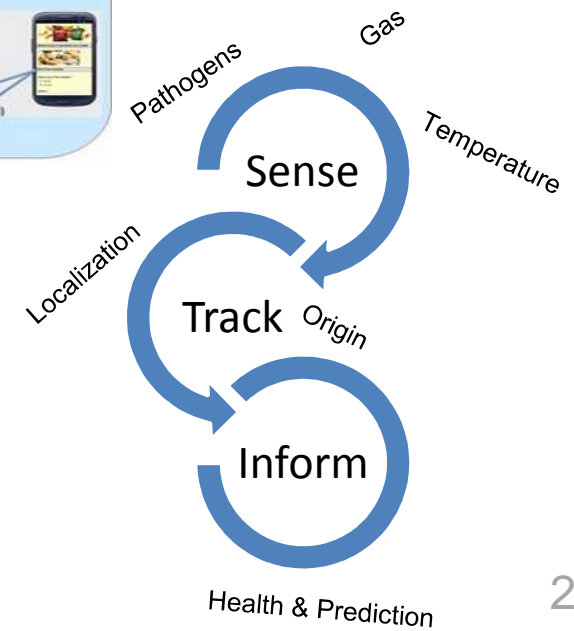
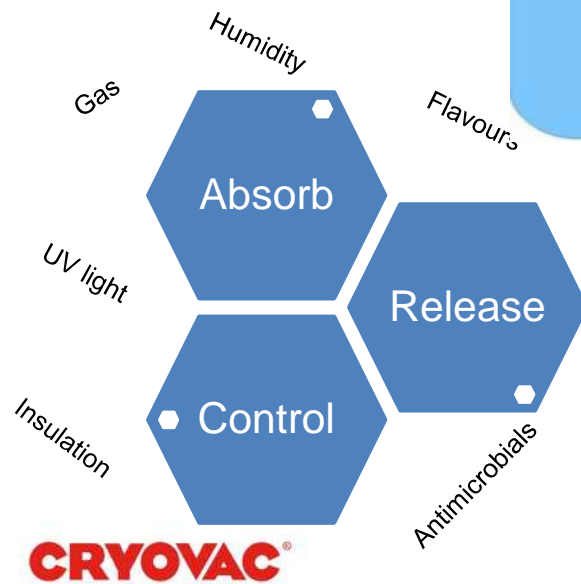
Intelligent

Interacts with  
Consumer

Track, Sense &  
communicate

Extension of  
communication  
function

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# Key Requirements

## *Intelligent Package integrated solution*

1. Compliance with legislation
2. True Correlation with product quality
3. Reasonable price



## **OTHERS**

- ✓ Easy to use/activate/read
- ✓ Applicable in-line at high speed
- ✓ No or little environmental impact
- ✓ Storage Resistance
- ✓ Abuse resistance

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# Carcass Inspection

- ✓ Fluorescence spectroscopy
- ✓ Detects visible & invisible faecal contamination
- ✓ Validated with Beef & Lamb
- ✓ Full Automatic system under development
- ✓ This based on true Imaging system



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# Emerging “novel food processing technologies”

Microbial reduction principle	Mechanism	Driving force	Process	Additional bactericidal modes
Nonthermal inactivation	Electromagnetic energy	Charged particles	Irradiation	Free radicals
		Electron transfer UV photon transfer	Electron beams UV energy	
	Supercritical fluid conditions	Concentration	Pressure and CO <sub>2</sub>	High penetrating power
	Momentum transfer	Hydrodynamic pressure in liquids	Pressure homogenization	Temperature Cavitation
	Momentum transfer	Hydrodynamic pressure waves	High hydrodynamic pressure/shock waves	Shear stress
	Momentum transfer	Hydrostatic pressure	High hydrostatic pressure	
Pulsed energy	Electrical fields	High-voltage gradient	Pulsed electric fields	Temperature
	Electromagnetic energy	Light and UV photon transfer	Pulsed light	Temperature
	Momentum transfer	Pressure	Pressure cycling	
Plasma	Electrical or electromagnetic energy	Charged particles and photon transfer	Atmospheric plasma	Light photons Free radicals Charged particles
Chemical	Oxidation	Concentration	Ozone CO <sub>2</sub> Ion exchange Chlorination pH adjustment	
	Osmotic pressure	Solute concentration	Water activity	Bound water

Table 1: Processing Unit Operations and Fundamental Principles of Traditional and Novel Processing Technologies

A large red swoosh graphic on the left side of the slide.

# The future of “novel food processing technologies”

The main driver for the application of novel food processing technologies would be microbial reduction leading to preservation and SL extension.

Technologies mentioned have been developing since early 20<sup>th</sup> century and knowledge is constantly increasing and the results of fundamental research are promising.

The factors that still limits the spread and industrialization of emerging technologies are **regulations**, **technology readiness** and **scale-up investment**.

# THANK YOU