

# Presentation

**Craftsmanship  
& THE FUTURE  
OF MEAT.**

## In-line process for injection, smoking, slicing and packaging of bacon with the most functional ingredients



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Meat Treatment (GEA)

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Regional Sales Manager  
(Vaessen-Schoemaker)

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Sales Steering  
(GEA)

### **Mathieu Nouhin**

Product Manager  
Freezing (GEA)

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Area Product Sales Manager  
Slicing & Loading (GEA)

### **Gerd Heuser**

Packaging Applications  
Manager (GEA)



# Introduction

by Willem Poos

**Craftsmanship**  
**& THE FUTURE**  
**OF MEAT.**



# Bacon: the best thing ~~since~~ sliced bread! before

- Dehydration was the earliest form of food curing (12,000 B.C.)

## **Curing with key ingredient nitrite for:**

- Consumer acceptance aspect: pink color of cured-meat products
- Health perspective: ability to prevent the germination of spores of *Clostridium botulinum*
- Product quality: retarding lipid autoxidation
- Warmed over: flavor development



# Bacon is bacon...or?

1. Irish and English back bacon (rashers)
2. Canadian bacon (eye of the pork loin)
3. Standard belly bacon / American bacon (streaky bacon)
4. Australian middle bacon
5. Country belly bacon (heavily smoked, salty, and thickly sliced)
6. Pancetta belly (rolled-up, seasoned)
7. Slab belly bacon (whole belly, not sliced)

## Other things to consider:

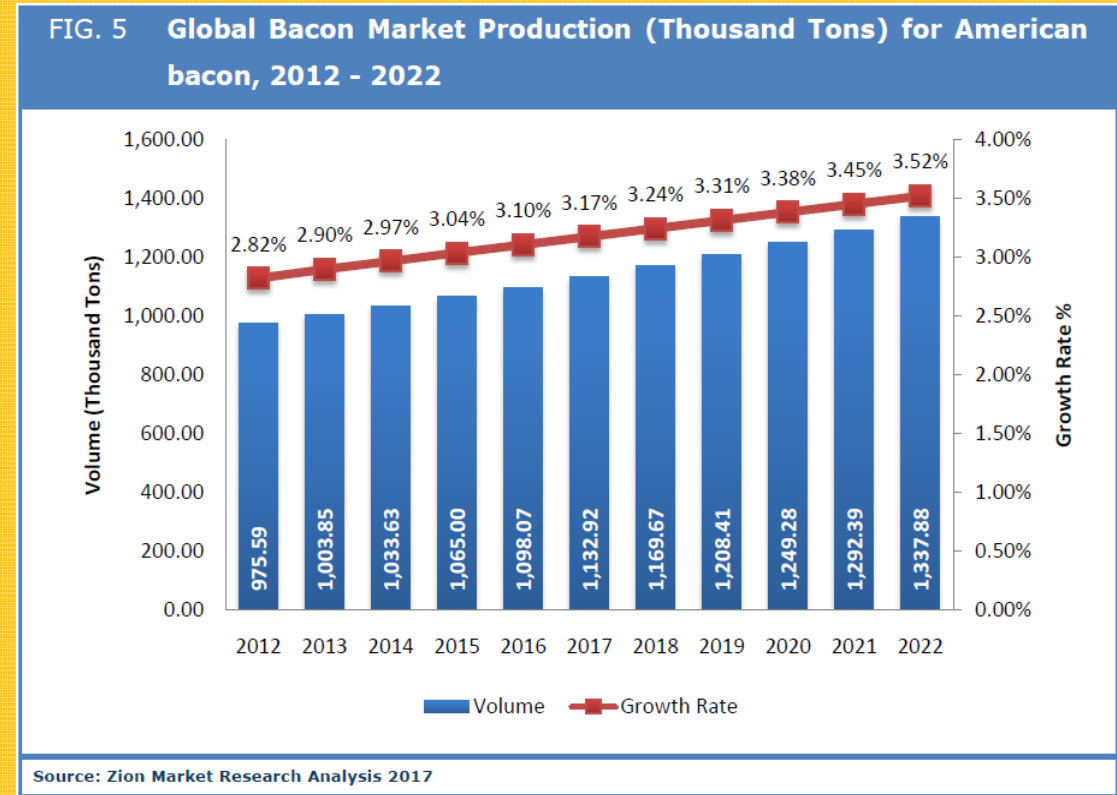
- Ready To Cook
- Ready To Eat
- Rind-on / rindless
- Cooked/boiled / smoked / dried /fried



# Bacon market

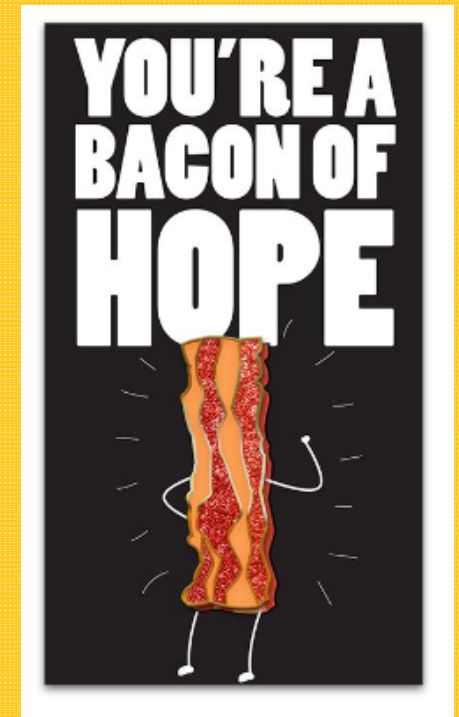
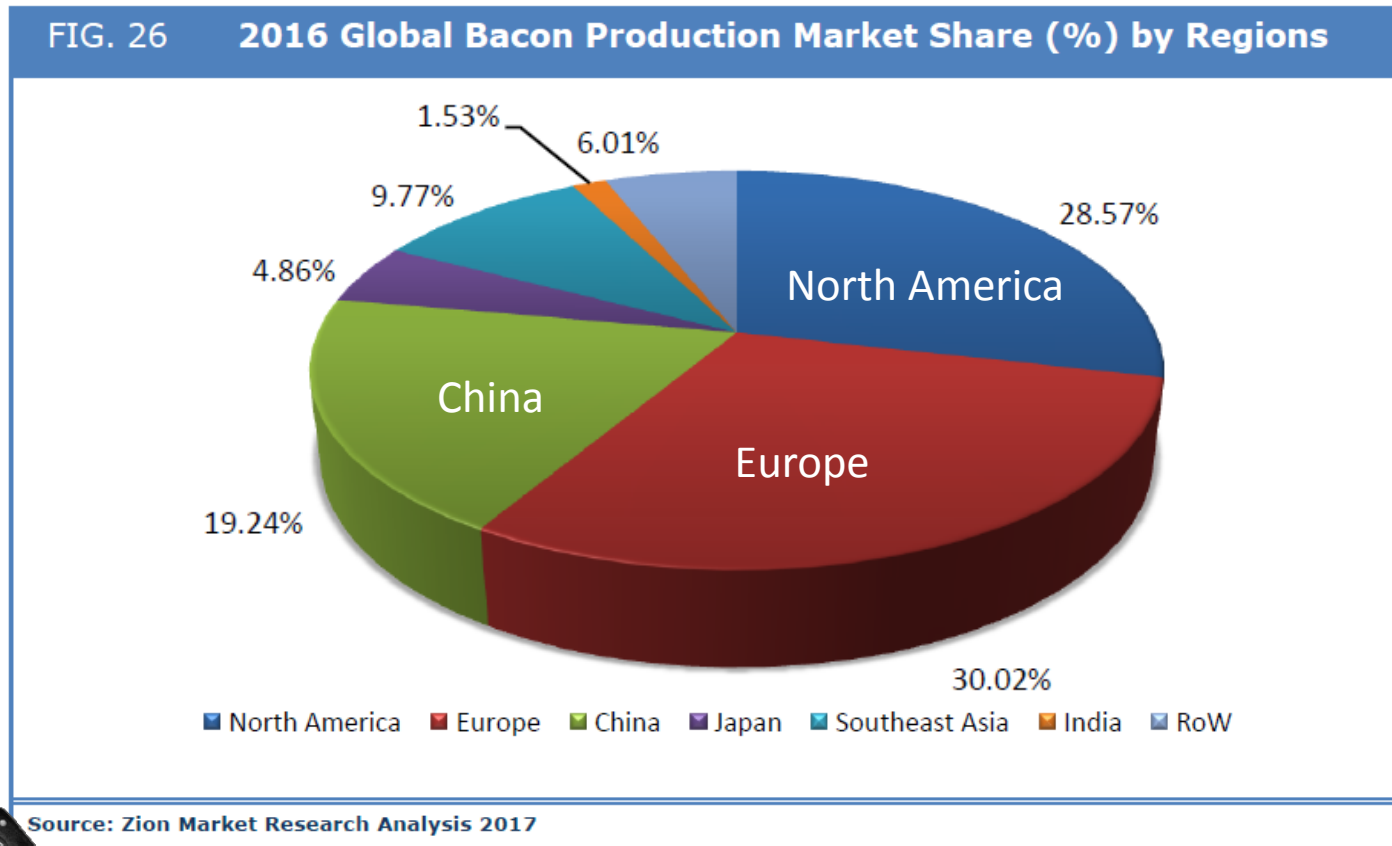
## Market drivers, situation, business:

- Worldwide popular product
- Commodity product
- Low margins
- Reduced sodium / nitrite
- Animal welfare
- Organic
- Local produced

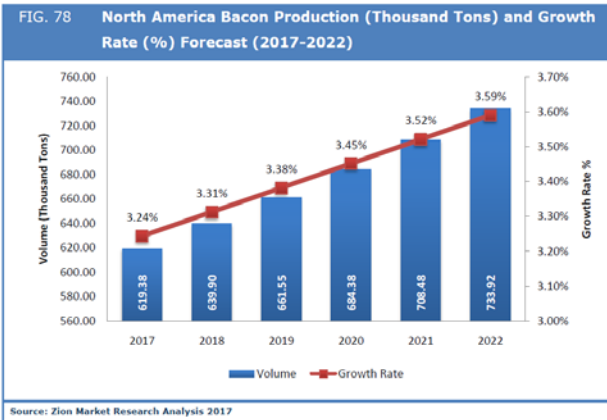


Compound Annual Growth Rate of 3.4% between 2017 and 2022

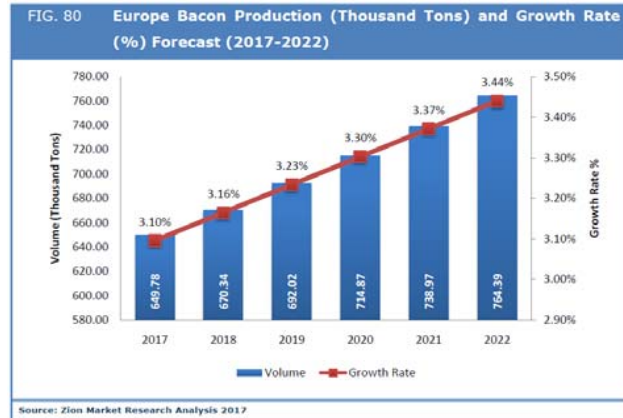
# Bacon market



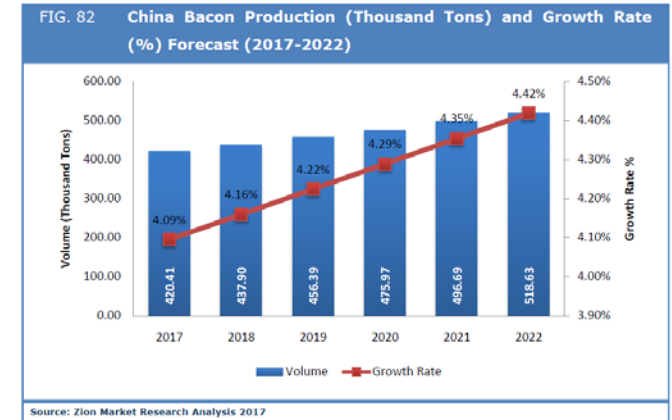
# Bacon market



North America Bacon Production



Europe Bacon Production



China Bacon Production



# Bacon process

## Challenges in current processes:

- Batch process
- Labor-intensive
- Long tumbling & hanging causing bad shape
- Pressing
- Slicing losses





# Bacon process

## Challenges in current processes:

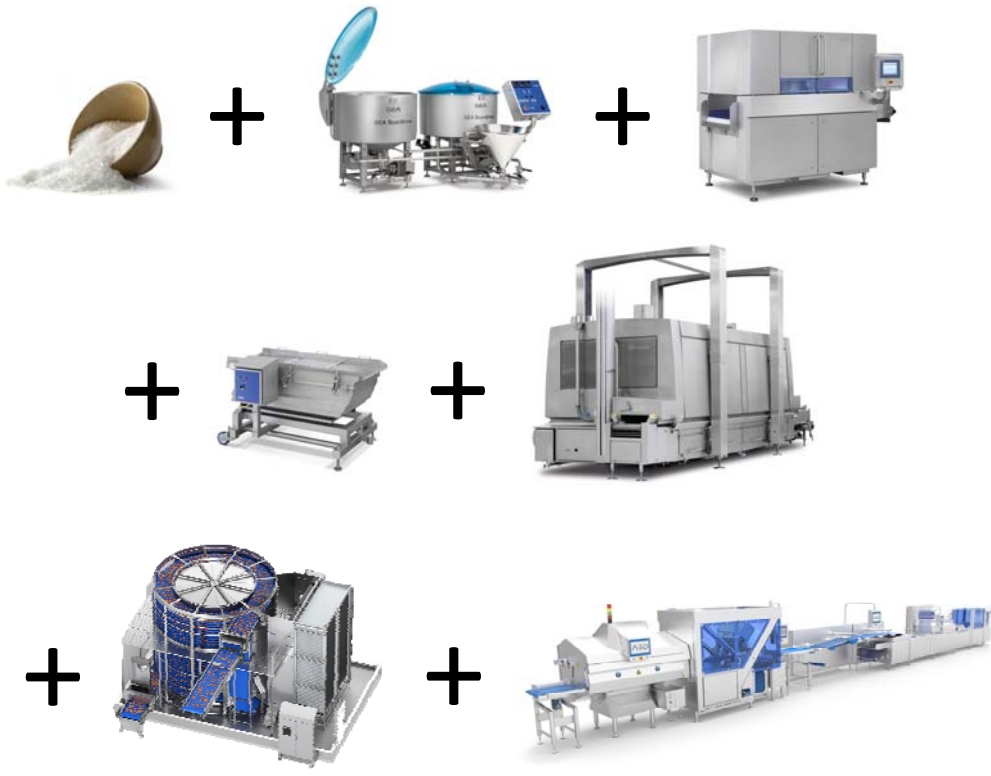
- Batch process
- Labor-intensive
- Long tumbling & hanging causing bad shape
- Pressing
- Slicing losses

Future:

**IN-LINE BACON PROCESS!**



# Bacon process



Future:

IN-LINE BACON PROCESS!

= GEA IN-LINE CONCEPT



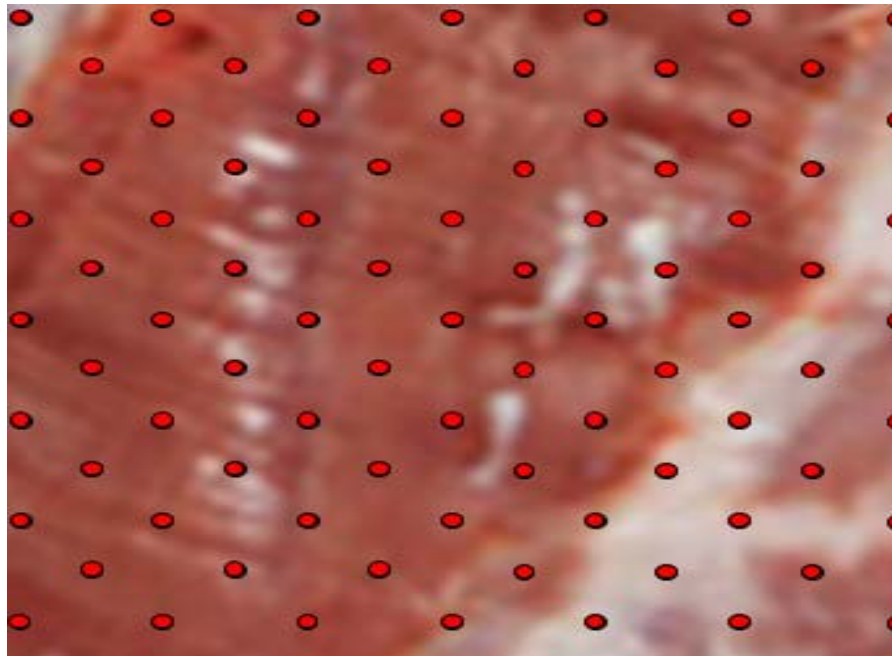


# Good shape versus bad shape



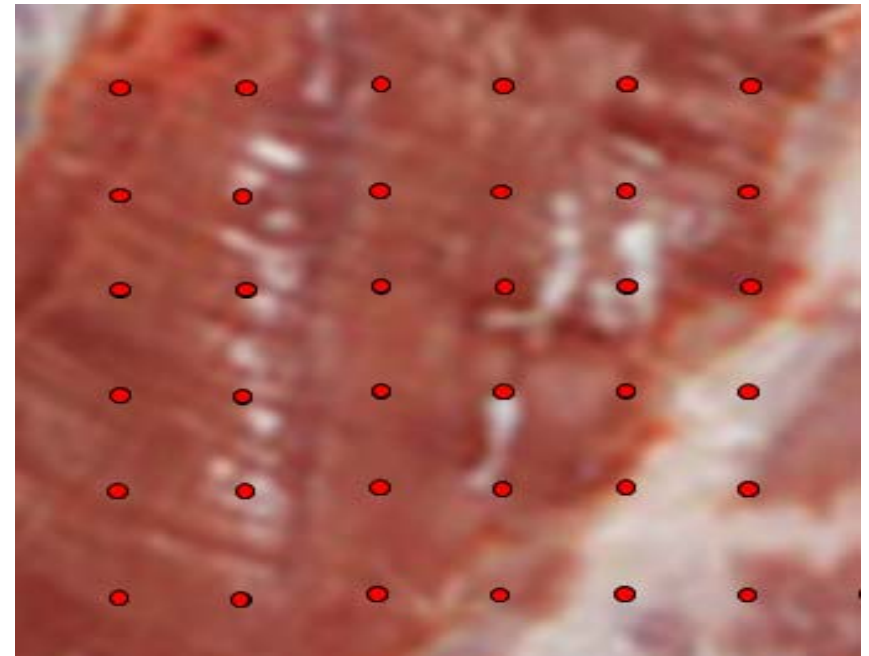


# Injection point ratio & shaking = better distribution



GEA 2 mm injection & shaking

78 injection points



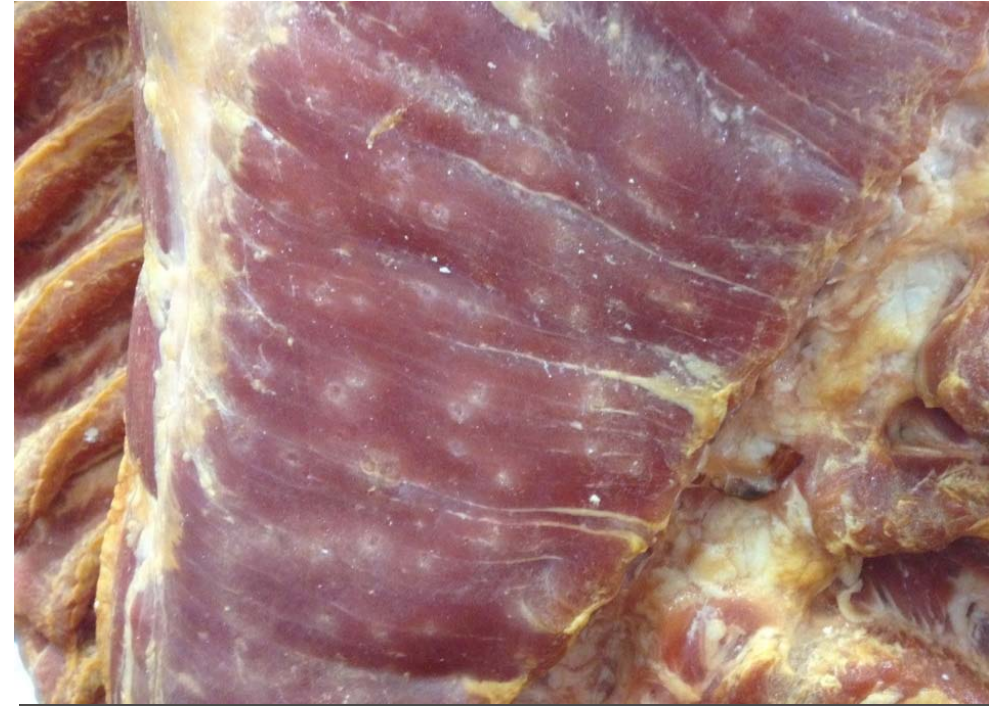
Conventional needle pattern

36 injection points

# Quality improvement



**GEA injection & shaking**  
No marks, better color, better distribution



**Conventional injection & tumbling**  
Needle marks, worse distribution / color



# The secret?

It is not **WHAT** you do,  
it is **HOW** you do it





Invitation to live demonstration



**Craftsmanship  
& THE FUTURE  
OF MEAT.**

# **In-line injecting, smoking and freezing of bacon**

**by Dré Waelput, Willem Poos and Mathieu Nouhin**

Please return to your seats  
afterwards



**Fully natural injection solution  
for in-line bacon processing**

by Dré Waelput

**Craftsmanship  
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# Bacon processing 1 + 1 = 3

## Total concept injector + brine

- ◆ Challenges/Goals:
  - A clean declaration in-line bacon process
  - Optimal distribution, even colour
  - Minimize brine pockets
  - Low injection level needs highly concentrated brines
- ◆ Products:
  - Back bacon
  - Canadian bacon
  - Pork belly bacon (cooked)





# Brines for injection

## Inline processing

- ◆ Functional without E-numbers
- ◆ Non dissolvable ingredients need efficient brine preparation
- ◆ Low viscosity brine giving good dispersion in case a short curing times is used
- ◆ Yield; back to zero or plus after cooking
- ◆ Low viscosity brines to avoid pickle pockets; this improves the slicing yields
- ◆ Brine can be used in a dense needle head with 2mm needles
- ◆ Colour for cooked
- ◆ Brine is giving a good product stability; colour and drip-losses

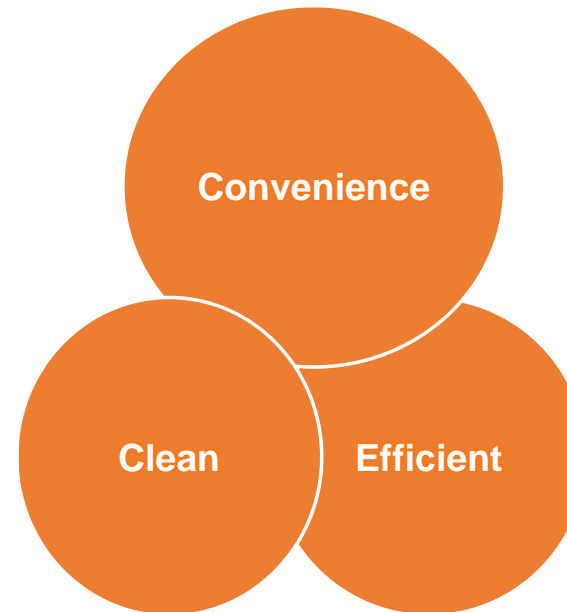
Without added nitrite



# Natuvas P15 Bacon – 7165

## Clean label

- ◆ Easy to disperse
- ◆ Low viscosity
- ◆ Can be used in thin needles
- ◆ Natural alternatives free from E-numbers
- ◆ Colour without added nitrite
- ◆ No forming of nitrosamine during cooking
- ◆ Suitable for cooked bacon





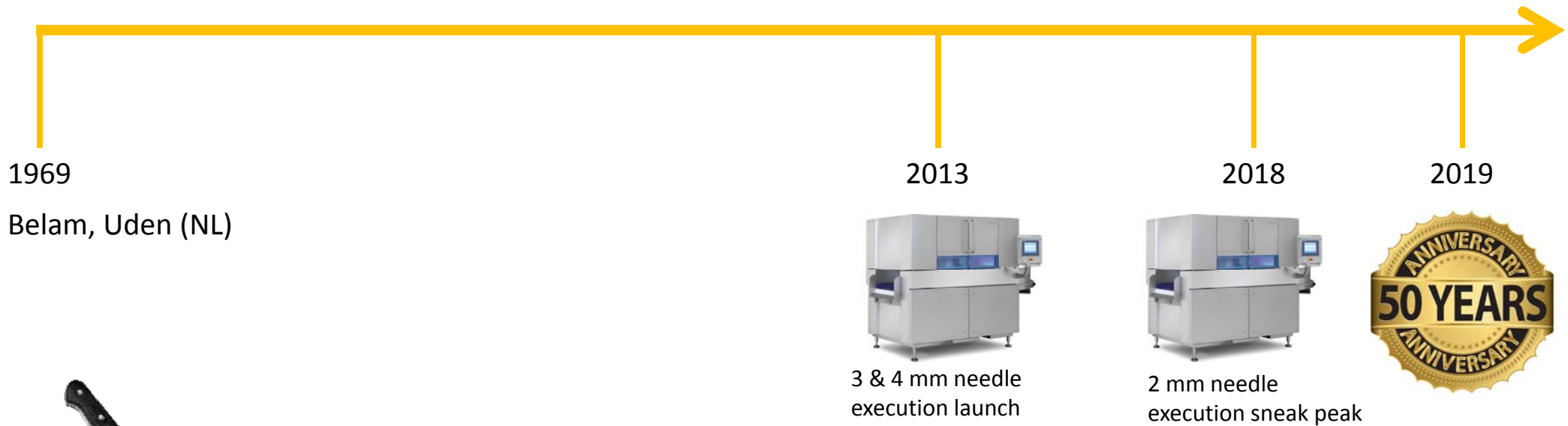
# GEA MultiJector: perfect bacon every time

by Willem Poos

**Craftsmanship**  
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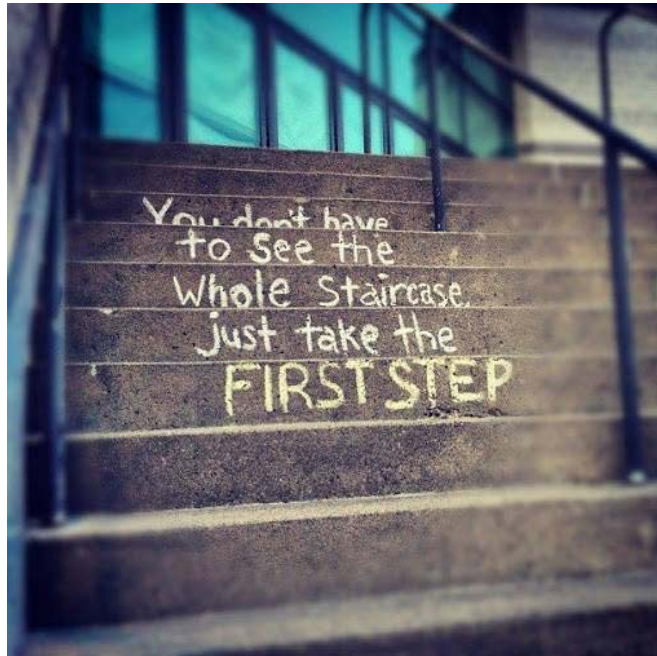


# Injection technology for almost 50 years!



# The new addition to the MultiJector family

The first step is the hardest!



Be in control!



# Unique in its own way

## Needles

Needle manifold blocks for easy exchange  
Tight needle pattern  
No tools needed  
OptiFlex material

## Flexibility

Adjust to product height (time in meat)  
Unmatched speed  
Waiting time (only speed where there is need)  
Needle depth adjustment (for rind-on products)

## Brine distribution

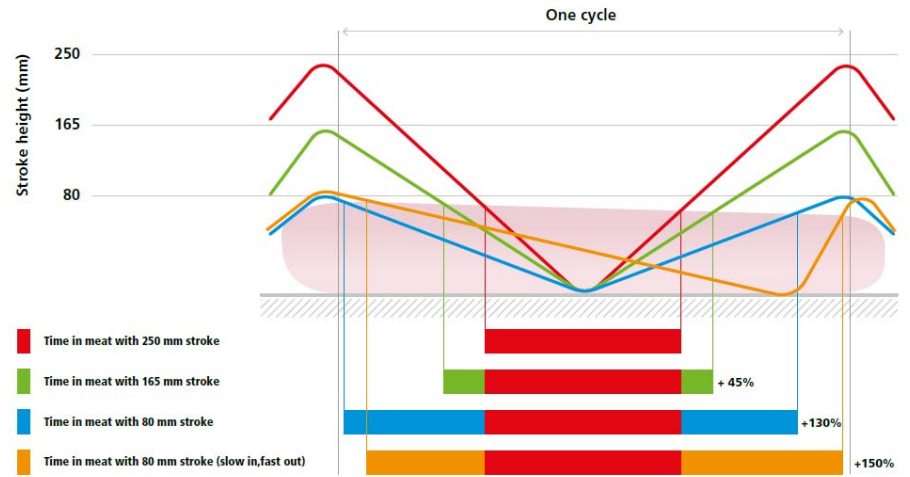
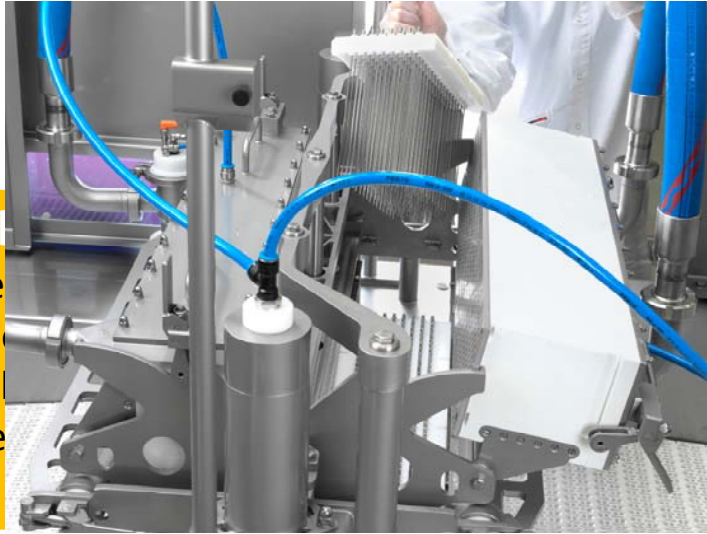
Short circuit from pump to needle tip (accuracy)  
Linear vertical movement  
Adjustable stripper plate  
Reduced return brine

## Hygiene

No hollow frame parts  
Easy to clean (most hygienic design available )  
Belt removal (only way to clean 100%)



Needle  
Needle  
Tight n  
No tool  
OptiFle



Brine  
Short c  
Linear  
Adjusta  
Reduce



Hy  
No  
Ea  
Be



Craftsmanship  
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OF MEAT.

**GEA** engineering for  
a better world



**Where there's smoke,  
there's flavor**

**by Luuc van Lankveld**

**Craftsmanship  
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★ ★ ★  
WHERE THERE'S  
**SMOKE**  
THERE'S FLAVOR  
★ ★ ★




## 5 good reasons to smoke food

- Taste
- Odor
- Color
- Texture
- Shelf life

# Typical smoke flavors

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*Smoke can add it's distinctive flavor to food, but burning wood also creates some unwanted side effects....*

- Tar
- Ashes
- PHA (Polycyclic aromatic hydrocarbon)

*What do these components have in common?*

**They are insoluble in water!**



# Creating smoke condensate

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## GEA CookStar with SuperHeat smoke

- First in-line spiral oven with freshly generated purified smoke
- Injection and evaporation of atomized smoke condensate
- Controlled smoking environment in a Spiral oven
- More constant and mild smoke flavor
- Healthier and cleaner process







# Benefits GEA HotSmoke

## What's new:


- Special developed smoke condensate
- HotSmoke tailored for bacon process parameters
- Healthier products compared to conventional smoking methods

## Efficient smoking process :

- Cuts process times up to 50%
- Less labor intensive and safer process
- More consistent color and taste compared to batch systems

*First Bacon production line will go life  
Beginning 2019!*





**CALLIFREEZE®: A new and unique  
inline freezer control system  
by Mathieu Nouhin**

**Craftsmanship  
& THE FUTURE  
OF MEAT.**

CALLIFREEZE®

Self balancing your process



# Actual product frozenness measurement: batch



Temperature measured at product surface with a target of  $-12^{\circ}\text{C}$  expecting a core product temperature of  $-5^{\circ}\text{C}$  for slicing quality



# Actual product frozenness measurement: issues



- Temperature checking is done manually and after freezing.
- Temperature measured at product surface.
- Temperature measurement doesn't provide the level of frozenness in product volume

➔ Not continuous

➔ Poor accuracy

➔ Poor reliability

# Solution: CALLIFREEZE<sup>®</sup>

1 Continuous measurement of product level of frozenness at freezer discharge

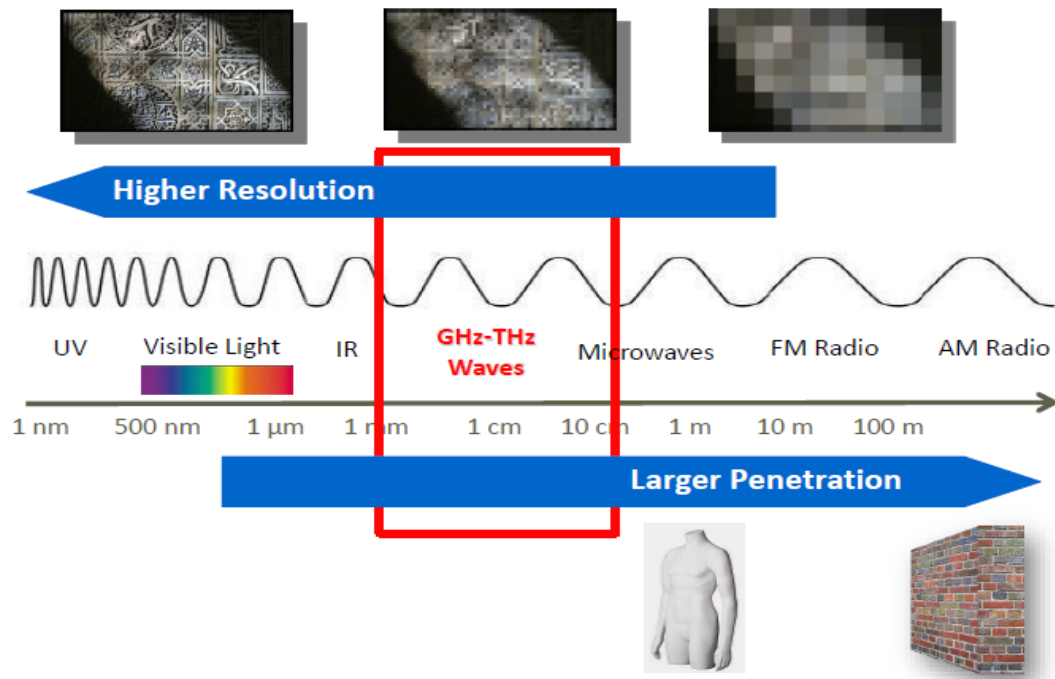
2 Calculation of freezer parameters to calibrate ambient temperature, retention time, evaporator feeding for minimum energy consumption and product quality

3 Optimized Freezer settings

- A. Belt speed
- B. Ambient temperature
- C. Evaporator valve station



# CALLIFREEZE<sup>®</sup> Technology



## GHz Technology

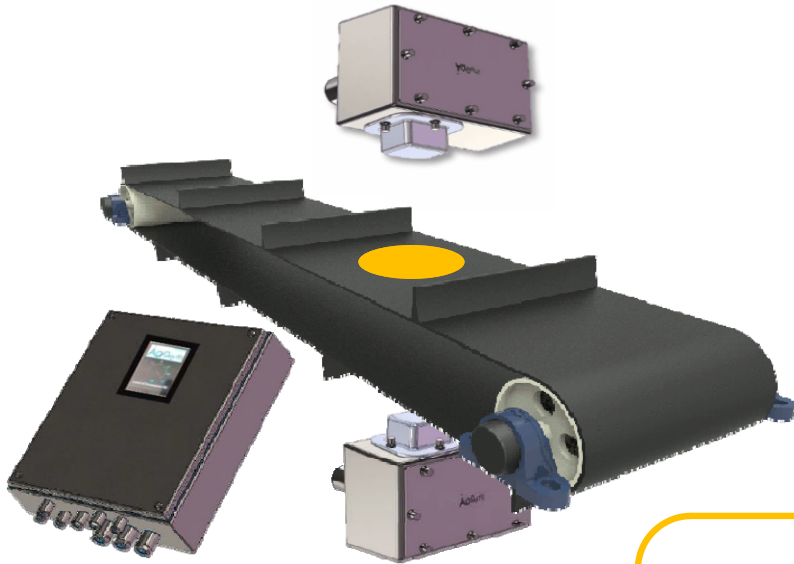
- Good penetration / resolution compromise
- Excellent sensitivity to H<sub>2</sub>O
- Contactless
- Real-time in-line
- Non-destructive
- Non-ionizing
- Through product measurement

To determine the phase of water

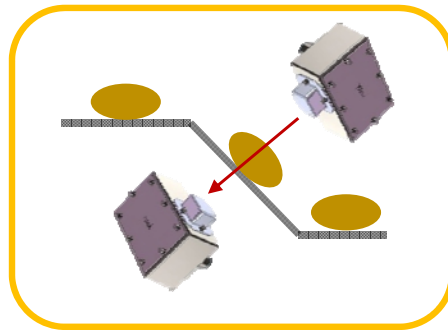


# CALLIFREEZE<sup>®</sup> sensor system

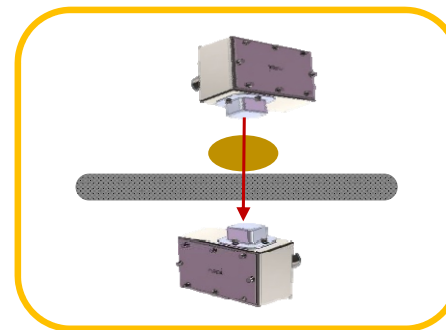
Continuous measurement of Level of Frozeness  
without contact with the product



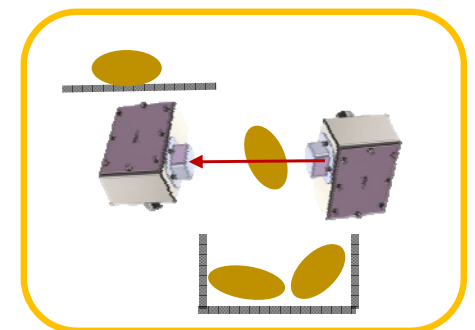
SLIDER



CONVEYOR



FREE FALL



# CALLIFREEZE® benefits

- Direct Level of frozenness measurement → *Reliable product frozenness status perfectly controlled for slicing process requirements*
- Continuous measurement → *Inline process control*
- Sensor integration into freezer control-command system → *Automated freezer+refrigeration control and optimisation*

*Applicable to new and existing freezers.*

*Valid for a wide variety of food applications.*



Pause



**Craftsmanship  
& THE FUTURE  
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# Time for coffee

**Time for a short break.**

Please return to your seats  
for the next presentation at 16:00



Invitation to live demonstration

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**Craftsmanship  
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# **In-line slicing and packaging of bacon**

**by Arjen Hettinga and Gerd Heuser**



# Innovations for the perfect slice: GEA DualSlicer

by Arjen Hettinga

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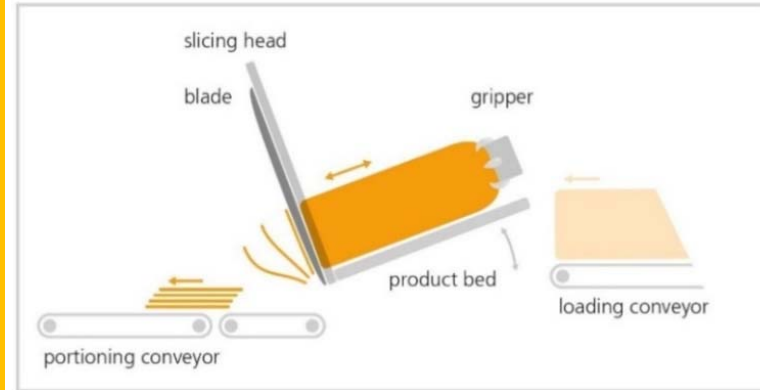
The perfect slice





## Smooth and gentle product loading

- Ergonomic product infeed height
- Two completely independent product and gripper drives
- Infeed conveyor or GEA OptiScan 600



Working principle (simplified)



## Perfect slicing and portioning quality

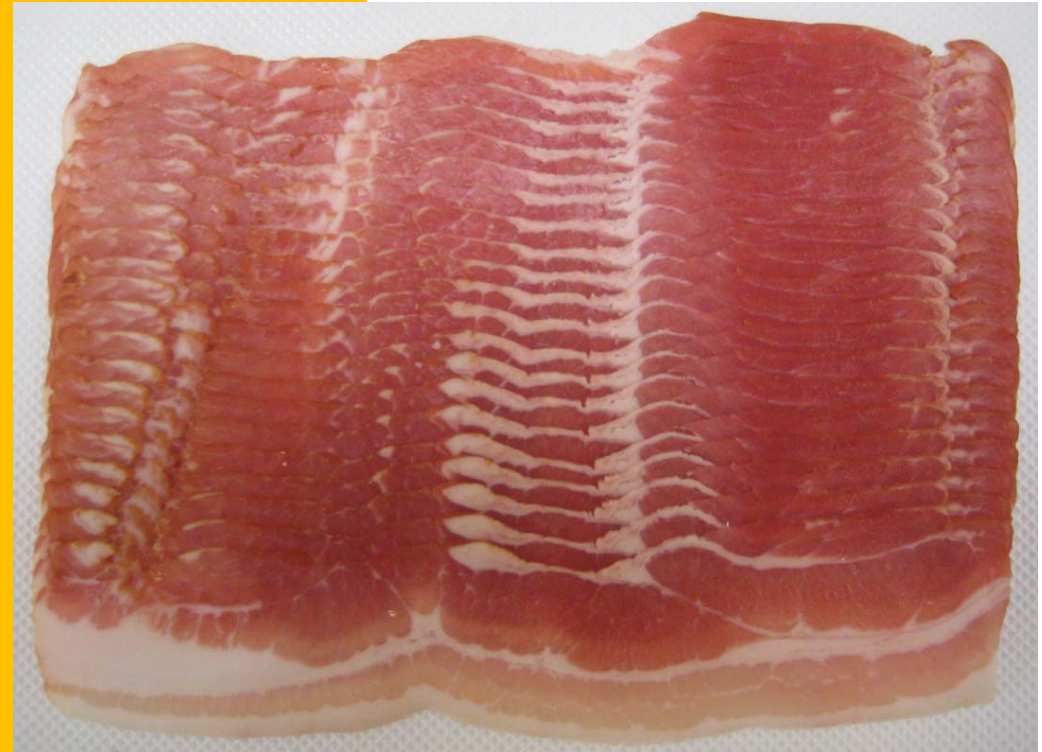
- Automatic shear edge gap adjustment
- Very stable and thin involute blade
- 40° slicing angle of rotor
- Optimal rotor position at any time (adjustable by approx. 60 mm, position stored in recipe)

## Very high output rate

- Reduced idle cuts due to three-stage portioning conveyor
- Automatic product infeed from the back side guarantees smooth product handling
- Short reload time

## Low give-away and high yield

- Two independent product and gripper drives
- Optional with pre-scanning system GEA OptiScan 600





## Involute blade types

- Appropriate blade type achieves outstanding accuracy per slice
- Blades are available in various tothing profiles and coatings
- High slicing speeds of up to 1,500 rpm
- Distinct blade stability due to large mounting point
- New blade technology, machined out of material





# Portion forms



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▶ Shingled portion  
(often small slice thickness, approx. 0.8 – 1.1 mm)

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▶ Stacked portion

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▶ Shaved portion

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▶ Pieces  
(only low capacity production)

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▶ Interleaved portion – please note important remarks:

- 2-lane version
- max. 700 rpm at 100 mm paper length
- preferably polystyrene 65 µm film

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▶ Fixed slice count regulation

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▶ With or without portion completion  
→ currently only with GEA OptiScan 600

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▶ Variable slice count regulation  
→ only with GEA OptiScan 600

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# Highlights

**Craftsmanship  
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## WE CARE ABOUT ...

- Variable or fixed slice count by fixed weight
- Full portion control by minimum endpiece length
- Minimum on empty packs due to GEA PreDiverger
- Low give-away with high acceptance rate due to x-ray scanning
- Superb slicing quality due to idle cut rotor, stainless steel shearedge and new blade design "high stability"
- 3-lane portioning conveyor for higher output and less idle cuts



Performance

Reliability

Efficiency



**Addressing every need**

**GEA PowerPak**

by Gerd Heuser

**Craftsmanship  
& THE FUTURE  
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# GEA PowerPak

The PowerPak Uni is designed to pack all kinds of food products in Vacuum and MAP or Skin packages. The PowerPak offers highest package quality in combination with high output and low TCO.



# GEA PowerPak

## Key features

- Outstanding flexibility with **GEA PowerChange**. The tooling free dieset changing system for the forming as well as sealing station
- Higher speed and output combined with less energy consumption. The **GEA TiroLabel Plus** the latest innovation when it comes to labelling technology.
- 100 % certainty because every pack is inspected for O<sub>2</sub> content with **GEA OxyCheck**. No packaging material or contents are wasted thanks to non-invasive measurement technique.



# The Challenge...

Leaking packages or wrong residual oxygen contents are one of the major concerns for any company involved in Modified Atmosphere Packaging.





# Random Sampling – The Costs

## Test of 84.000 Packages per year means:

### Costs Manual Sampling

*Costs per package incl. content (100g):*

2,00 €

### Costs (1):

180.040 €

Scenario cost per „recal“ of all packages produced between quality checks

*Assumptions: Check every 30 minutes. Occurs 5 times a year*

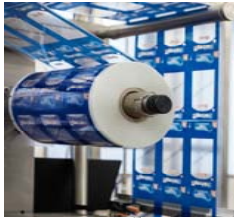
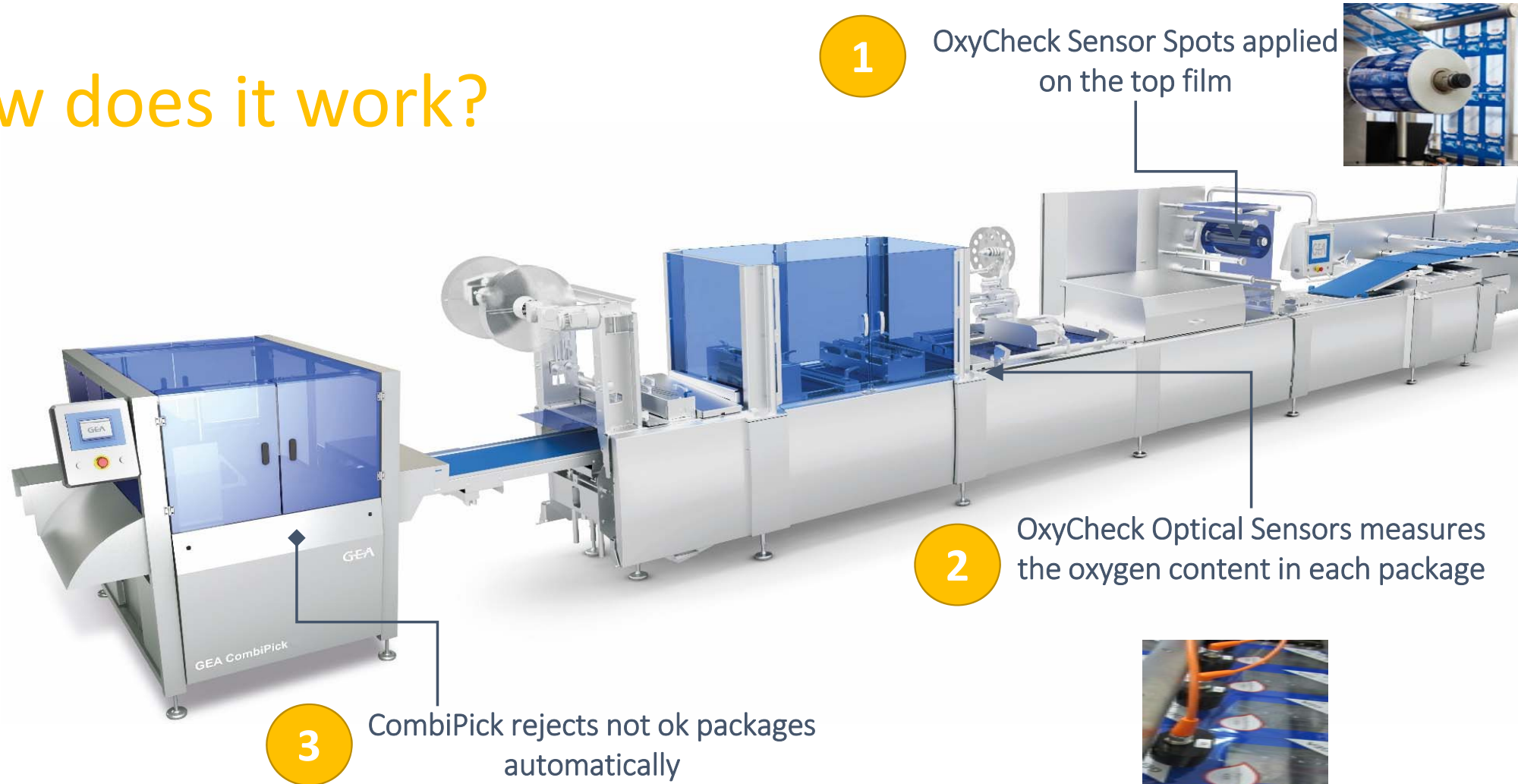
### Costs (2):

30.900 €

### Total costs (1) + (2):

211.000 €

# How does it work?



# Performance Data

- Measuring range (O<sub>2</sub> residual): 0.01 Vol% - 2.00 Vol%
- Tolerance: +/- 0.1 %
- Measuring time per spot: approx. 5 ms



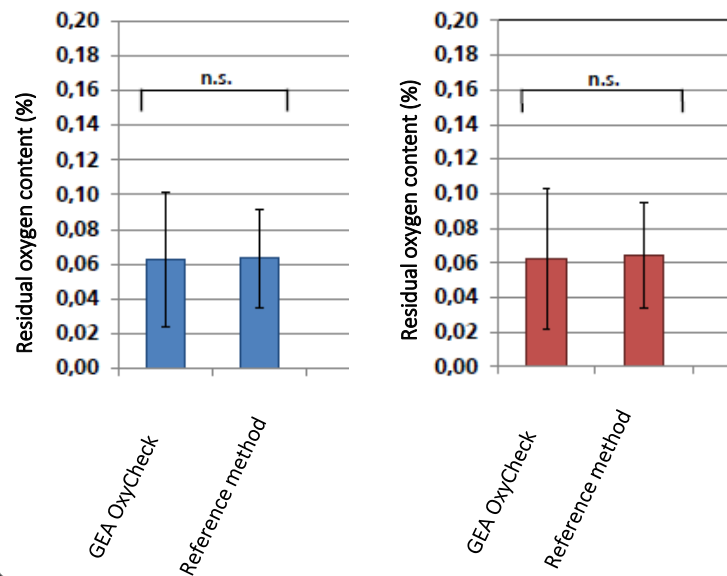


# GEA OxyCheck – The Key Benefits

- 100 % certainty because every pack is inspected for O<sub>2</sub> content
- No packaging material or contents are wasted thanks to non-invasive measurement technique
- Fast and efficient thanks to being an in-line automated process
- No time wasted for tracing when an out-of-specification pack first occurred
- Significantly reduced risk that an out-of-specification pack leaves food processors plant
- Protect significantly from recalls (costs could exceed 300 kEUR per case), brand damage and the risks of fines associated with incorrect residual oxygen contents or leaking packages



# Verification Fraunhofer Institut IVV, Germany



- Very high accuracy
- Accuracy higher than the guaranteed tolerance of +/- 0,1 %
- Very fast system
- No significant differences in comparison with other methods

# GEA OxyCheck – News



With GEA OxyCheck produced packages are already available in supermarkets

# Summary

by Willem Poos



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# Main benefits GEA Bacon line

- Accurate injection levels with GEA Multijector
- Clean Label with Vaessen-Schoemaker
- More efficient “smoke process” with GEA CookStar
- Balanced freezing with GEA CALLIFREEZE®
- Full portion control with GEA DualSlicer
- Highest package quality in combination with high output and low TCO

