Reducing salt, fat and sugar in everyday foods

Results from TeRiFiQ EU project and opportunities for food industry

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http://www.terifiq.eu
• National, European and World institutions alert that excess intake of salt, lipid, sugar lead to the onset of life-threatening pathologies. For example, sodium-rich diets have been widely demonstrated as promoting hypertension and saturated fats are positively associated with serum cholesterol level.

• Many countries and health organisations have encouraged the food industry to reduce the salt, fat, sugar content and (or) to improve fat quality in processed foods.

• However, these components are multifunctional. Consequently, changes in concentration or by substitution will change many properties of the food such as texture, flavour perception, acceptability, shelf life, safety and nutritional properties.
Many interactions can occur between the flavour stimuli and the food matrix. As example, previous studies showed that saltiness perception was governed by the concentration of sodium present in saliva which varied not only according to salt content but also according to cheese composition, and more precisely lipid/dry matter ratio.

- **Binary reduction**: \( \downarrow (\text{Fat} - \text{Sodium} - \text{Sugar}) \rightarrow \downarrow \text{fat/sodium} & \downarrow \text{fat/sugar} \\
- **Combining technologies** to achieve significant binary reductions in sodium, fat and sugar content in everyday foods whilst optimising their nutritional quality

Scope

• Food categories
  - Fat/sodium in dairy (cheeses), meat (dry and cooked sausages) and sauces (for pizza) products
  - Fat/sugar in bakery (Muffins, madeleines) and sweet cream products
  - Physicochemical and perceptual interactions for these two systems while at the same time ensuring the products’ nutritional and sensorial qualities, safety and affordability for both industry and consumers.

In particular, Terifiq explored promising strategies notably:
Modifying the composition of the food to increase stimuli release in-mouth (development of multiple emulsions),
- Perceptual interactions, mainly taste/aroma to enhance sweetness, saltiness and fat perception by congruent aroma notes.

• SME participation
Total EC subvention: 3 M€ EC contribution including >1 M€ for 11 SMEs partners (35%)
Aims

- TeRiFiQ aims to achieve significant binary reductions in sodium-fat and fat-sugar content of the most frequently consumed food products around Europe whilst at the same time ensuring the products’ nutritional and sensorial qualities, safety and affordability for both industry and consumers.
Approach

- **17 partners** including **11 SMEs** involved at all stages of project

- **Structure of project**
  
  **4 years**: 3 years for reformulated food development / research at the lab scale and the last year for demonstration at the industrial scale
Non SMEs partnership

- Nofima
- Institute of Food Research, Norwich
- Wageningen University
- ACTIA (Actalia, ADIV, ITERG)
- INRA Transfert
- INRA (CSGA, STLO, QuaPA)
## SMEs partnership

<table>
<thead>
<tr>
<th>Participant</th>
<th>Country</th>
<th>Business Field</th>
<th>Activity in TeRiFiQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brasserie d'Orval s.a.</td>
<td>BE</td>
<td>Beer and Cheese</td>
<td>RTD and DEMO on reformulated cheeses</td>
</tr>
<tr>
<td>HERITAGE 1466 (HERVE)</td>
<td>BE</td>
<td>Cheese factory</td>
<td>RTD and DEMO on reformulated cheeses</td>
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<tr>
<td>LEIV-VIDAR AS</td>
<td>NO</td>
<td>Meat products</td>
<td>RTD and DEMO on reformulated meat products (cooked sausages)</td>
</tr>
<tr>
<td>BOADAS 1880 S.A.</td>
<td>ES</td>
<td>Meat products</td>
<td>Demonstration on reformulated meat products (dry sausages)</td>
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<tr>
<td>Chazal groupe</td>
<td>FR</td>
<td>Delicatessen meat products</td>
<td>DEMO on reformulated meat products (paté)</td>
</tr>
<tr>
<td>Millba AS</td>
<td>NO</td>
<td>Bakery production</td>
<td>RTD and DEMO on reformulated bakery products (muffin)</td>
</tr>
<tr>
<td>ADRIA Développement</td>
<td>FR</td>
<td>Food technical institute</td>
<td>RTD and DEMO on reformulated bakery products (madeleine)</td>
</tr>
<tr>
<td>Centiv GMBH</td>
<td>DE</td>
<td>Process technology and food research</td>
<td>RTD and DEMO on reformulated sauces</td>
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<tr>
<td>S.C. Sativa - Product LTD</td>
<td>RO</td>
<td>Food production (bakery products and pizzas)</td>
<td>RTD and DEMO on reformulated sauces</td>
</tr>
<tr>
<td>NIZO</td>
<td>NL</td>
<td>Food research contract</td>
<td>RTD (not on their own food product)</td>
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<tr>
<td>Federalimentare Servizi srl</td>
<td>IT</td>
<td>Services to companies of the food sector</td>
<td>Leader of technology transfer, dissemination and outreach</td>
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</table>
Structure of the project

WP 1
Reduction of sodium content and improved fat composition in cheeses (ACTIA)

WP 2
Reduction of fat and sodium in sausages (NOFIMA)

WP 3
Simultaneous reduction of fat and sugar in bakery products (WUR)

WP 4
Reduction of fat and sodium in ready-to-eat made sauces and meals (IFR)

WP 5
Optimisation of flavour release and perception changes induced by fat, sodium and/or sugar reduction (INRA)

WP 6
Development of reformulated products at industrial scale (ACTIA)

WP 7
Technology transfer, dissemination and outreach (FEDSERV)

WP 8
Project management (IT)
Structure of the WPs

1 Reducing sodium content and improved fat composition in cheese
   T1.1 - The relations between salt-level reductions and fermentations in cheese
   T1.2 - Relation of salt-level reduction and the ripening process (lipolysis, proteolysis, lactates fermentations, opening etc.),
   T1.3 - influence of salt-level reduction on cheese final acceptability (texture, functionalities, taste, aroma).
   T1.4 - Correction of salt reduction by modulation of composition parameters
   T1.5 - Study of the increase of unsaturated fatty acids

2 Reduction of fat and sodium in cooked and dry-fermented sausages
   T2.1 - Exploring the application of new technologies in sausage production
   T2.2 - Optimisation of functional properties of salt and protein
   T2.3 - Impact of fat and sodium reductions on water and salt transfers and formation of odour and flavour compounds
   T2.4 - Process optimisation in pilot-scale
   T2.5 - Evaluation of product quality and consumer acceptance

3 Bakery products with reduced fat and sugar content
   T3.1 - Development of model bakery product with reduced fat and sugar content
   T3.2 - Optimization of the formulation of model bakery product
   T3.3 - Up-scaling of model products and evaluation of their nutritional quality, sensory performance and consumer acceptance

4 Reduction of fat and sodium in readymade sauces and meals
   T4.1 - Development of model foods with reduced fat and sodium.
   T4.2 - Pilot scale production of ready meals with reduced fat and sodium
   T4.3 - Sensory assessment of pilot scale formulations
   T4.4 - Evaluating product quality
Structure of the WPs

5 Optimising flavour release and perception changes induced by fat, sodium and/or sugar reduction
   T5.1 - Perceptual interactions
   T5.2 - In vivo flavour release and perception
   T5.3 - In vitro flavour release
   T5.4 - Small size solute diffusion in reformulated products

6 Development of reformulated products at industrial scale
   T6.1 - Industrial scale production of cheeses with reduced fat and sodium
   T6.2 - Industrial scale production of sausages with reduced fat and sodium
   T6.3 - Industrial scale production of bakery products with reduced fat and sugar
   T6.4 - Industrial scale production of ready-made sauces with reduced fat and sodium
   T6.5 - Consumer behaviour

7 Technology transfer, dissemination and outreach
   T7.1 - Dissemination to the scientific community
   T7.2 - Technology transfer to the industry
   T7.3 - Communication to stakeholders (general public and policy makers/consumer groups)

8 Project Management
   T8.1 - Strategic steering
   T8.2 - Project monitoring
   T8.3 - Administrative and Financial Management
**Final symposium goals and participants**

### Scientific session: the most interesting scientific results in the objective of a food reformulation of quality

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>10:30-10:35</td>
<td>Welcome address - Maurizio Notarfonso, FEDERALIMENTARE</td>
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<tr>
<td>10:35-10:50</td>
<td>Introduction to TeRiFiQ - Christian Salles, INRA</td>
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<tr>
<td>10:50-11:10</td>
<td>Introduction to the topic and outlook - Tim Gumbel, EC DG SANTE</td>
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<td>11:10-11:30</td>
<td>Invited speaker from PLEASURE EU project - Alain Le Bail, ONIRIS</td>
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<tr>
<td>11:30-11:50</td>
<td>Less sodium content and better fat in cheeses - Jean-René Kerjean, ACTALIA</td>
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<td>11:50-12:10</td>
<td>Less fat and sodium in sausages - Rune Rødbotten, NOFIMA</td>
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<tr>
<td>12:10-12:30</td>
<td><strong>Coffee break</strong></td>
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<tr>
<td>12:30-12:50</td>
<td>Less fat and sugar in muffins and madeleines - Markus Stieger, WUR</td>
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<tr>
<td>12:50-13:10</td>
<td>Less fat, salt and sugar in sauces - Peter Wilde, IFR</td>
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<tr>
<td>13:10-13:30</td>
<td>Flavour release and perception in reformulated foods - towards a better understanding - Christian Salles</td>
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<td>13:30-14:30</td>
<td><strong>Buffet lunch</strong></td>
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### Industrial session: the most successful food reformulations in a food marketing objective

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>14:30-14:50</td>
<td>Intro to demonstration activities - Christophe Cotillon, ACTIA</td>
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<td>14:50-15:40</td>
<td>Success stories by TeRiFiQ SMEs - Moderator: Christophe Cotillon</td>
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<td>15:40-16:00</td>
<td>Health claim dossier: opportunities for SMEs and lessons learnt - Alfonso Siani, EFSA</td>
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<tr>
<td>16:00-16:30</td>
<td><strong>Coffee break</strong></td>
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<tr>
<td>16:30-17:15</td>
<td>Roundtable with industry and public stakeholders: Tim Gumbel (EC DG SANTE), Dirk Jacobs (FoodDrinkEurope), Agostino Macri (UNC), Alfonso Siani (EFSA) [to be confirmed], Dario Vallauri (Tecnogranda, SALUX Coordinator), Moderator: Igor Bodnár, Firmenich</td>
</tr>
<tr>
<td>17:15-17:30</td>
<td>Conclusions - Christian Salles</td>
</tr>
</tbody>
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The main goal of this “TeRiFiQ open Symposium” is to present the main project outcomes to the main Food and Drink stakeholders.
- Scientific original results in relation with reformulation
- Industrial application

Participants
Scientifics
Industry (SME and LE)
Food clusters
Associations (consumers, health)
...
As the symposium is open, all the people interested by the topic
Acknowledgements

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I wish you a nice TeRiFiQ final meeting