

TeRiFiQ

Project no. 289397

Combining **T**echnologies to achieve significant binary **R**eductions in Sodium, **F**at and Sugar content in everyday foods whilst optimizing their nutritional **Q**uality

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Deliverable D6.1

Report on the industrial implementation of the reformulated cheese products and recommendations for industry

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Lead contractor/partner for this deliverable: ACTALIA

Contributors: ACTALIA, ORVAL, HERVE

Dissemination level	
PU Public (must be available on the website)	x
PP Restricted to other programme participants (including the Commission Services)	
RE Restricted to a group specified by the consortium (including the Commission Services)	
CO Confidential, only for members of the consortium (including the Commission Services)	



Table of Contents

1. Summary	3
1.1 Objectives of the deliverable	3
1.2 Main results obtained.....	3
2. Introduction	3
3. Results and Discussion	3
3.1 ACTALIA results.....	3
3.2 ORVAL results.....	4
3.3 HERVE results	4
3.4 Communication for cheese makers.....	6
4. Conclusion	7

1. Summary

1.1 Objectives of the deliverable

The deliverable has for objective the industrial implementation of the reformulated cheese products and recommendations for industry. The report outlines the conclusion of the demonstration phase including any constraints (technical, economical) the reformulation may bring about.

1.2 Main results obtained

We observed that low salt (-30% NaCl) Camembert and Emmental cheese types are on the market and seem to be appreciated by consumers, even if the price is higher than classical types. Orval proposed a version of the Trappist “Veil Or” (long ripening) with 20% reduced salt content or -15% reduced salt normal Trappiste (normal ripening). As we suspected according to WP1 results the 20-30% salt reduction is possible for Soft and Semi-Hard cheese if the modification of texture and aroma are accepted by the consumer.

On the contrary, the defects of low salt Bou D’Fagne cheeses (soft cheese with smear) made by Herve are too important to be overcome.

2. Introduction

In WP1, the partners produced with a good success (composition, sensory quality) soft and semi-hard experimental low salt (-30% NaCl) cheeses. The butyric defect in Trappiste cheeses was overcome by the use of lysozyme. Important defects on the contrary were noticed on low salt experimental Bou d’Fagne cheese (soft cheese with smear).

3. Results and Discussion

3.1 ACTALIA results

As ACTALIA demonstrated in WP1 that cheese types like Brie (soft cheese with mould) and Raclette (Semi-hard cheese) can be made with limited technology, composition and quality modifications, ACTALIA observed the cheese types which are present in supermarkets. In France and Belgium, low salt cheeses are between -25 and -30%.

Observations on: low salt cheese exposition, cheese quality, cheese price were carried in out by a marketing specialist in 112 supermarkets was carried out by experimented cheese engineers who were able to describe the quality of cheese (overall quality, colour, taste) as experts.

Low salt (25/30%) Camembert, Emmental, Feta were present in all stores except 2 smaller. Low salt cheeses were all of very good quality (sometimes whiter and less tasty). The cheese prices were higher by 30% (mean) than normal cheeses, with most results between 0 and +40%.

As a conclusion, it can be said that low salt hard, semi-hard and soft cheese with mould are present on the market with a good quality and higher price than normal versions. Low-salt (-25/-30%) cheese are a good opportunity for companies.

3.2 ORVAL results

In WP1 ORVAL made good “Vieil Or” Trappist cheeses at a reduced salt level of 20 % by using a shorter brining time. These cheeses are produced at a commercial level. The addition of lysozyme allowed to overcome the butyric defect in winter (cheese blowing, bad taste, undesirable opening due to *Clostridium tyrobutyricum*). This as the only difference between normal cheese and reduced salt cheese.

Two different consumer tests were achieved for young and for old cheeses with a panel of 103 persons. The consumers were asked for liking and purchase intent. These tests were done in Brussel by Meurice Institute.

The purchase intent for young cheese is 85 % against 75 % for the salt reduced cheese

Many consumers spontaneously prefer traditional cheese with no modification of composition. The salt reduced cheese is less appreciated for taste, texture and after-taste.

Even if the reduced cheese has significant differences in appreciation with the classic cheese, its average rating remain generally located between “rather pleases me” and “I like”.

For old cheese the purchase intention is 77% for the classic “Vieil or” versus 69 % for the reduced old cheese. But the difference after 5 month is not significant. Only the texture and elasticity is better for classic cheese.

Industrial applicability

Orval has chosen to reduce 20 % of the salt content in the (old) “Vieil Or”. This product is a small part of the Orval production. The Vieil Or is sold only in the Abbey store.

For the young Orval Trappist cheese that represent 94 % of the production, the salt content was reduced from 2 %, at the beginning of the study, to 1.7 %. The reduction is 15%. This reduction was made naturally last year after a change in the production process. We don't see the impact of this reduction on the cheese sales. The increase on the production of Orval cheese in 2015 will be 6 % as the last five years.

After this study, the cheese factory of Orvall does not wish to reduce more than 15 % on young Trappist cheese because the cheesemakers believe that the product will be less appreciated.

For Orval, the intent of this work was not to develop new product because the production cannot actually support big sales and a big increase of the production. Orval worked only the salt reduction on the existing products. The salt reduction is not mentioned on the label. ORVAL team thinks that it was not a marketing argument to sale more cheese but only to prevent the health of our cheese consumers.

3.3 HERVE results

The goal of task 6.1 is to transfer on a plant scale production the reformulated products with lower salt levels, based on the Research and Development carried on in the previous tasks.

HERVE finally used a global concept allowing us to reduce the level of salt on our washed smear Bou D’Fagne cheese. This concept is based on the combined action of a specific mix of lactic bacteria, smear bacteria, ripening ferments and rennet. All together these

ingredients are able to produce a clean lite salt cheese. This formulation gave excellent pilot-scale results.

HERVE transferred the formulation on industrial batches made from 1000L of milk each (about 100kG of cheese). HERVE obviously followed the production and ripening process all along the way. The trick was that a protective flora occupies the smear instead of contaminants appearing because of the low-salt concentration and allows the implantation of the red smear bacteria. Below you can see a picture taken at 2/3rd of the ripening period: cheeses are nice and the coloration process is starting.

This strategy worked very well, the low-salt cheese were clean at the end of the ripening and packaged on time. No additional washing operation was needed.

After several tastings, final results were the following:

- smear is less greasy, a bit dryer
- defect of texture: sand texture (due to the smear)
- defects of taste: important bitterness, bad flavor

These defects are too important and cannot be overcome.

To our opinion, as a conclusion for this task, the level of salt in our products, taking into account realities of our environment constraints, is necessary as a technological factor to maintain a good sanitary level, ecosystem equilibrium and appropriate organoleptic properties. So that the obtained products are not marketable as is.



3.4 Communication for cheese makers

The results for cheese makers are very clear:

- For most of cheese types (soft cheeses with moulds, semi-hard and hard cheese) -30% salt reduction is possible. The composition, taste, texture and aroma modifications must be observed in detail and corrected if necessary. The butyric acid fermentation by *Clostridium tyrobutyricum* must be prevented for hard and semi-hard cheeses. The 30% salt reduction was seen as a good opportunity for the market.
- For soft cheeses with smear (Herve or Maroilles types), the salt reduction seems difficult and risky because of the adverse effect on rind colour.

4. Conclusion

In this part of the study of salt reduction, the partners confirmed the results obtained in the WP1.

- The presence of good low salt cheeses was observed on the market.
- ORVAL decided to market low salt “Viel Or” Trappist.
- HERVE decided that low salt “Bou D’Fagne” cheese making is too risky in terms of quality and will disappoint the consumers.
- ACTALIA, ORVAL and HERVE agreed on a simple advice to cheese makers.