A Web-application to reformulate recipe through optimization: proof of concept

Romane Poinsot[a]. Matthieu Maillot[a]. Rozenn Gazan[a]. Florent Vieux[a]

[a] MS Nutrition La solution quantitative Marseille. France

Introduction

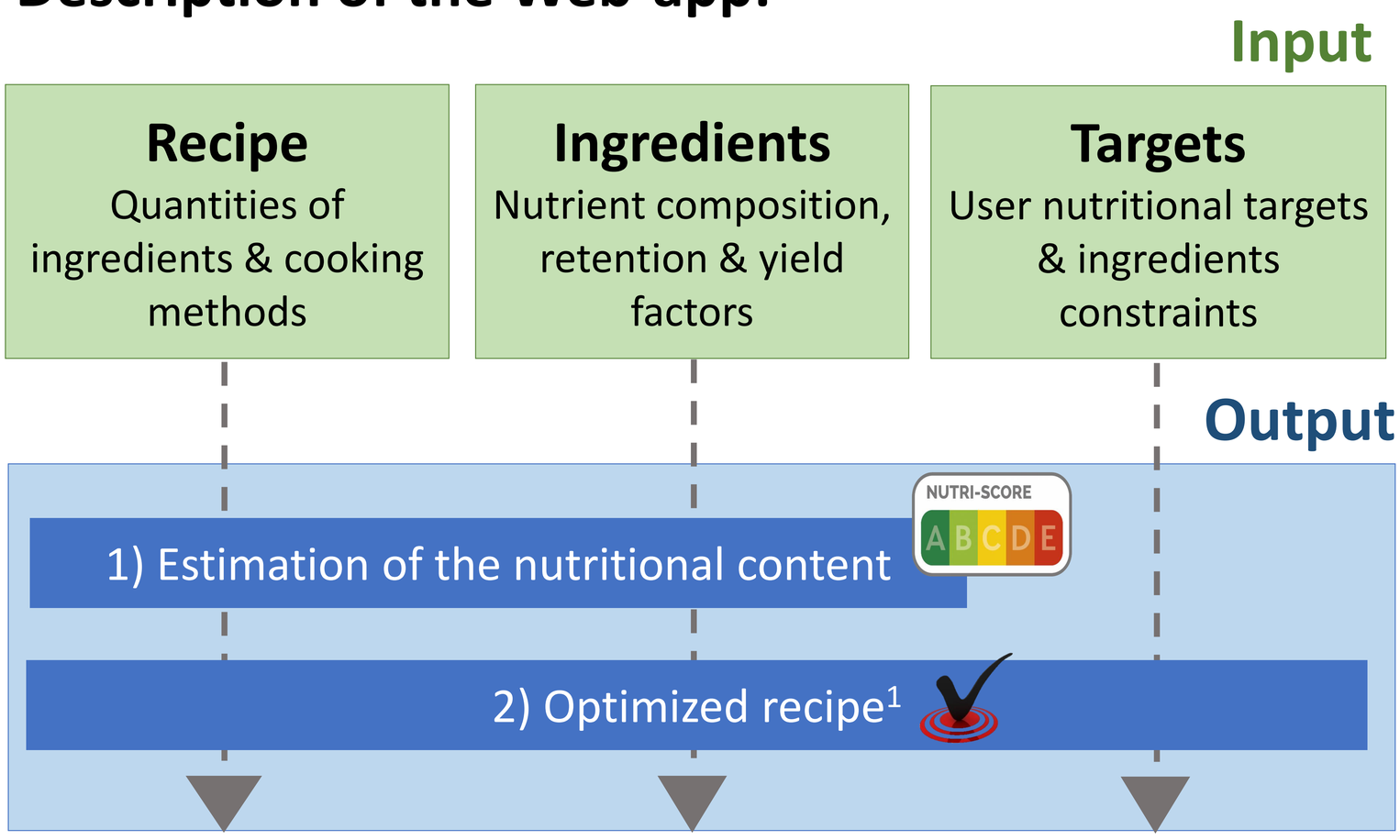
Improving the nutritional quality of food products through reformulation is a key approach to improve diet quality and to reduce the prevalence of non-communicable diseases

Objective

Provide a web application able to take into account impact of process when:
-Estimating the nutritional composition of processed foods
-Improving the nutritional content through recipe optimization

Materials and Methods

Description of the Web-app:



The web app was developed under R-Shiny package

EuroFIR guidelines were used to consider the impact of processes on food nutrients content

[1]Based on linear programming, the optimization functionality automatically corrects the amount of ingredients to meet the selected nutritional targets and ingredients constraints

Figure 1. Schematic representation of the web app

Proof of concept:

Traditional Czech Bramborak dish

Input: **Recipe** and **ingredients information** was taken from previous study[2]. **Targets** were set to improve saturated fatty acids (<4g/100g), sodium (<360mg), fiber (>2.1g/100g) and proteins (>12% E) contents simultaneously while keeping acceptable proportions in amounts of milk. flour and eggs (same as in initial recipe)

Output: Nutri-Score was used as nutritional indicator for comparing nutritional quality of the initial and the optimized Bramborak recipes

Results

1) Estimation of the nutritional content:

The initial Bramborak was **ranked C** according to the Nutri-score.

2) Optimized recipe:

The Web app suggests **increasing** amounts of garlic, wheat flour, eggs, and **decreasing** amounts of potatoes. lard and salt (Table 1).

The optimized Bramborak reaching nutritional targets was **ranked B.**

	Initial (g)	Optimized (g)
Garlic	0.8	1.3
Wheat flour	18.0	29.5
Eggs	3.6	5.9
Potatoes	68.6	58.0
Lard	8.1	4.4
Salt	0.9	0.7

Table 1. Initial and optimized quantities of raw Bramborak ingredients, for 100g

Conclusion

Organoleptic qualities of the optimized recipe were not taken into account but adding more constraints on the amount of ingredients could help to design a more acceptable recipe. This web-application needs to be expanded with additional nutrient compositions of ingredients and fine-tuned according to food industry needs.

[2]Machackova. Giertlova. Porubska. Roe. Ramos. Finglas. EuroFIR Guideline on calculation of nutrient content of foods for food business operators. Food chemistry. 2018