

There is more to shelf life than  
pasteurization.

*SANOVO WAVE TECHNOLOGY, the ultimate pasteurization solution*

## SHELF LIFE:



- Local Regulation;
- Supplementary Restrictions;
- Bacteriological Limits;
- Guidelines (ex. Incubation Time);
- Percentage of admissibility;

## SHELF LIFE:



### **OBLIGATORY ASPECTS:**

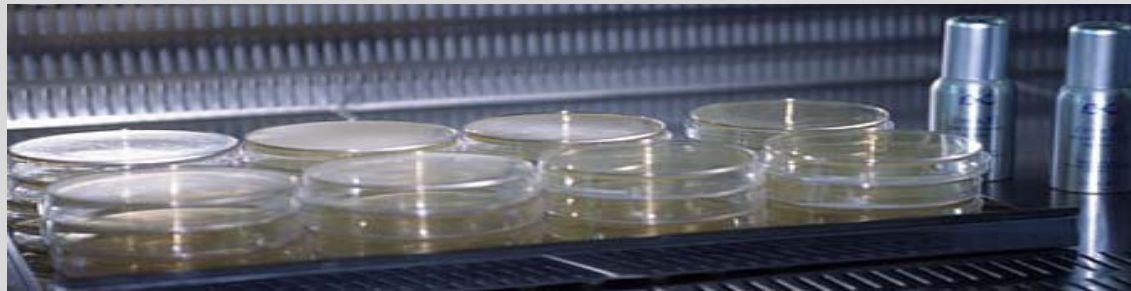
Parameters that the product must fulfill in accordance with local regulations (ex. Bacteriological limits).



### **OPTIONAL ASPECTS:**

Rules that companies set themselves to ensure production of a safe and good product (ex. Degradation Phenomena).

## BACTERIOLOGICAL LIMITS:

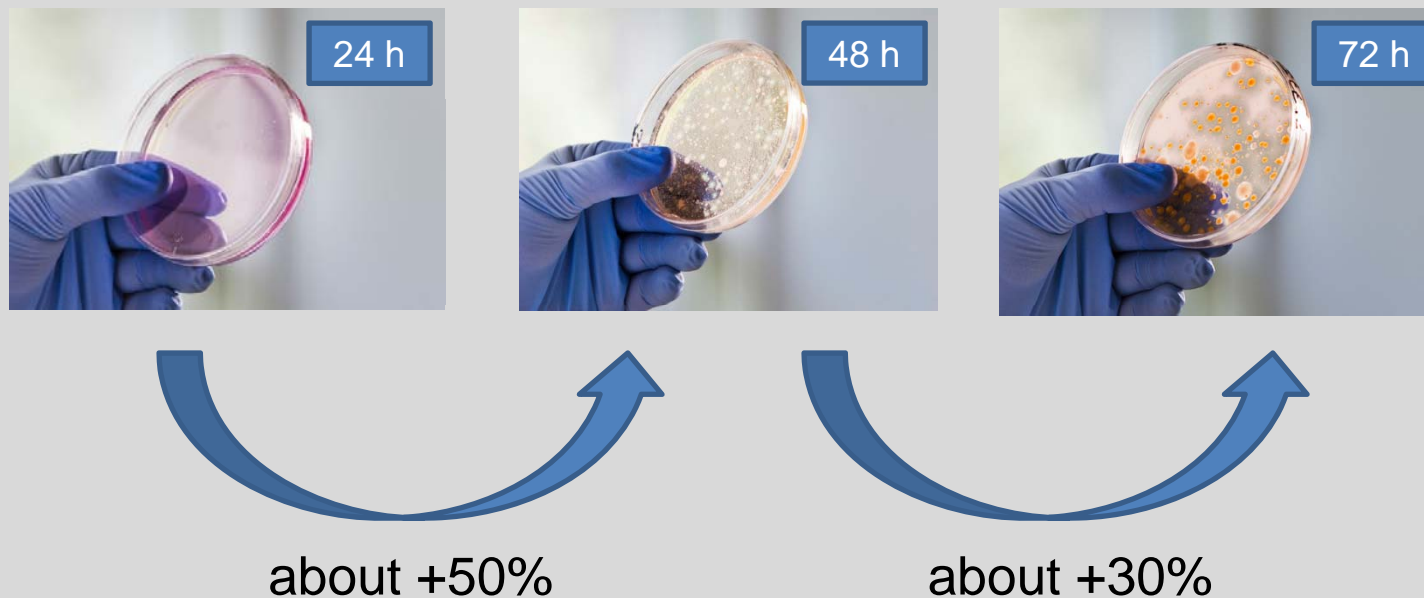


Mesophilic Aerobic Bacteria	< 100.000 UFC/g
Enterobacteriaceae	< 100 UFC/g
Staphylococcus Aureus	absence/g
Salmonella	absence/25g
Listeria Monocytogenes	absence/25g

It is important to define the admissible limits.

## GUIDELINES:

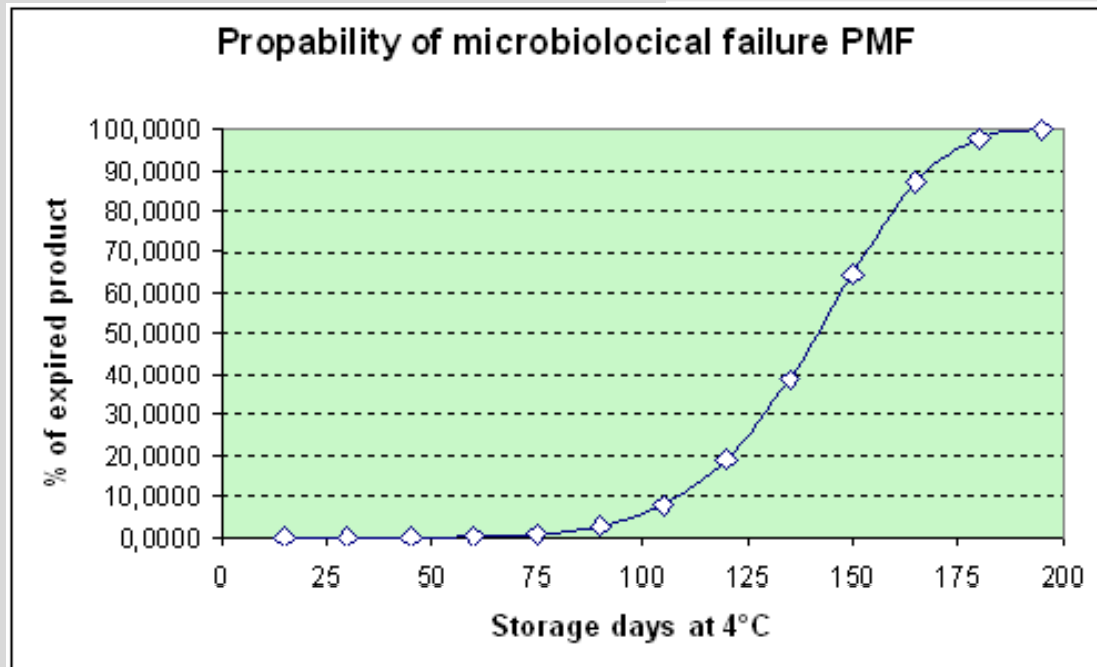
When looking at “bacterial counts” it is necessary to specify the guidelines taken as reference to define the measurement methods, admitted precision and repetitiveness (ex. ISO 4833 in Europe).



# Percentage of admissibility :



Storage days at 4°C	PMF%
15	0,0000
30	0,0011
➡ 45	0,0195
➡ 60	0,1513
75	0,7400
90	2,6840
105	7,8360
120	19,0470
135	38,6780
150	64,5130
165	87,0360
180	97,7575
195	99,8790



**0,0195% - 0,1513% = 0,13% ➡ 2 weeks more**

## Parameters that can influence the Shelf Life In Egg Processing Operations:



- Raw product Quality;
- Hygienic breaking conditions;
- Filtering, cooling, storage;
- Pasteurization;
- Filling machine and material;

## Raw product quality.



### IN GENERAL:

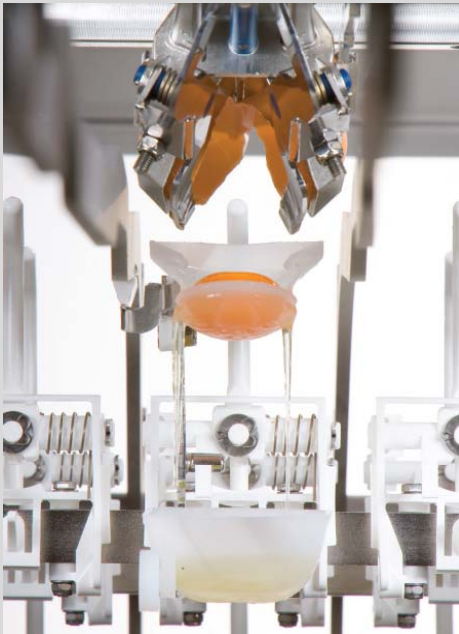
Plant Efficiency = difference between TPC in the raw product and TPC in the final product.

Product	PH	DM	FAT	PROT.	Raw Product TPC	Final Product TPC	LOG Reduction
Whole Egg	7,46	24,18	9,86	12,06	90.000	36	3,40
Whole Egg	7,45	24,20	9,86	12,06	14.500	282	1,71
Whole Egg	7,46	24,18	9,86	12,06	90.000	73	3,09
Whole Egg	7,43	24,31	10,5	12,29	5.143.333	225	4,36
Whole Egg	8,2	24,58	10,27	12,41	8.200.000	78	5,02

Some examples of log reduction in a pasteurization process with the same pasteurization parameters (Temperature and Time);

## High Higenicity

*Treatment of the product during breaking operations.*



After the installation of the new Optibreaker in place of an old machine, the bacteria count was reduced **by one additional log on the PASTEURIZED product** (reduction of Thermo Resistant).

## Filtering - Cooling - Storage



Bacteria	Generation Time @ 4°C	Generation Time @ 10°C
Pseudomonas Fluorescens	10 – 11 hours	2,5 – 3 hours
Listeria Sp	30 – 45 hours	8 – 10 hours
Escherichia Coli	Infinite	5 –19 hours
Staphylococcus Aureus	Infinite	42 – 50 hours

To avoid bacteria growth the product must be kept refrigerated during all production phases, just after breaking till the delivery to final customer.



Coolers after breakers

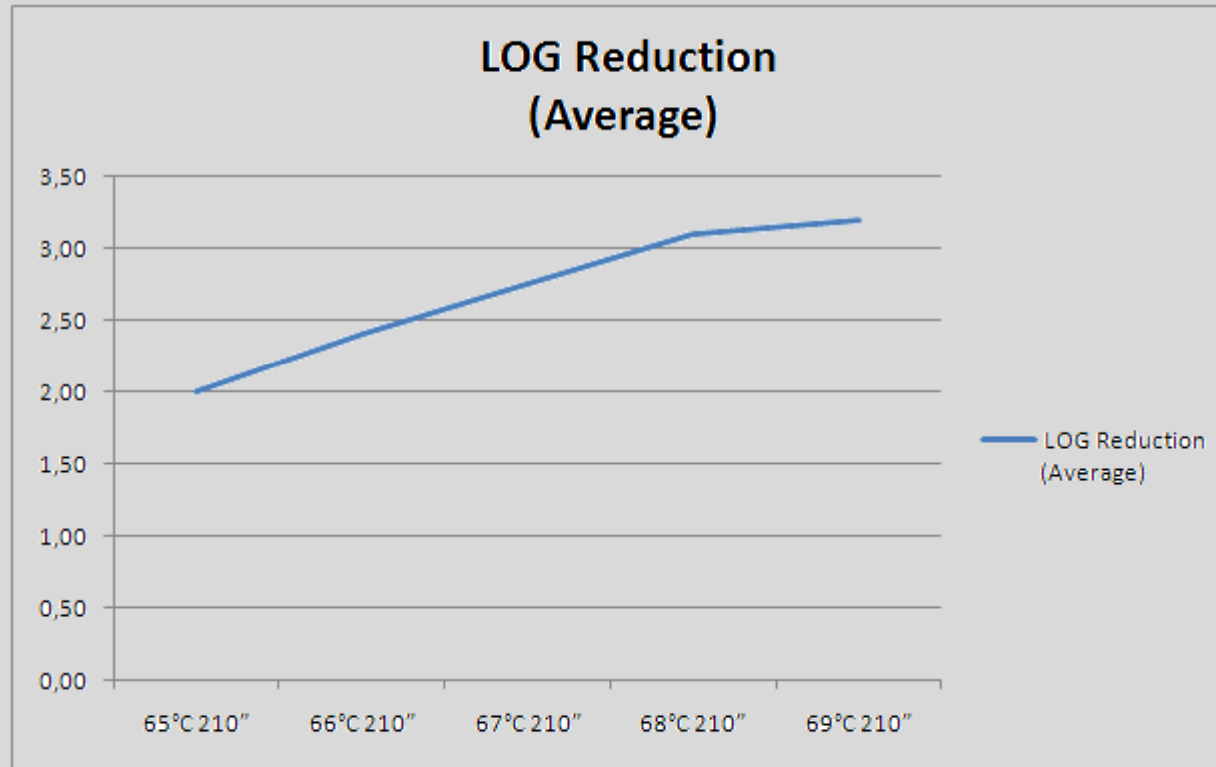


Refrigerated Storage Tanks



Cold Rooms

## Pasteurization effect



The **log reduction** is the result of the combination of the pasteurization temperature and the exposure time.

The higher the pasteurization temperature the higher is the LOG reduction.

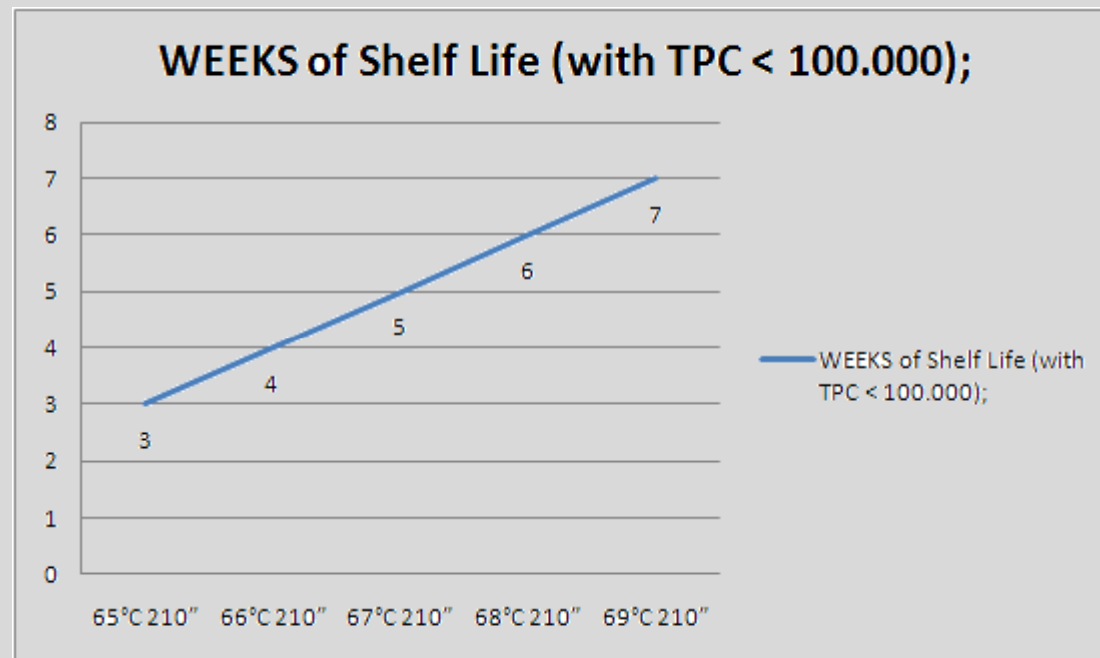
*Note: The graph shows the average of the results achieved on a large number of tests on different pasteurizers.*

## Filling



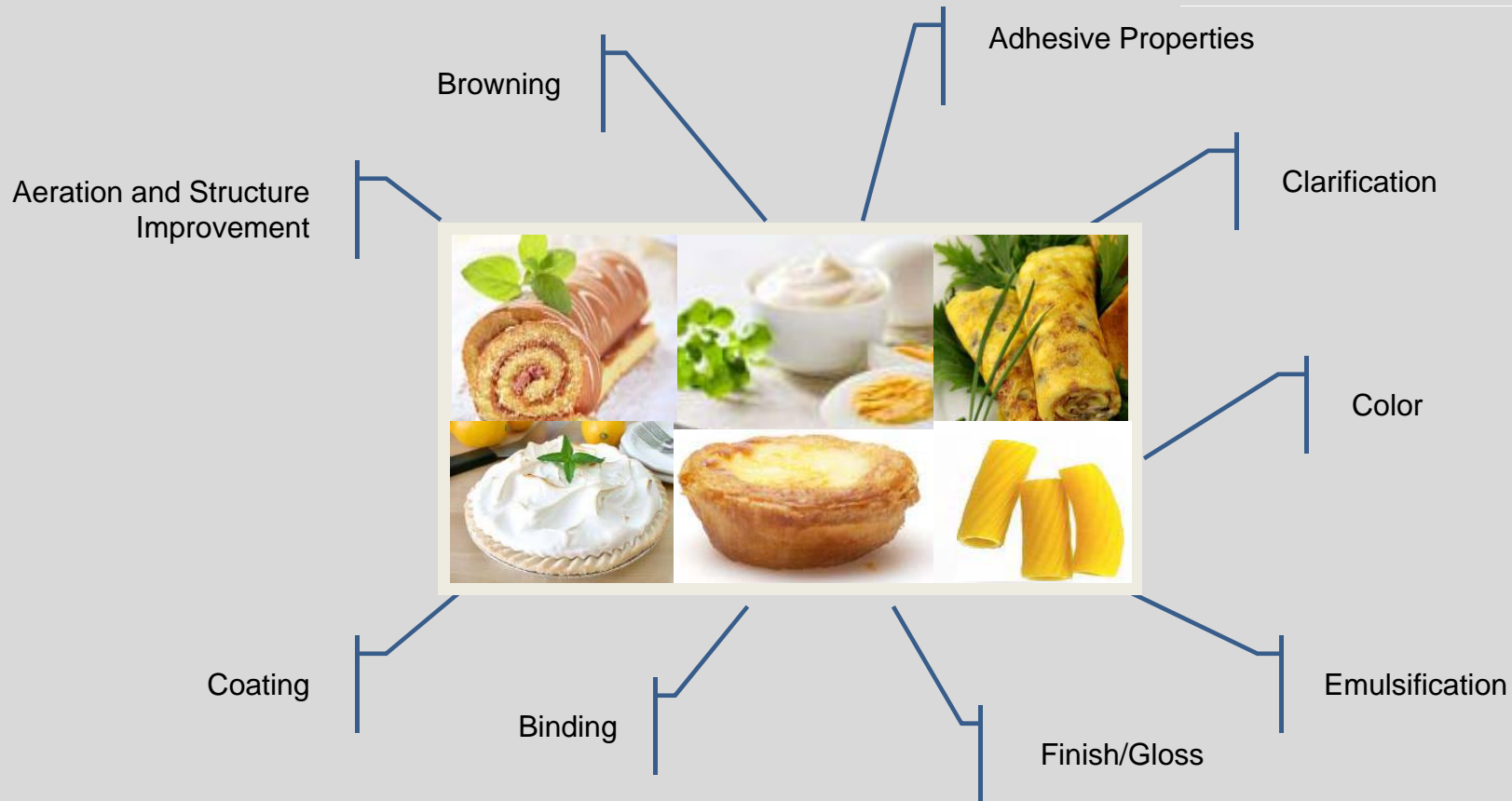
The type of filling (machine and material) plays an important role on the definition of the shelf life of a product.

## Shelf Life



Shelf Life tightly connected to temperature and exposure time.

# Functional Properties



## Functional Properties:

*bad effect of pasteurization.*

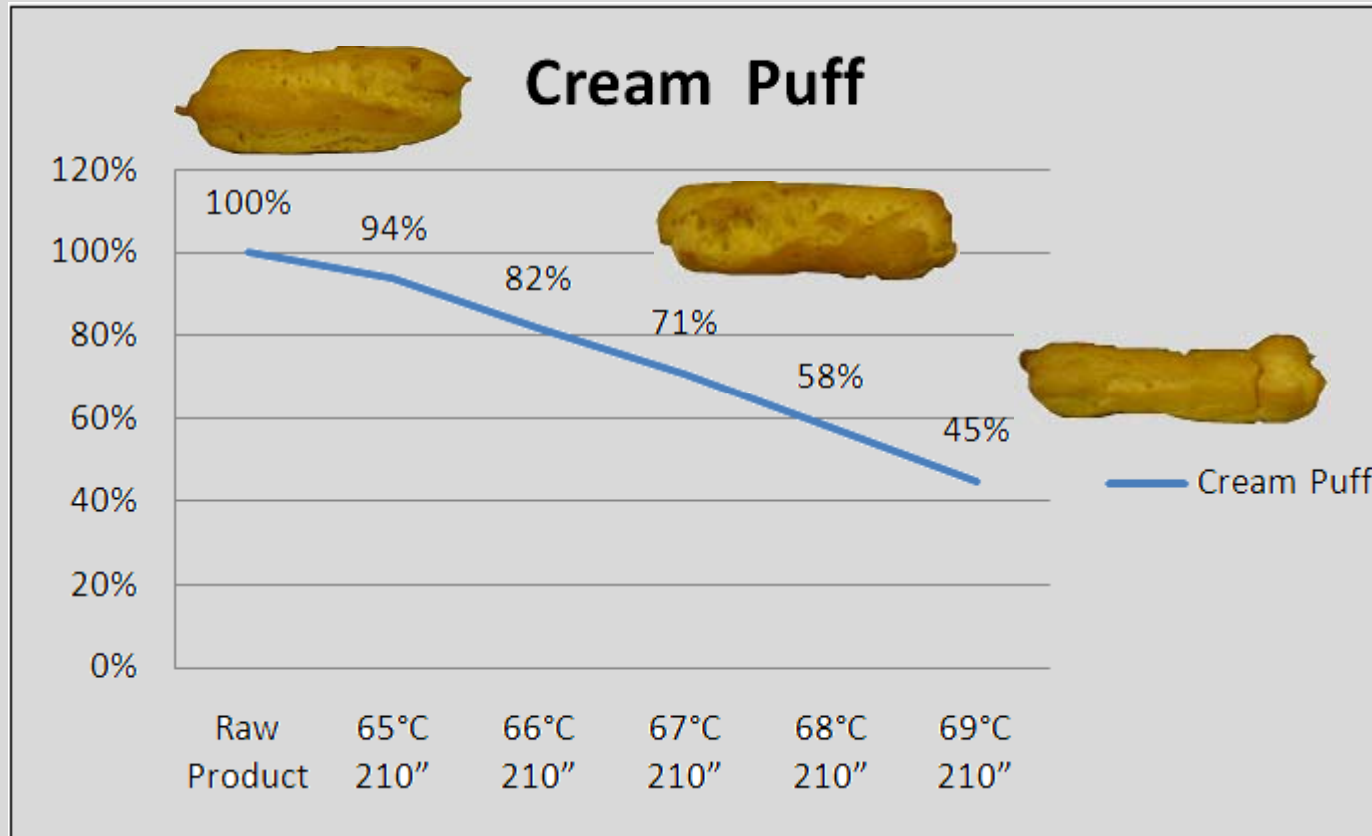


- High temperature
- Long holding time
- Stress
  - Homogenization
  - Mechanical Shock
  - Etc

The preparation of Sponge Cakes and Cream Puffs is a very good index of the protein denaturizing.

## Functional Properties:

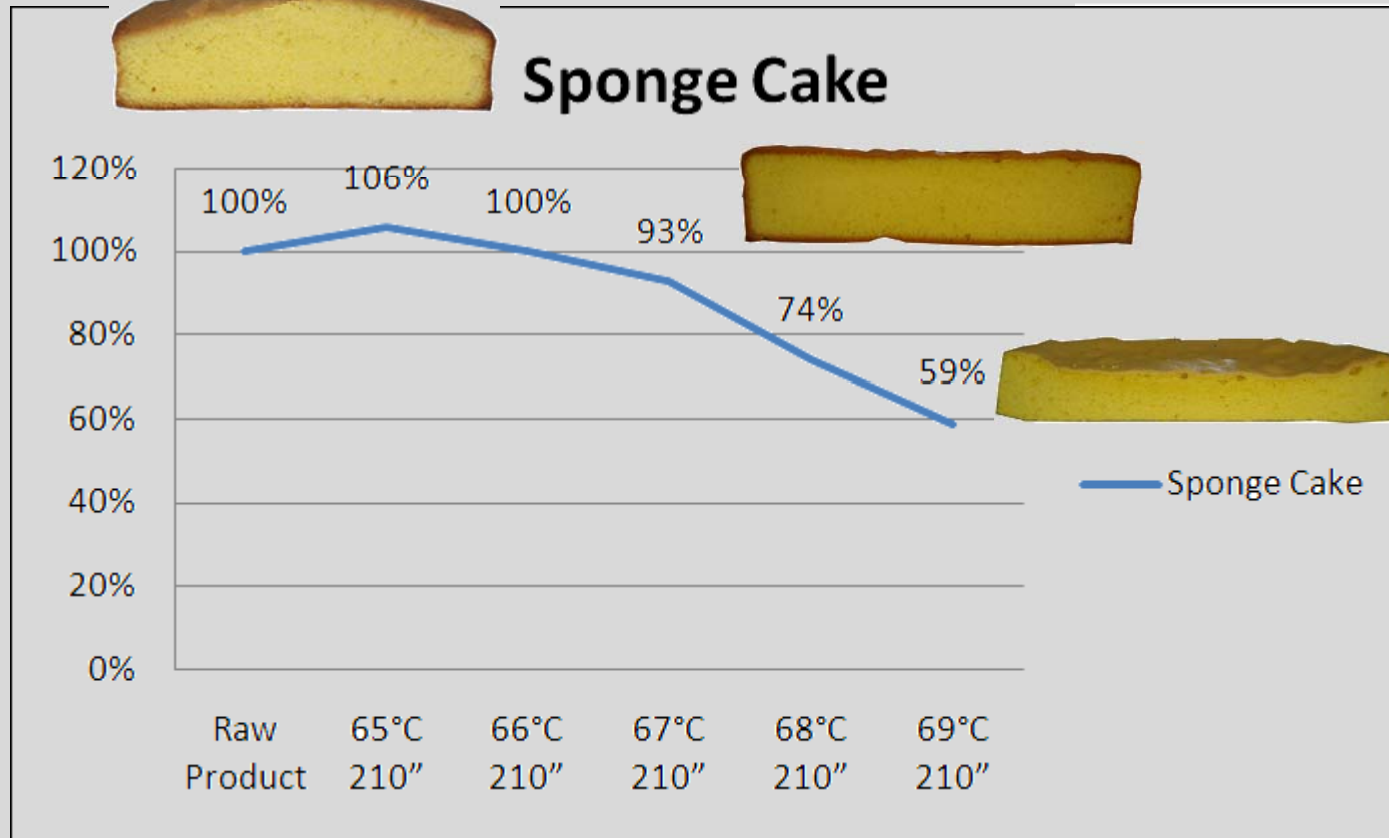
*Effect of pasteurization.*



Pasteurization temperature influences the functional property of the product. In the diagram the effect of pasteurization of liquid whole egg on the preparation of Cream Puffs .

# Functional Properties:

Effect of pasteurization.



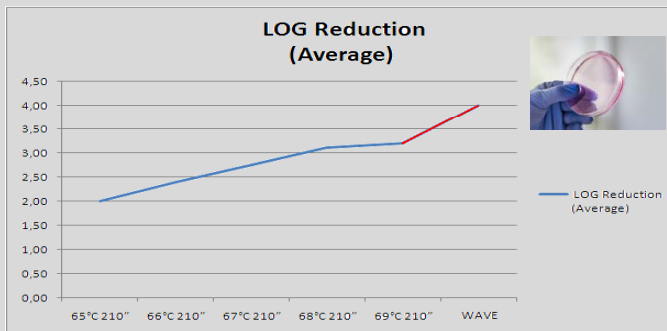
.....and Sponge Cakes.

**SANOVO WAVE Technology**

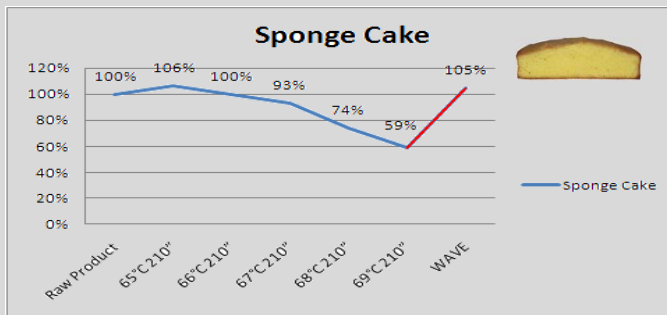


The best compromise between ESL and Product Quality:  
**THE SANOVO WAVE TECHNOLOGY**

# SANOVO WAVE Technology

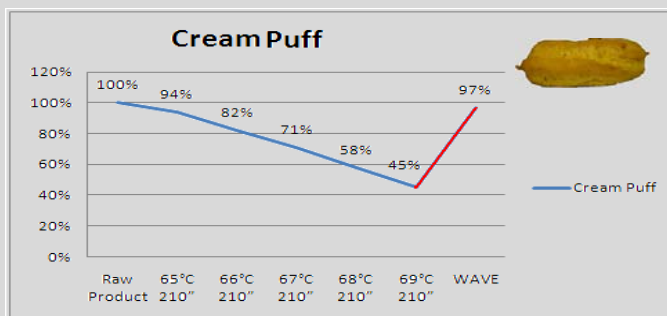


**1 Log** more compared with the traditional pasteurizers.



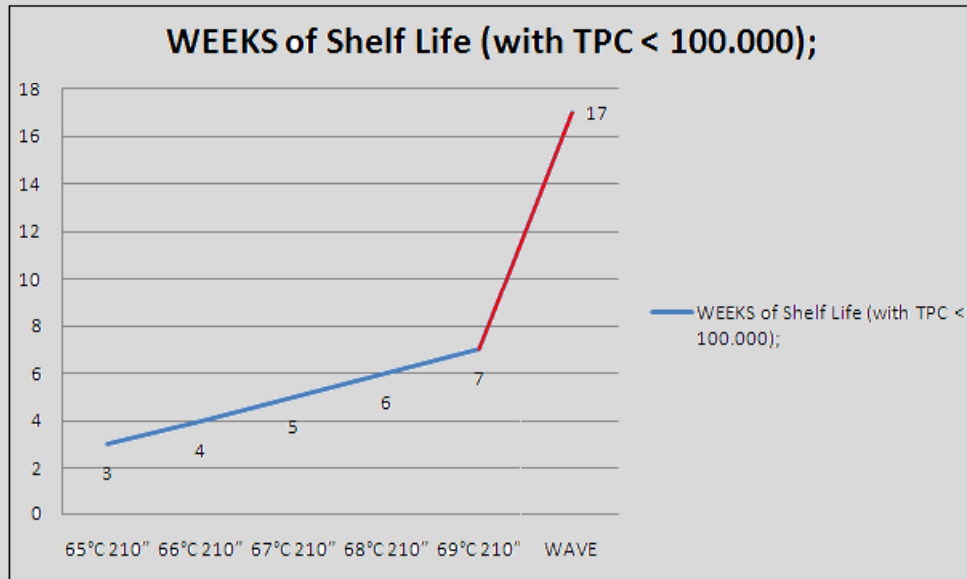
The functional property are comparable with the **raw product**.

For Sponge Cake.....



.....and for Cream Puff.

# Shelf Life Tests Results

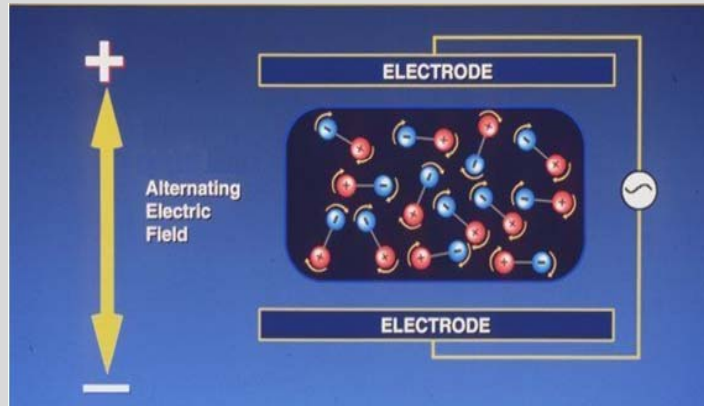


**NOT aseptic line!!!**

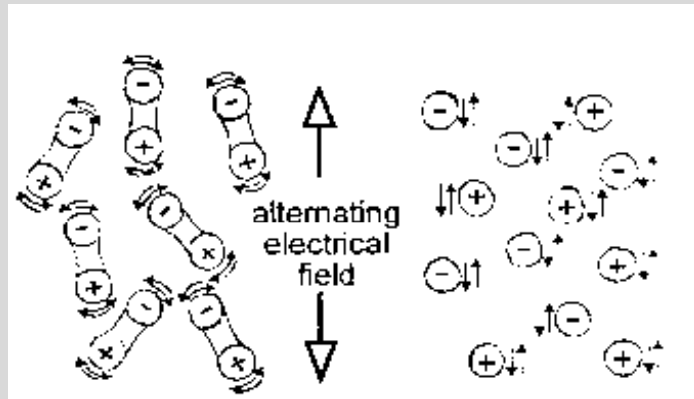
An incredible result with Shelf Life:  
**17 Weeks with not Aseptic (or ultra cleaning) equipment.**

\* Wave Technology – product was removed from storage after 17 weeks, as the quality was still equal to fresh product

## Operation Principle.



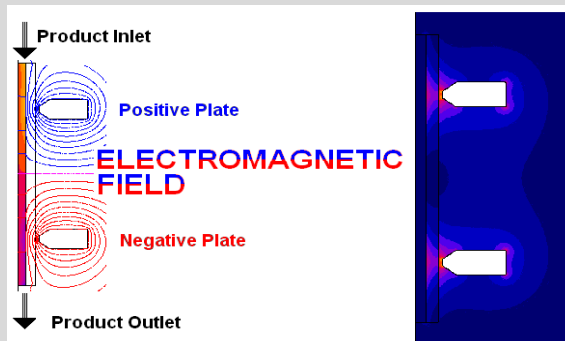
The product flows through a pipe which is not in contact with any heating system, but it is heated by electromagnetic waves.



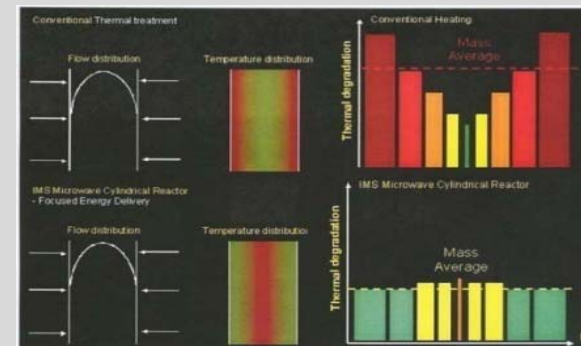
The continuous inversion of the molecules and the continuous migration of the ions cause heating of the product.

Inversion of the electric polarity 27.000.000 times per second (27,12MHz).

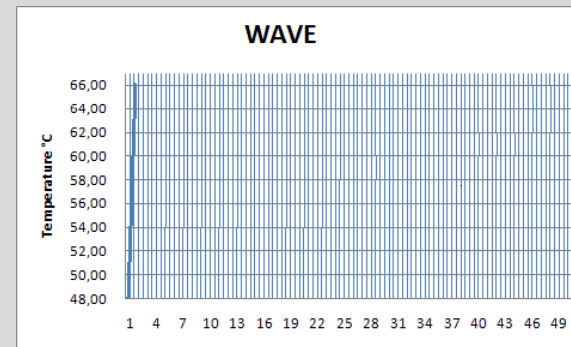
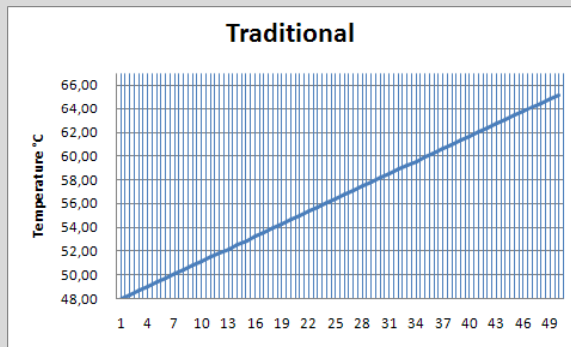
# SANOVO WAVE Technology



No contact with the product.



Uniform Heating



Instantaneous Heating: (we can more than 50°C in a fraction of a second)

THANK YOU FOR YOUR ATTENTION.

WE WELCOME YOU TO VISIT OUR STAND AT DO96 IN HALL 7

