

Food innovation and reformulation for a healthier Europe: A challenging mission

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Improving diets by changing the composition of processed foods is considered one of many means to help reduce the prevalence of diet-related diseases. Food reformulation initiatives have so far aimed at reducing salt, trans-fatty acids, saturated fatty acids, sugars and total energy. Eventually, any impact of such programmes largely depends on consumers' food choices and will only show in the long term.

Challenges of food reformulation

In order for reformulation initiatives to achieve measurable effects on population nutrient and energy intakes, it is important to assess which food sources contribute most to intake and target these specifically.¹ For manufacturers, 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.

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It is crucial to ensure that replacing one ingredient with another actually improves the nutritional properties of the food product significantly, bearing in mind consumers do not accept any compromise in taste.² This demands knowledge about potential substitution ingredients, including food additives, as well as reconsideration of the overall composition of a food product. New ingredients used in reformulation must be allowed for use in all countries where the product is sold. In certain food product categories reformulation is not applicable for certain ingredients, because the final nutritional properties of the product are not changed at all.

Notably, reformulation projects also provide opportunities to improve the overall nutrient density of foods by enhancing the content of desirable ingredients such as minerals, vitamins or fibre.

Quality and consumer acceptance

Different ingredients play their role in the sensory characteristics of a food, and reformulation efforts meeting consumer expectations for taste, texture, colour etc. must be made. A second challenging alternative is to introduce stepwise changes in product formulations to let consumers adapt gradually to new sensory properties.²

A substitution 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.

Processing

Adapting individual ingredients (e.g. saturated fat) may impact the processing steps required in food production. New recipes may necessitate adaptation of technologies involved.³ Alternative ingredients may require specific handling, or changes in the product technologies, adding to the complexity of reformulation initiatives.

Food safety

In addition to the taste aspects, salt and to a certain extent sugar, traditionally are added to foods for preservation purposes.¹ They bind water and thus lower the water activity of a food, a determining factor for microbial growth and thus food spoilage. Reducing the levels of these nutrients may compromise food safety and shorten product shelf-life. Solutions may be found in fundamental reformulation, adjusted storage instructions, new packaging approaches and using other preservatives.

Salt reduction

Reformulation to decrease salt content initially often focuses on a step-by-step reduction. To achieve larger reductions in salt content, salt replacers or taste and flavour enhancing ingredients are needed. Most of these have limitations due to off-tastes. Despite these complexities, the first salt reduction programmes were implemented in the 1970's. Such initiatives have resulted in significant decreases in salt intakes, and the estimated economic and public health impact is substantial.^{1,4}

Fat reduction

The role of fat in food is firstly to give calories, fat-soluble vitamins, taste, texture and volume. Ingredients used for replacing fat are commonly protein- or carbohydrate-based from e.g. potato, corn, chicory roots, egg, soy or milk, which may mimic the properties that fat brings to food.⁵

Replacing trans fats – finding the right substitute

Partially hydrogenated vegetable oils, which are a source of trans fats are commonly replaced by other oils because trans fats have been linked to a higher risk of cardiovascular events.⁶ However, it is essential that the replacement oil actually reduces such a risk to be of real benefit. Whereas margarines are now virtually free of trans fats in Europe, technical issues prevent progress for bakery products.

Exchanging saturated with unsaturated fats – a matter of softness

Consistency is a major issue when reducing saturated fatty acid content in food by replacing it with unsaturated fat. The more unsaturated fatty acids there are, the softer the fat gets, which may create a challenge for manufacturers in that processing technologies might need to be adapted or replaced.³ Additionally, more unsaturated fat also means higher tendency towards fat oxidation and rancidity.

“Sugar-free” and “sugar-reduced” products

There are already many sugar-free and sugar-reduced products on the market. Their sweetness comes either from intense sweeteners and/or from bulky sweeteners such as isomalt. As sugar also gives bulk to foods, the bulk needs to be compensated by other ingredients, which are often other carbohydrates, e.g. starches. 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. It is different with drinks, where sweetness is replaced by intense sweeteners and the bulk with water.

The way forward

The potential recipe for future success of food reformulation comprises e.g. further innovation as part of close collaborations between authorities and industry, 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 levels, acceptance by the consumer, and clear nutrition labelling of these new product offers.

References

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