



# Using lactates for food conservation and protection



- We are a **leading supplier of lactic acid and lactates** produced through natural fermentation and purification of sugar and corn

- Key Figures:

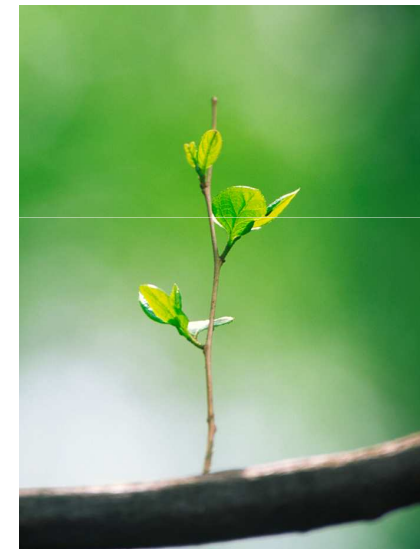
	Our staff:	Our production capacity:
Belgium	140	30 000 t
China	175	50 000 t
USA	10	15 000 t
	<i>(10% in R&amp;D)</i>	



## Our activities

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- Food
  - ◆ Safety
  - ◆ Clean labeling
  - ◆ Health improvement
- Non-Food
  - ◆ Pharma, Cosme, Indus, Feed
  - ◆ Green Solvents
  - ◆ Lactochemistry
  - ◆ Plastics: Futerro (JV with Total Petrochemical)

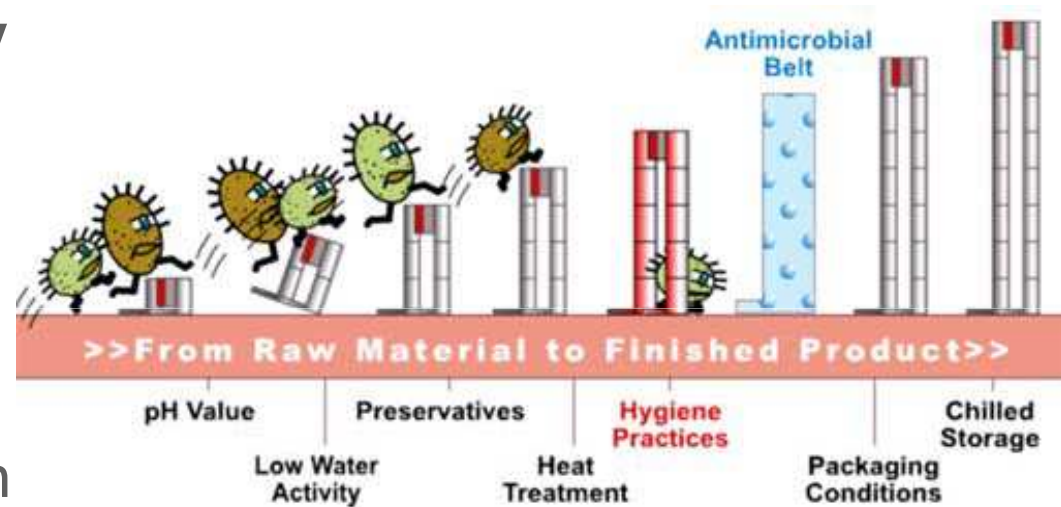




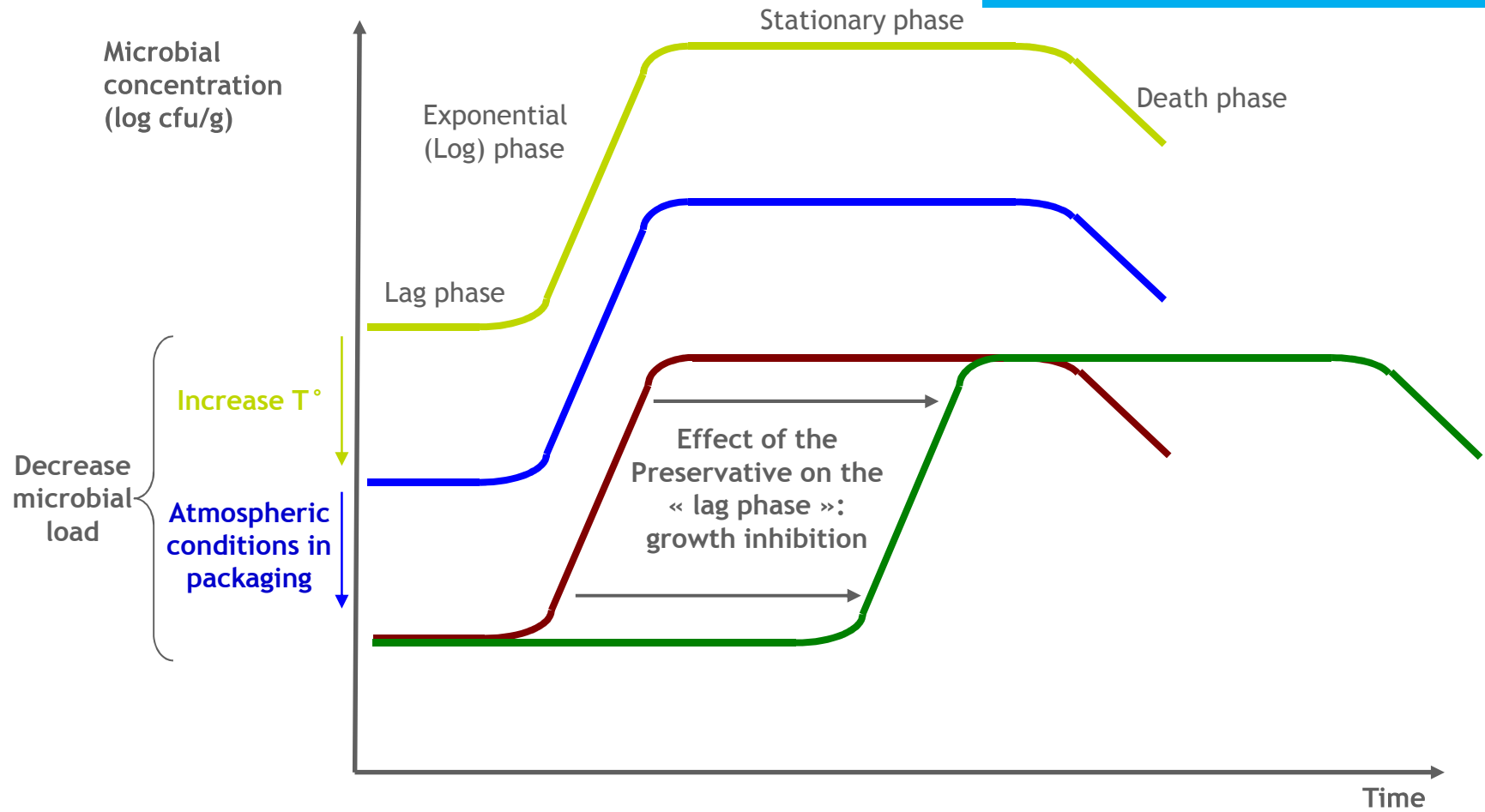
# Food Conservation Techniques

- Hurdle technology

- ◆ pH ←
- ◆ Water activity ←
- ◆ Heat treatment
- ◆ Atmospheric protection
- ◆ Hygiene practices
- ◆ Preservatives ←

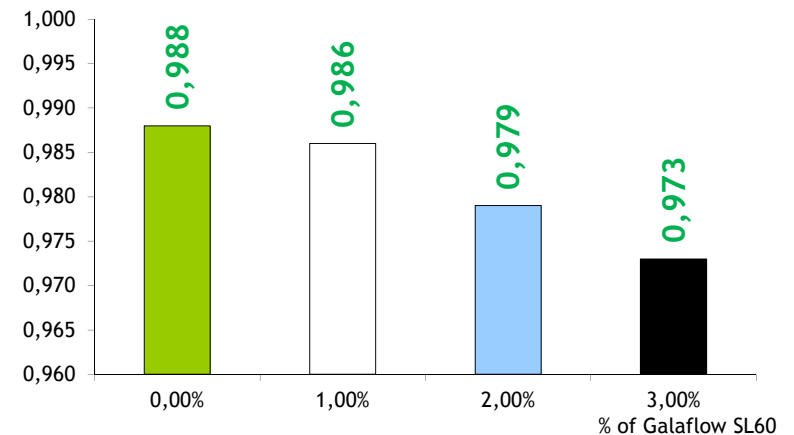
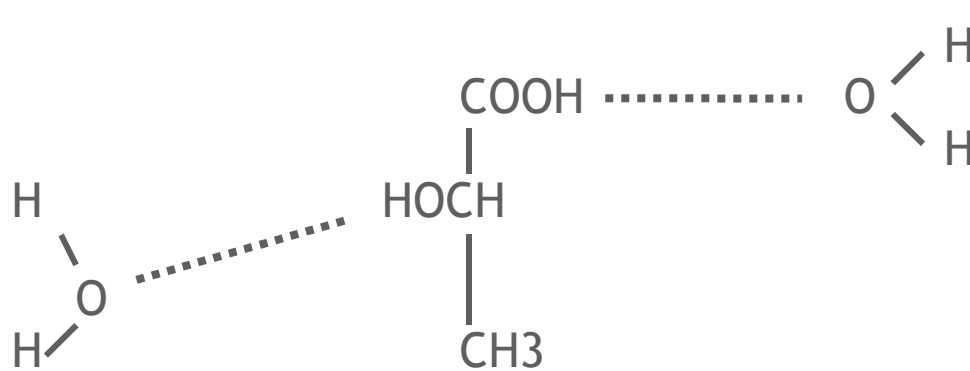


# Food preservation



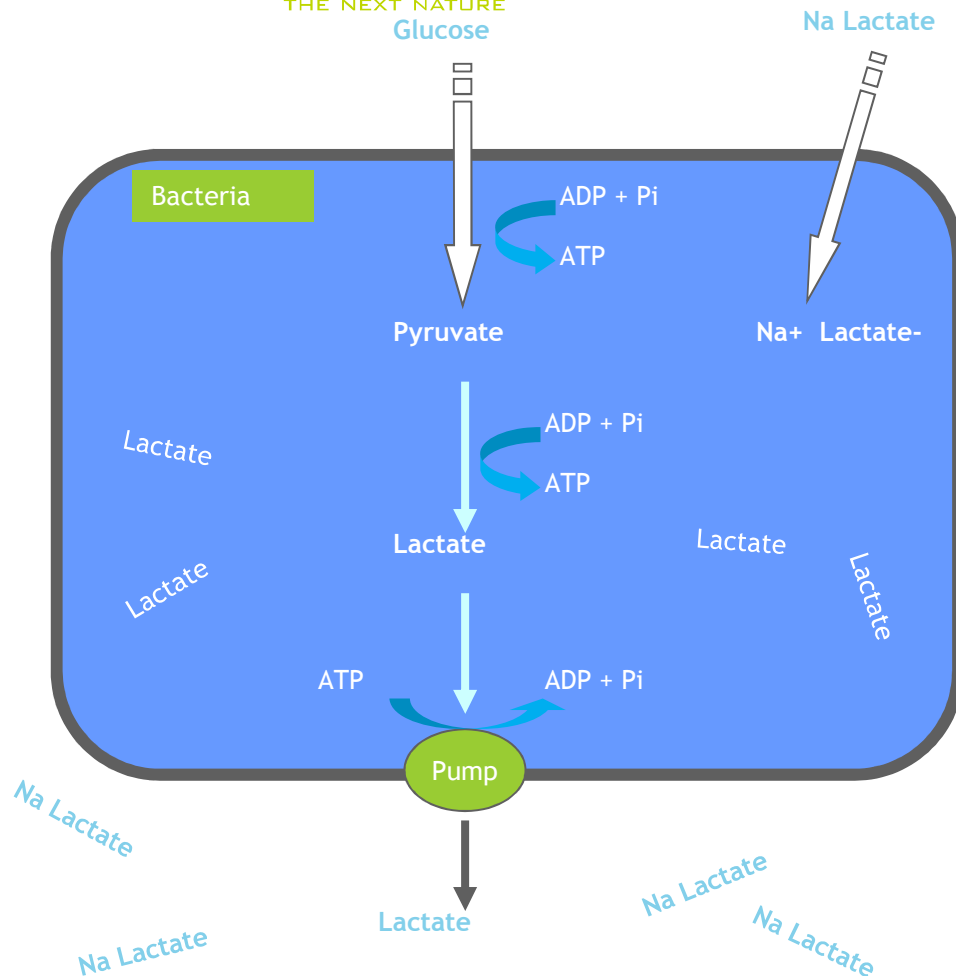
# How does the lactate work? (1/3)

- Decrease of water activity ( $a_w$ )



- The lactate's hydroxy functions binds the free water in the food matrix → less water available for micro-organism development

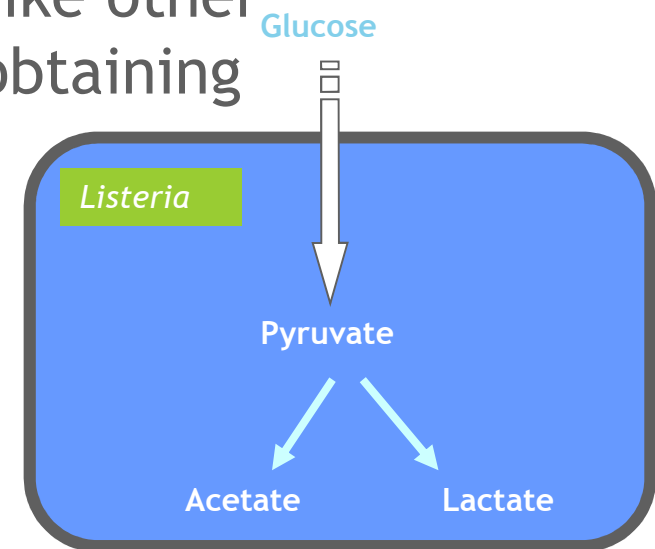
# How does the lactate work? (2/3)



- The feedback effect
  - ◆ In aerobic conditions, the metabolism of the bacteria produce 36 ATPs
  - ◆ In anaerobic conditions, there is a total of only 6 ATPs
  - ◆ The elimination of the lactate is being achieved through an ionic pump which requires energy → less energy available for development
  - ◆ The sodium lactate in the external system creates an osmotic pressure blocks the elimination of the lactate → **FEEDBACK EFFECT**

## How does the lactate work? (3/3)

- Lactates salts are effectiveness against bacterial growth (i.e. *Clostridium*, *Listeria*, *Staphylococcus*, *Salmonella*...)
- BUT, in anaerobic conditions, *Listeria*, like other pathogens, also produces acetate thus obtaining enough energy to continue growing (lactate alone not effective any longer)
- Only a blend of lactate and (di)acetate will block *Listeria* growth





## Some Proven Applications

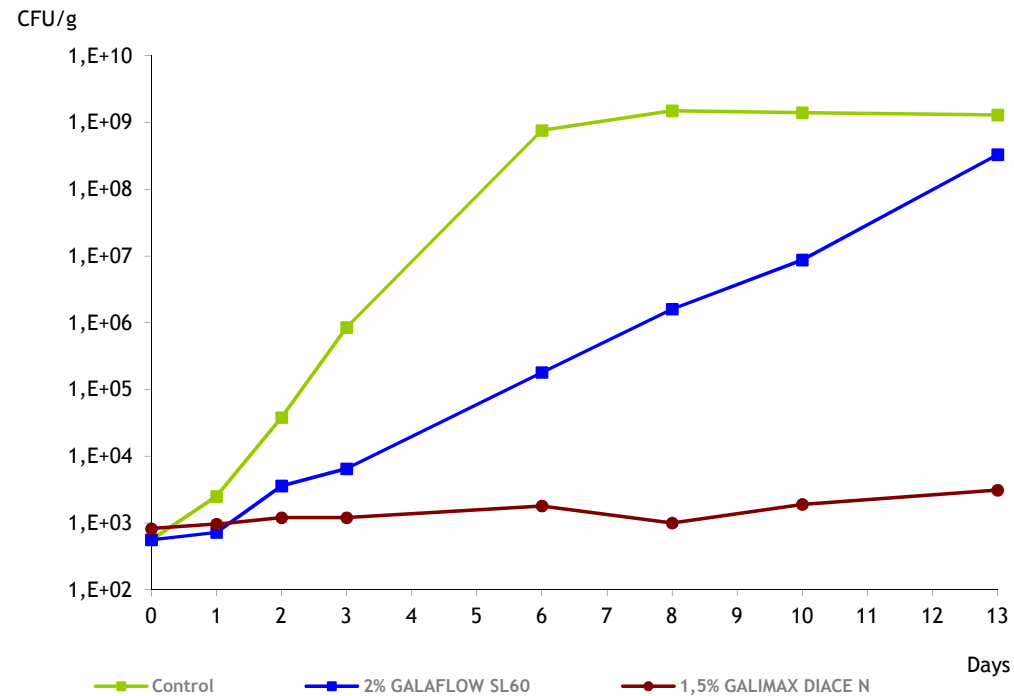
## A solution to each concern



CONCERNS	GALACTIC SOLUTIONS (Tailor made blends)	FUNCTIONALITY
Meat Safety	DIACE <sup>®</sup> - PROMEAT Plus <sup>®</sup>	Against Pathogen
Shelf-life Extension	ACE <sup>®</sup> - PROMEAT Plus <sup>®</sup>	Control APC
Taste & Color	RED & FRESH <sup>®</sup>	Prolonge Freshness
Health	PROMEAT Plus LS <sup>®</sup>	Sodium Reduction

## Liver Cream « pâté »

Growth of *Listeria monocytogenes* in a cooked matrix ("pâté" type) stored at 10 °C (non vacuum)



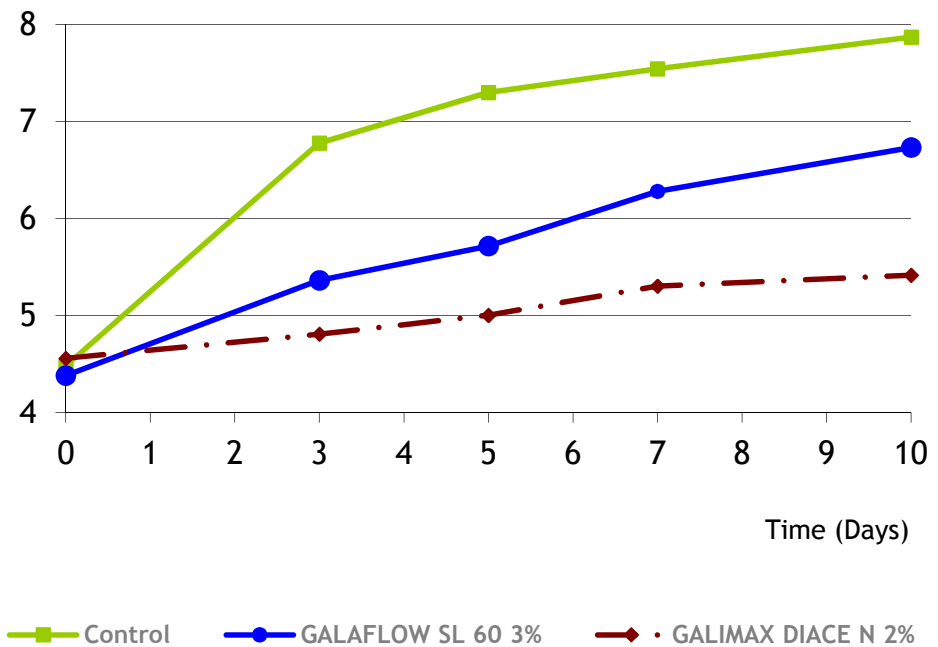
# SHELF-LIFE EXTENSION

## Control APC

### Frankfurter

TPC after time (4° C)

Log (TPC/g)

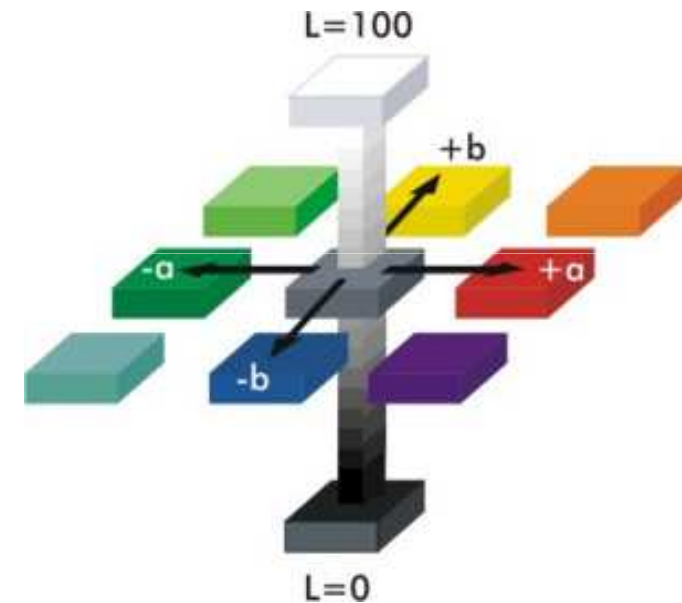


# TASTE & COLOR

## Prolonge Freshness

- Raw beefburger - measured by L,a,b model

CODE	Physico-chemical analysis			
	Day	Colour		
		L	a	b
Control	0	34,36	14,93	6,52
	3	33,62	16,32	6,55
	7	33,01	12,82	6,99
	10	35,11	12,64	5,99
Red & Fresh®	0	33,20	14,98	7,15
	3	32,58	15,78	5,72
	7	32,51	14,79	5,72
	10	35,02	15,37	6,83



➔ Red & Fresh® helps preserve redness of raw meat

# TASTE & COLOR

## Prolonge Freshness

Hamburgers at day 0



Control



Red & Fresh®

Hamburgers at day 7



Control



Red & Fresh®

➔ Red & Fresh® keeps the natural color of raw meat

# HEALTH

## Sodium Reduction in Frankfurter

Ingredients	Control (%)	GALACTIC (%)
Deboned turkey thigh without skin	12,55	12,46
Chicken MDM	47,55	47,45
Chicken skin	23,75	23,58
Water	9,7	9,1
Curing salt (NaCl + 0,6% Nitrite)	1,8	1,26
Dextrose	0,5	0,5
Soya protein	1,5	1,5
Potato starch	1,5	1,5
Polyphosphate	0,3	0,3
Ascorbic acid	0,1	0,1
Spices from RAPS	0,4	0,4
Smoking flavor from RAPS	0,2	0,2
Carmines	0,1	0,1
Paprika extract	0,05	0,05
<b>PROMEAT Plus LS®</b>		<b>1,5</b>
<b>Total</b>	<b>100</b>	<b>100</b>
<i>Sodium content (from curing salt)</i>	<b>0,72</b>	<b>0,50</b>

**-30%**

## Examples of Applications

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- MEAT
  - ◆ Fermentation/ Summer Sausage
  - ◆ Cooked Sausage
  - ◆ Carcass decontamination
  - ◆ Fresh Minced Meat
- FISH & SEA FOODS
  - ◆ Shrimps in brine
  - ◆ Fresh salmon



## Safety and shelf-life

Fresh seafood is highly sensitive to bacterial contamination, such as :

- *Listeria*
- *Pseudomonas*
- *Clostridium*

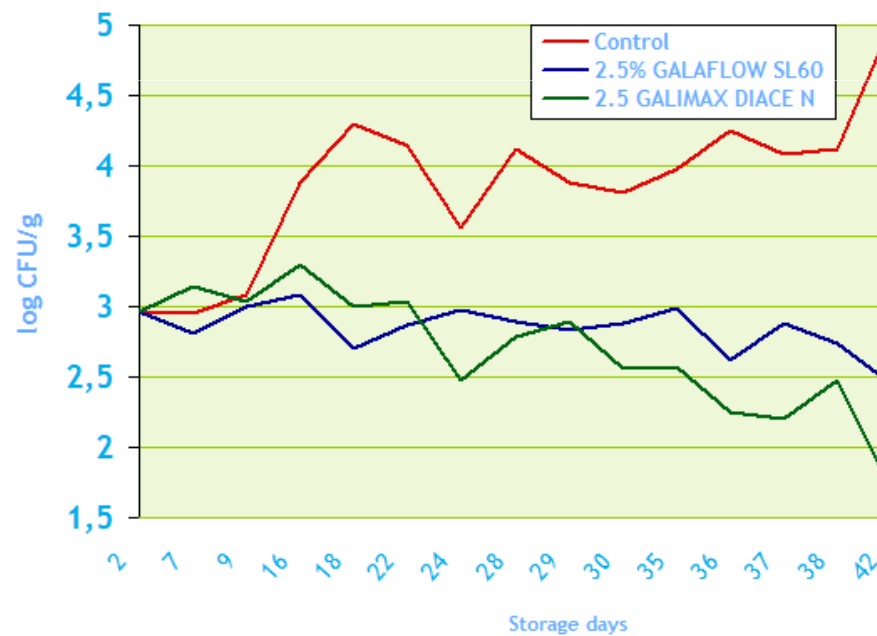


Special product range:  
**Lactate**  
**Lactate/Diacetate**



- *Listeria monocytogenes* (inoculation: 3 Log CFU/g) - smoked salmon (vacuum packed - 4° C)

Effect of GALIMAX DIACE-N  
and GALAFLOW on *Listeria monocytogenes*  
Smoked salmon



- Tailor-made blends for specific functions
- Properties & benefits
  - ◆ Antimicrobial
    - Effective against *Listeria monocytogenes*, *Staphylococcus aureus*, *Clostridium botulinum*, *Echerichia coli*, *Salmonella* ...
  - ◆ Almost no effect on pH
  - ◆ Have no adverse effect on color / taste
  - ◆ Enhance meat flavor

« BETTER PRESERVATION WITHOUT COMPROMISE »



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