

WP2 Reduction of fat and sodium in cooked and dry-fermented sausages

Summary





- Develop production procedures for nutritionally improved cooked and dry fermented sausages while:
 - maintaining sensory perception and consumer acceptance of the original products
 - &
 - ensure food safety and quality
- Reduction goal - cooked sausages:
 - 50% reduction in sodium and fat content
- Reduction goal - dry fermented sausages:
 - 30% reduction in sodium and 60% reduction in fat content

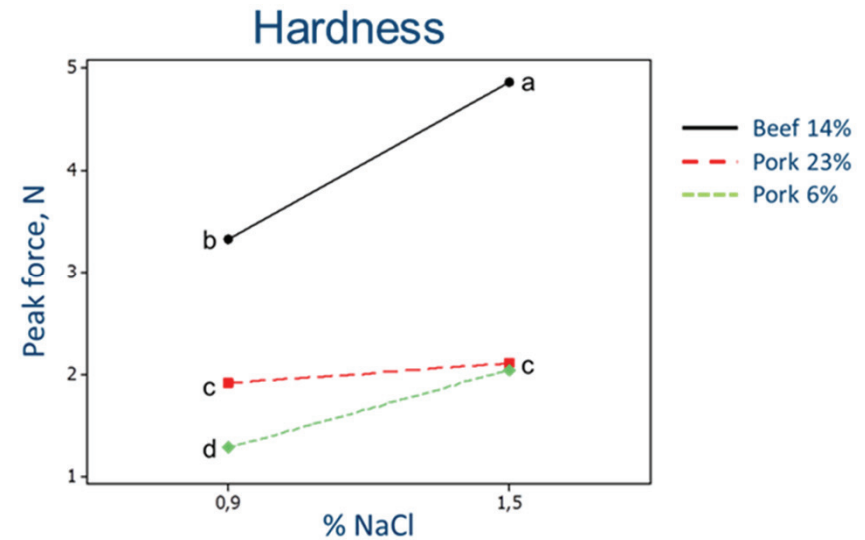
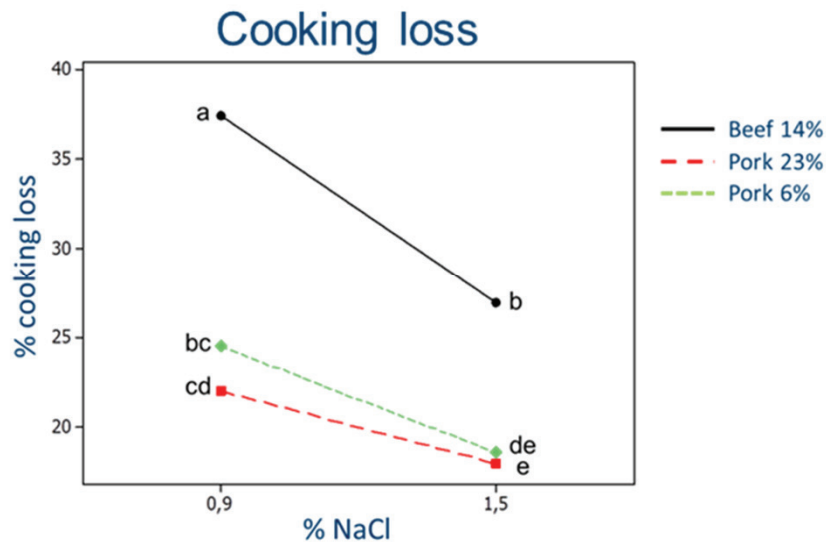
Initial phase: evaluate effects of different variables

- Meat raw materials:
 - Pork 23 % fat
 - Pork 6 % fat
 - Beef 14 % fat
- Pre-salting (1 % NaCl):
 - None
 - 2 days
- Salt concentration:
 - 0.9 % NaCl
 - 1.5 % NaCl
- Emulsions



Functional properties:

Salt < 1% unacceptable texture
 Beef gave higher cooking loss and increased hardness compared with pork



Second phase, pilot study:

- **Mixed design:**

- Salt

- 1.0% NaCl
- 1.3% NaCl
- 1.6% NaCl
- 1.8% NaCl

- Fat

- 0.9%
- 1.2%
- 1.6%
- 1.8%

- Emulsion

- Pre-rigor salting

Sensory evaluation:

Lowest level of fat and salt were discarded

The assessors were not consistent when comparing with Standard sausage

No effect of pri-rigor salting

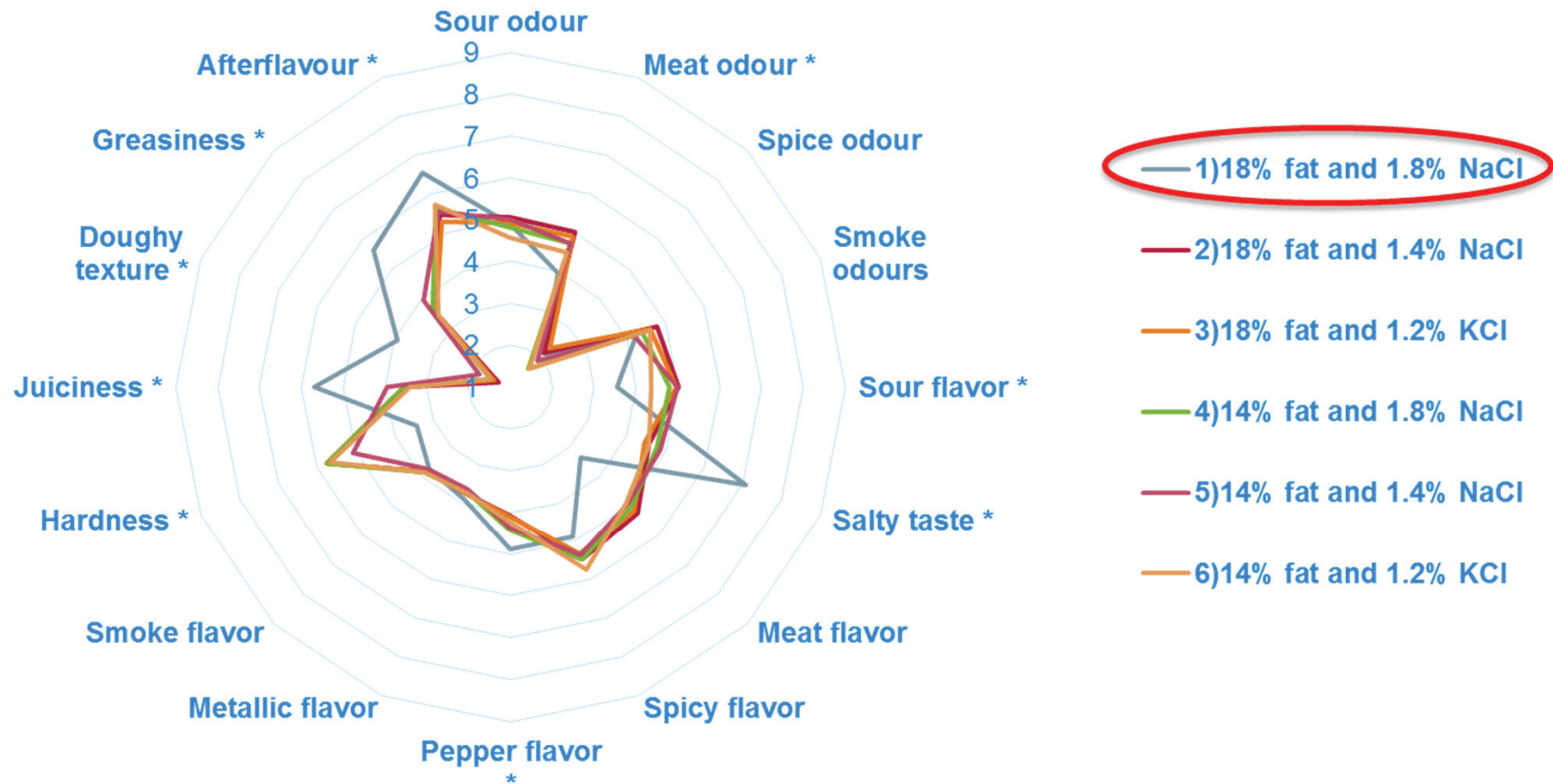
Third phase: Pilot production, full scale

- 2 levels of fat
 - 3 levels of sodium
- } Batter size 200kg

- 1) 18% fat, 2.2% NaCl (Standard product)
- 2) 18% fat, 1.4% NaCl + 0.4% KCl
- 3) 18% fat, 1.2% NaCl + 0.6% KCl
- 4) 14% fat, 1.8% NaCl
- 5) 14% fat, 1.4% NaCl + 0.4% KCl
- 6) 14% fat, 1.2% NaCl + 0.6% KCl

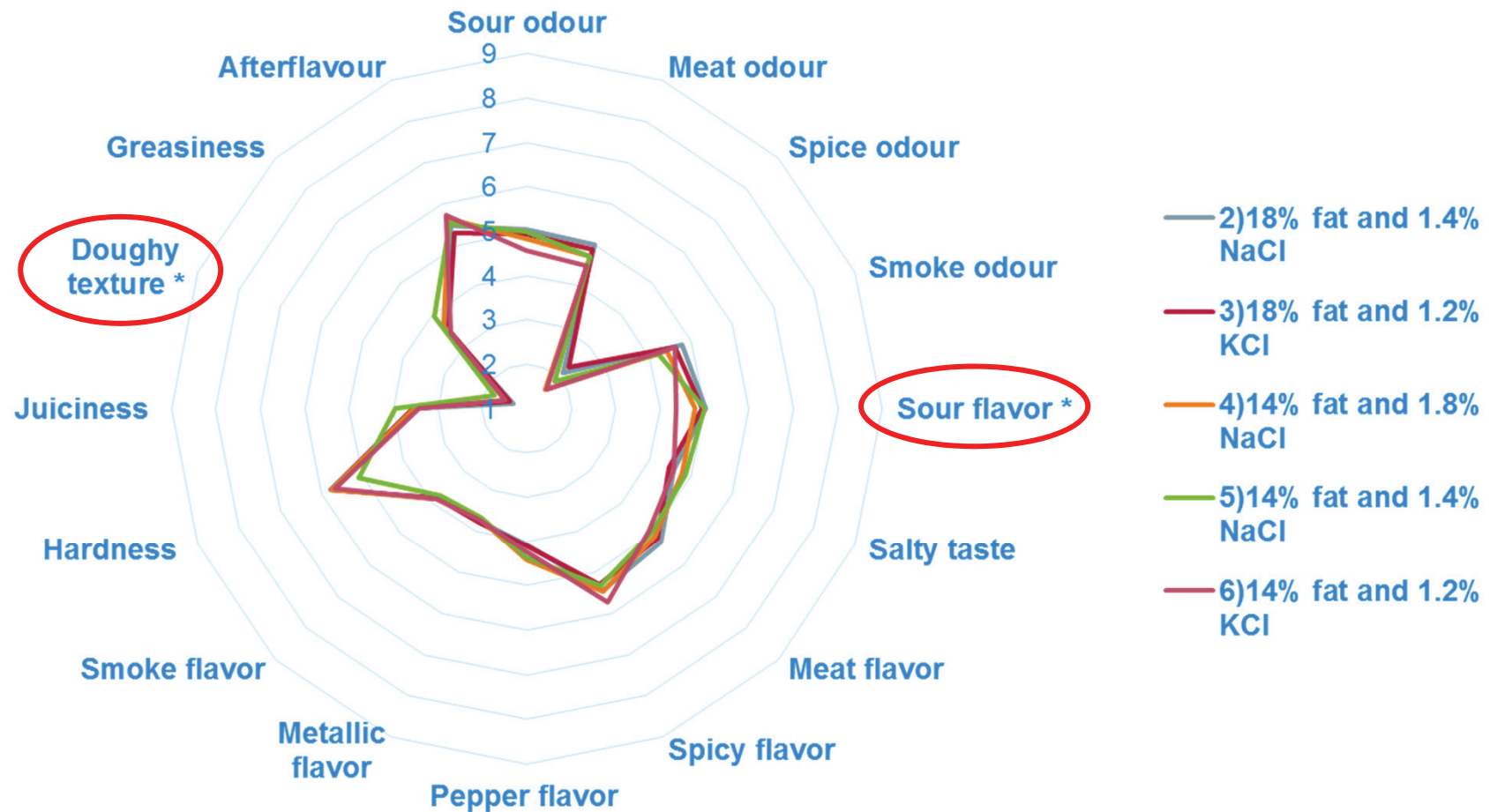


Sensory analysis, 6 different recipes





Sensory analysis, 5 recipes



Conclusion cooked sausages:

- There are no technical problems to make sausages with 50% reduction in fat and sodium. However, it is questionable whether consumers will buy them.
- We have achieved a decrease in fat by 22% and sodium by 45% without reducing sensory or functional quality significantly
- A reduction by 50% seems not economical feasible

Objective:

- 60% reduction in fat content - saturated fatty acids (SFA)
- 30% reduction in sodium



snacks of fuet



chorizo extra

Labeling has been a driving force

- To obtain the claims «reduce in salt» and «reduce in fat» according to the regulation (EC) N°1924/2006 :

- -25% of salt
 - -30% of SFA
- } compared to reference nutritional composition in salt and SFA of similar products representative to Spain market



- **Part I : Industrial Technological tests at pilot scale before ADIV tests**

- Test of strategies to select the most suitable fat emulsions
- Test of salt reduction using KCl and fat reduction using lean meat



- **Part II : Technological tests at pilot scale**

- **Reduction of salt content by 30%** compared to Spanish current products by applying 3 strategies :
 - Partially substitution of NaCl by KCl and masking the bitter tastes by yeast extracts addition as flavour enhancers
 - Using of dried meat as dehydrated pork meat powder
 - Sausage pre-drying at low temperature
- **Reduction of SFA content by 60%** compared to Spanish current products by applying 3 strategies :
 - Producing lean products
 - Addition of vegetable oil and fibre
 - Using of fat emulsions (pork fat and/or oil / water / animal protein)

- **Part III : Industrial technological tests and sensory product quality and consumer acceptance**

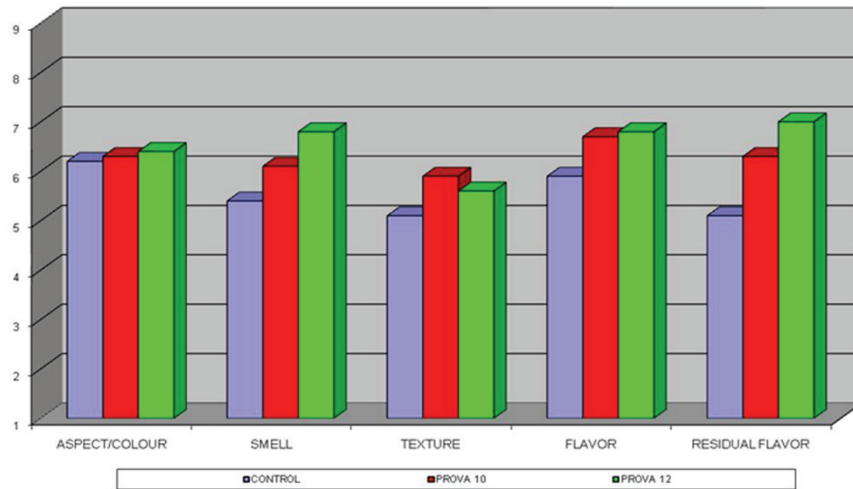
- **Part IV : Challenge test**

- assess microbial status of the best technological strategies of combined salt and fat reduction defined for snacks fuet. The safety of products and process was thus validated.

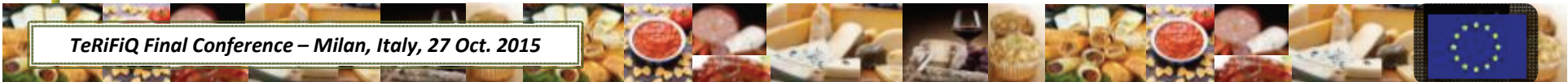
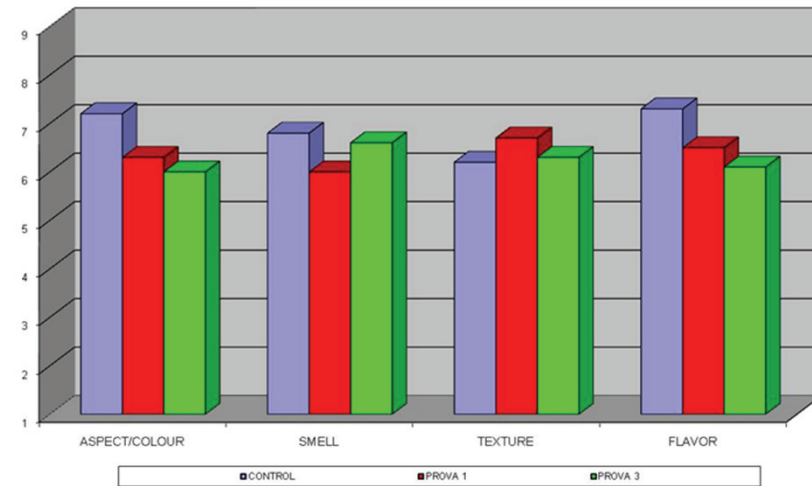


- Part III, sensory test, industrial scale, in Spain
 - Trained sensory assessors

Snack of fuet



Chorizo

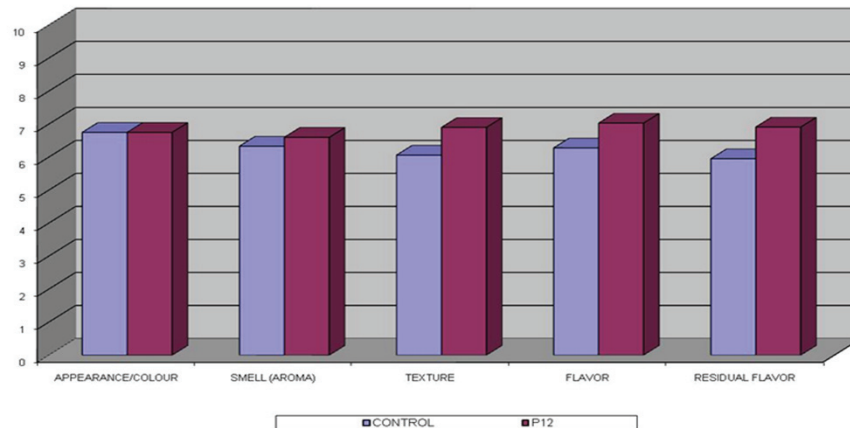




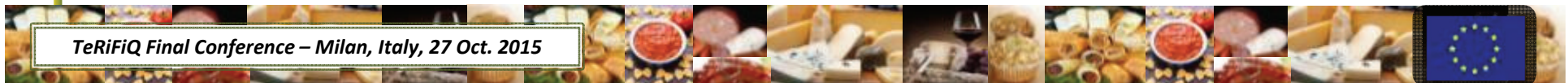
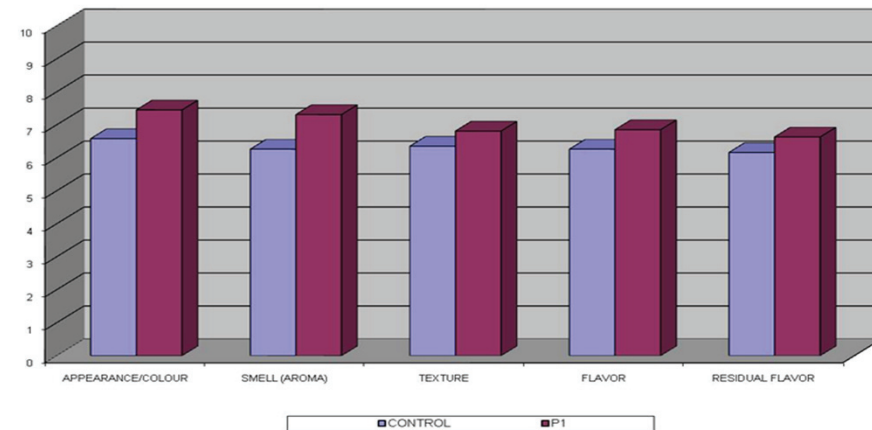
- Evaluation by 100 consumers
 - 49% male
 - 51% female
 - between 18 and 65 years

- 99% of consumers affirm that they would buy the reduced snack fuet
- 89% of consumers affirm that they would buy the reduced chorizo

Snack of fuet



Chorizo

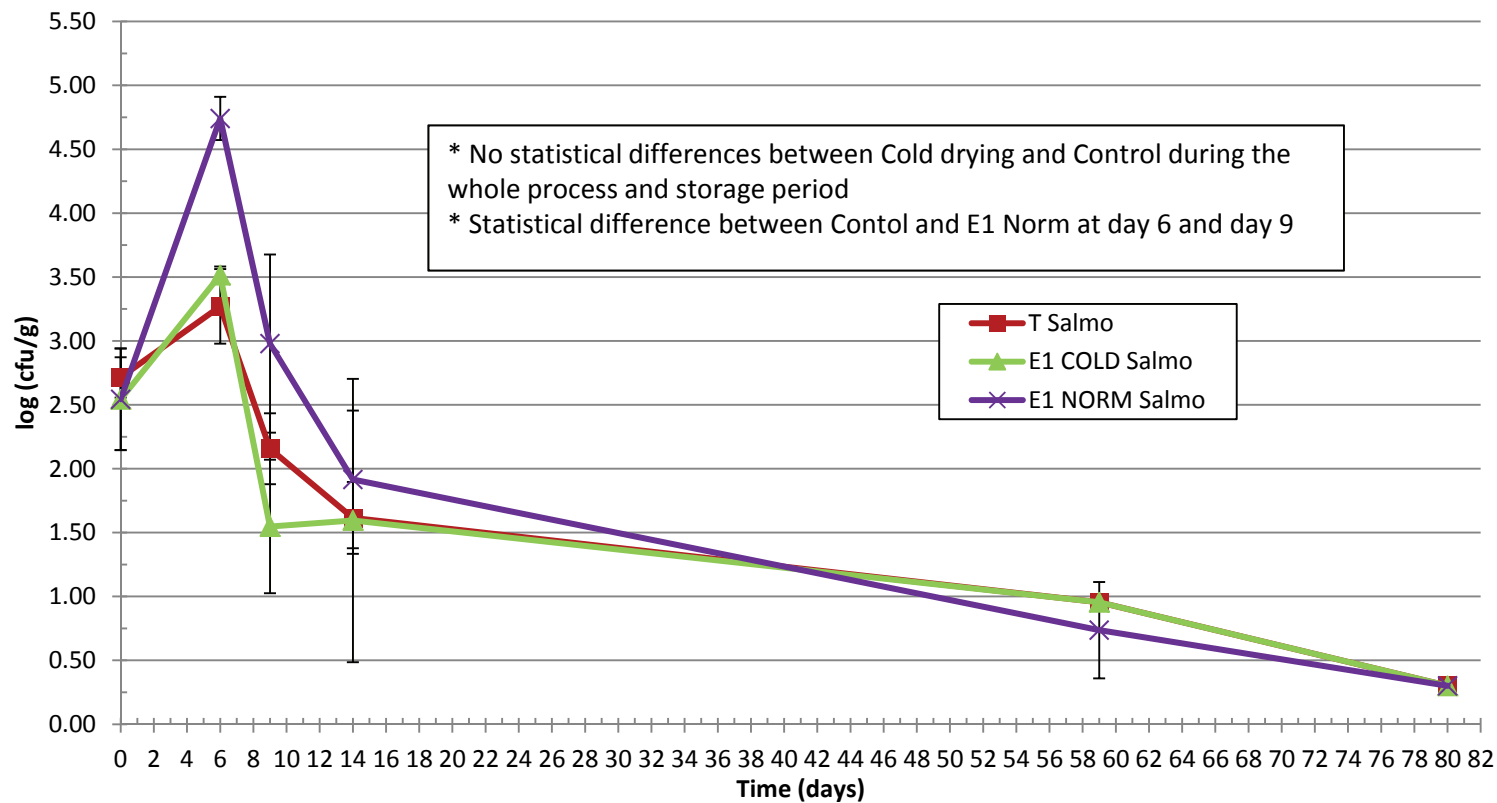


- Challenge test Snack of fuet, for bacterial control
- 3 different processes

Products	Tests
Snacks fuet	T : Control
	E1 Norm : 40% salt substitution by KCl + Sunflower oil + fibers+ Yeast extract addition
	E1 cold : Cold predrying + 40% salt substitution by KCl + Sunflower oil + fibers+ Yeast extract addition

- Salmonella evolution during ripening process

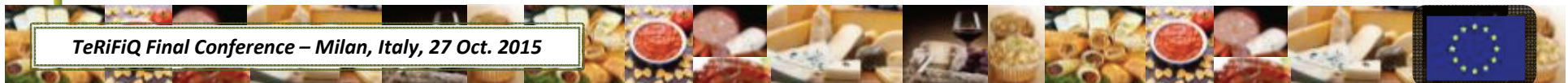
➔ Benefit of cold pre-drying to manage pathogen germ



Conclusions snacks of fuet industrial scale

- ✓ More than 70% reduction in saturated fatty acids (SFA) and more than 35% in sodium could be achieved
- ✓ Sensorial attributes are very close to control on every criteria. Characteristic taste of snacks of fuet is achieved
- ✓ With the pre-dried process at low temperature we have efficient microbial results because the pH is lower than control
- ✓ Yield of “reduced product” at industrial scale was a little bit lower than control, however it could be concluded that reduced products at industrial scale are affordable

New products in the market developed in TeRiFiQ project



- **Conclusions:**
 - Great reduction in salt and fat for new sausage products.
 - Mission accomplished!