TeRiFiQ

Project no. 289397

Combining Technologies to achieve significant binary Reductions in Sodium, Fat and Sugar content in everyday foods whilst optimizing their nutritional Quality

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Duration of project: 4 years
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Deliverable D6.4
Report on the industrial implementation of the reformulated sauces and recommendations

Abstract: *Successful transferred and demonstrated at industrial scale the applicability of the technologies developed from WP4 in the industrial production process as well as consumption of reformulated products by consumer in real industrial situations at different demonstration events.*

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Lead contractor/partner for this deliverable: CENTIV
WP4 Leader: ACTIA
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Dissemination level	
PU Public (must be available on the website)	X
PP Restricted to other program 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)	

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1 Reminder of task 6.4 and deliverable 6.4

Formulations and fat/salt/sugar reduction strategies identified in WP4 were used by participating SMEs, CENTIV and Sativa, to produce reduced fat and salt or sugar versions of existing products such as pizza sauces and sweet filing creams. They were included in regional foods using companies in different EU countries (Germany and Romania).
The foods were subjected to the Sativa company standard quality control procedures to ensure quality and safety are not affected.
The food structures designed to reduce fat and salt or sugar were characterised by ACTIA (ITERG) and IFR in WP4 to ensure they have survived the full, food processing environment and procedures.

2 Aim

The main aim of this task 6.4 was to transfer and demonstrate at industrial scale the applicability of the technologies developed from WP4 in the industrial production process as well as consumption of reformulated products by consumer in real industrial situations.

3 Introduction

Food reformulation describes the action of changing the composition of processed foods to obtain a healthier product (Van Raaij et al., 2009). These changes seek to limit the addition of ingredients such as salt, *trans*-fatty acids (TFA), saturated fatty acids (SFA) and sugar believed to be associated with negative health effects including obesity, diabetes, CHD and stroke when consumed in excess (Iqbal, 2014).
Food reformulation, therefore, is intended to promote health and prevent disease by limiting certain nutrients in the diet. Thus, food reformulation is distinguished from food enrichment and food fortification.
An important progress was made by the SMEs in realizing the commitment to call upon the private sector to reduce the use of fat, salt and sugar in the food industry in order to lower their consumption.
To accelerate national efforts to address noncommunicable diseases (NCDs), the World Health Assembly has adopted **nine voluntary global targets for 2025** and endorsed a set of actions organized around the WHO Global NCD Action Plan 2013-2020 that, when implemented collectively by Member States, international partners and WHO, will help to achieve a global target of a 25% reduction in premature mortality from NCDs by 2025 and achieve the commitments made by Heads of State and Government in September 2011 (WHO, 2014).
One of the nine global targets is a **30% relative reduction in mean population intake of salt/sodium by 2025**. The corresponding indicator that will be used to measure progress is the age-standardized mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years (http://www.who.int/nmh/ncd-tools/definition-targets/en/).
Because sodium decreases water activity inhibiting the growth of pathogenic and spoilage microorganisms, such as *Listeria monocytogenes* and *Clostridium botulinum*, significant decreases in the salt content must be compensated by the addition of other antimicrobial agents to ensure food safety and preservation (Taormina, 2010).

4 Results and Discussion

4.1 Industrial implementation of the reformulated sauces and demonstration phase

For SMEs, reformulation, e.g. reducing the caloric content or reducing salt, trans-fatty acids and saturated fatty acids is far from simply removing or replacing one ingredient in a recipe; it concerns a whole range of factors.
It was crucial to ensure that replacing of one or two ingredients with others, actually changed the nutritional properties of the food product significantly, and we had to bear in mind that consumers do not accept any compromise in taste. This demanded knowledge about potential substitution ingredients for salt and sugar, as well as reconsideration of the overall composition of the food product.

Selection of reformulated products able to be studied at industrial scale
The formulations have shown the most promise in terms of processing and storage stability together with positive sensory attributes selected for further development (pizza sauce and sweet filling creams) into real food production (pizza and cakes) and subsequent full sensory testing in Task 4.4 in WP4, were subjected to further implementation at industrial scale and demonstrated.
The ingredients used in reformulations to reduce fat, salt and sugar are allowed for use in all EU countries where the products could be produced and commercialized.
A replacement in ingredients can change significantly the list of ingredients as it appears on the label (type of ingredients, number of ingredients, order of the ingredients, etc.) and this can affect consumer perception of the product. In some cases the legal denomination of the product will change, which can also affect consumer perception.
The SME partner Sativa supported by the SME partner CENTIV has been applied the reformulations obtained in WP4, pizza sauce for pizza and sweet filling creams for cakes, at an industrial scale using and adapting processing existing lines and compare the outcome in terms of quality, production volume.
In order to also test the transferability of the reformulated products such as pizza sauce on pizza and sweet filling creams on cakes, industrial demonstrations have been organized in different locations such as Romania and Italy:

A) REGIONAL EVENT: Open Demonstration of TeRiFiQ Project results
Date: 29 May 2015
Location: Sativa, Cristuru Secuiesc, Romania
Interested participants from SME and not only, tasted small samples of pizza sauces and pizza, and sweet filling creams and cakes.

Figure 1: Photos from Open Demonstration at Sativa, Romania

B) <u>INTERNATIONAL EVENT</u>: 14th International Symposium "Prospects for the 3rd Millennium Agriculture"

Section: Food Science and Technology
Date: 24 - 25 September 2015
Location: USAMV Cluj-Napoca, Romania
Poster session: interested participants tasted small samples of pizza sauces and pizza, and sweet creams and cakes

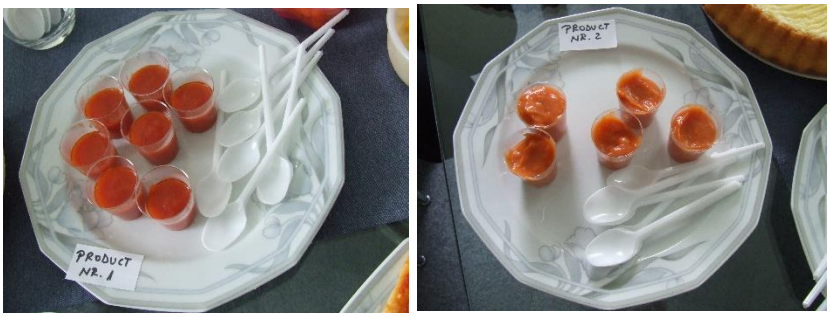

Figure 2: Pizza sauces: Product Nr.1 – standard, and Product Nr.2 - reduced fat and salt

Figure 3: Pizza: Product Nr.1 – standard, and Product Nr.2 - reduced fat and salt

Figure 4: Cakes: Product Nr.1 – standard, and Product Nr.2 - reduced fat and sugar

C) Final TeRiFiQ Project Conference at EXPO Milan

Date: 27 September 2015

Location: EXPO Milan in the Pavilion Terrace, Italy

Interested participants at the final conference and industry round table, tasted small samples of pizza sauces and sweet filling creams

Figure 5: Photos from Demonstration at Final TeRiFiQ Project Conference at EXPO Milan

4.2 Recommendations and guidelines for future industrial application

It is compulsory to list all the ingredients contained in a food product, including water and additives, appearing in descending order of weight. Each constituent of a 'compound ingredient' must also be listed, unless the constituent has already been listed as an ingredient in its own right, or is present below certain quantities provided it is not a potential allergen. The quantity of a product's main or characterising ingredients must be declared, usually as a percentage, when the ingredient (or category of ingredient) appears in the name of the food, is normally associated with that food, or is given particular emphasis in the label (e.g. highlighted or pictured) (source: EUFIC).
Nutrition claims are only permitted if they are listed in the Annex of Regulation (EC) No 1924/2006.

Claims for salt
Declaration of salt rather than sodium: The term "salt" must be used since it is more readily comprehensible by consumers than "sodium". The amount of salt in a product is calculated by determining the total sodium in a product (naturally occurring, and that deriving from salt and other additives) and multiplying by 2.5.
A claim that a food is low in sodium/salt, and any claim likely to have the same meaning for the consumer, may only be made where the product contains no more than 0,12 g of sodium, or the equivalent value for salt, per 100 g or per 100 ml.

Sweeteners for sugar replacement
Sweeteners are food additives. All food additives are included in the ingredient lists on product labels which must identify both the function of the food additive in the finished food (i.e. sweetener) and the specific substance used either by referring to the appropriate E number or its name.

Steviol glycosides (E 960) are mixtures of steviol glycosides used a sweetener and extracted from the leaves of the Stevia plant. This sweetener has up to 300 times the sweetness of

sugar but an almost negligible effect on blood glucose levels; hence it is considered by some as an attractive substitute for sugar. In 2011, the Commission adopted Regulation EU 1131/2011 which granted authorisation of the use of steviol glycosides as a sweetener in food. The food additive was assigned number 'E 960' and added to the official EU list of authorised food additives.

It is known that sugar also gives bulk to foods, the bulk needs to be compensated by other ingredients, which are often other carbohydrates, e.g. pea or potatoe starches used in our reformulations. As they have the same energy content as sugar, sugar replacement does not by default lead to changes in the nutritional properties and caloric contents of these products.

Claims for sugar

The food is processed, reformulated, or modified so that compared to a similar reference food, it contains > 25% less sugars and > 5 g less sugars/reference amount : **"reduced in sugar"**, "reduced sugar", "sugar-reduced", "less sugar", "lower sugar", "lower in sugar".
Compared to a reference food of the same food group, contains > 25% less sugars and > 5 g less sugars/reference amount : **"lower in sugar"**, "less sugar", "lower sugar".

Reformulation to decrease salt and sugar content focuses on a step-by-step reduction. To achieve larger reductions in salt and sugar content by enhancing ingredients have limitations due to off-tastes, e.g. **salt replacers -** suggested dosages from 0.05% to 0.2%.

The chosen alternative ingredients for salt and sugar reduction do not require specific handling, or changes in the product technologies, therefore no complexity of reformulation. For the proposed applications salt and to a certain extent sugar, have no preservation purposes. Reducion of these nutrients do not compromise food safety and do not shorten product shelf-life, therefore no other adjusted storage instructions, new packaging approaches and use of other preservatives is neccesary.

Fat reduction

The role of fat in food is firstly to give calories, fat-soluble vitamins, taste, texture and volume. Ingredients used in G/O/W (gel-in oil-in water) formulation for reduction of the fat are commonly carbohydrate-based which may mimic the properties that fat brings to food. According to EU Regulations 1829/2003 and 1830/2003 a real Non-GMO traceability is required.

Claims for fat

A claim that a food is low in fat, and any claim likely to have the same meaning for the consumer, may only be made where the product contains no more than 3 g of fat per 100 g for solids or 1,5 g of fat per 100 ml for liquids (1,8 g of fat per 100 ml for semi-skimmed milk).

Voluntary declaration of "supplementary" nutrients: nutrition-related requirements under Regulation (EU) No. 1169/2011 on the provision of food information to consumers (EU FIC). Supplement the mandatory nutrition declaration with information on the amounts (in grams (g)) e.g. starch.

Labelling of trans fats: Information on trans fats cannot be provided as these are not included in the list of mandatory or supplementary nutrients. The European Commission published a report in 2015 on the presence of trans fats in foods and in overall diets across the EU. The report is considering the provision of information to consumers on trans fats and potential restrictions on their use.

Order of the mandatory nutrition information: must present the information in the following order: energy, fat, saturates, carbohydrate, sugars, protein and salt.
Order of the "supplementary" nutrients: as appropriate, supplementary nutrients, together with the units of measurement to be used.

Energy	**kJ/kcal**
Fat	**g**
of which	
- saturates	**g**
- mono-unsaturates	**g**
- polyunsaturates	**g**
Carbohydrate	**g**
of which	
- sugars	**g**
- polyols	**g**
- starch	**g**
Fibre	**g**
Protein	**g**
Salt	**g**
Vitamins and minerals	**The units specified in point 1 of Part A of Annex XIII**

Figure 6. Nutrition Information (source: TECHNICAL GUIDANCE ON NUTRITION LABELLING, 2013)

Economic constraints

Standard Sativa consumers would pay with 2-5% higher price for reformulated reduced-salt and fat pizza sauce, and reduced-sugar and fat sweet filling cream.
Reformulated pizza sauce and sweet filling cream have higher production costs vs. standard ones, which can affects the consumers' acceptance in term of price.

Product	Standard price/kg	Reformulated price/kg
Pizza sauce	6.51 RON (cc. 1.4€)	11.04 RON (cc. 2.45€)
Sweet filling cream	9.47 RON (cc. 2.10€)	24.76 RON (cc. 5.5€)

Table 1 : Price of standard and reformulated pizza sauce and sweet filling cream products

A solution for these product would be a specific targeted product range with high communication and marketing regarding the low salt, fat and sugar content of products.

Transferability to other products type may be extended

The reduced fat and salt tomato pizza sauce could be used in further applications such as a tomato sauce for pasta and spaghetti. A positive feedback on this issue has been received during the overall consumers acceptance tests performed in WP4.

The reduced fat and sugar sweet filling cream has applicability for different products, and already demonstrated by Sativa supported by CENTIV such as mentioned in Figure 6 :

A B C

Figure 6 : A. Birthday Cakes ; B. Muffins, and C. Cakes

5 Conclusions

Successful industrial implementation and demonstration of the reformulated pizza sauce and sweet filling cream.

For future success of reformulated sauces a close collaborations between authorities and industry is needed, involvement of caterers and retailers, and campaigns that raise awareness about the importance of dietary changes amongst consumers. However, it also depends on other factors, such as price, acceptance by the consumer, and clear nutrition labelling of the reformulated product offers.

Unavoidable costs associated with reformulation can be minimised if the product composition as a whole is considered (multi-nutrient) instead of specific nutrients.

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