

OptiSignFood: Developing more sustainable food products through artificial intelligence

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Introduction

The food development process is time and resource intensive. Information regarding environmental impact, nutritional values, food safety and quality of food are missing, not readily available or difficult to predict. As a consequence, food developers face a multi-dimensional optimization problem with high complexity and many parameters to be considered. The OptiSignFood project (July 2021 - June 2024, coordinated by Agroscope) will develop a tool to provide integrated, fast and reliable solutions that will take into account nutritional, sensorial, safety, health and environmental parameters when optimizing a new product or modifying an existing one.

Methodology

The model approach builds on scientific data and uses machine learning and mathematical methods to solve the multidimensional food optimization problem derived from the different parameters considered (see Fig 1.):

- **Food characteristics** are predicted based on an in-house database.
- **Environmental impacts** are calculated from existing Life Cycle Inventory data.
- **Nutritional composition** is extracted from the EuroFIR database.

Results and discussion

Developing the OptiSignFood software will require to:

- Harmonize the nutritional and environmental data by product, country of origin, production system and yield level.
 - Validate and test prediction models with real environments by food and beverage manufacturers.
- The OptiSignFood software will:
- Help producers react faster to market trends.
 - Promote safer, more nutritious food products with lower environmental impacts and improved resource efficiency.

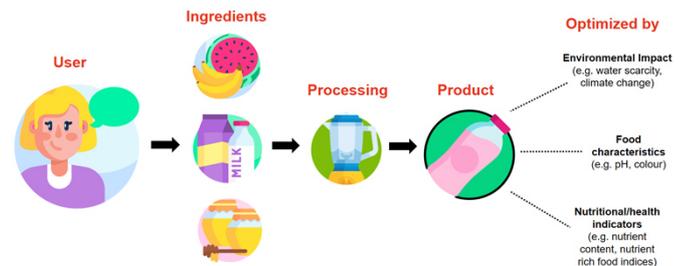


Figure 2: User to end product optimization development (icons by flatlicom.com)

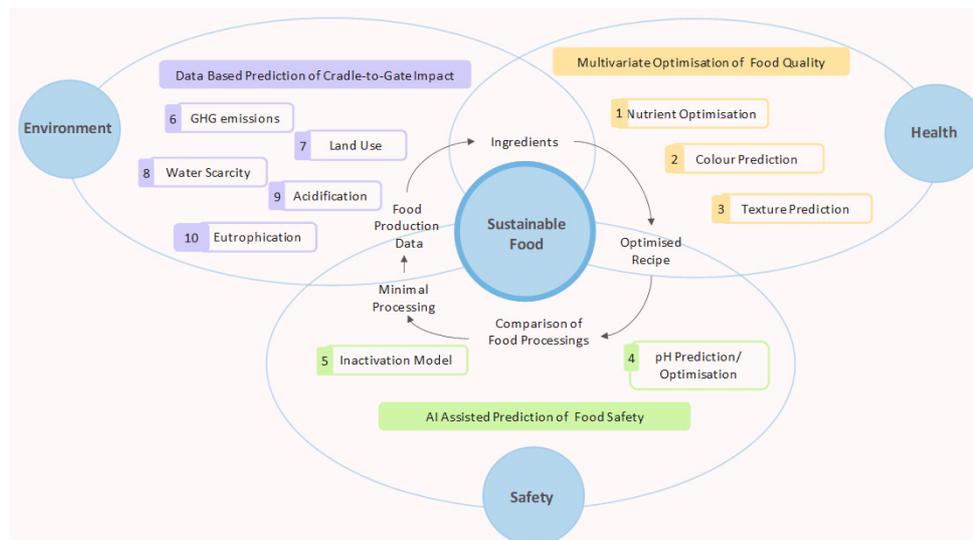


Figure 1: Concept of the OptiSignFood tool for the food and beverage industry.

Conclusions

- OptiSignFood will support faster product development lead by a safer, more environmentally friendly and more nutritious food products through optimization models based on machine learning and mathematical methods.
- The optimization model will enable to identify potential trade-offs between the different optimization parameters and enhance product development.
- OptiSignFood will enable the food and beverage industry to contribute to a more sustainable development of the food system.

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