# Valorizing solids-not-fat in milk and their co-products: A prospective study

**Duration: 2021-2024**

## Highlights

- This project addresses the problem of using surplus solids-not-fat (SNF) and valorizing the co-products resulting from their processing (whey, whey and milk permeates).
- Even today, enhancing the value of milk solids is a major challenge for the entire Quebec and Canadian dairy chain.
- Although several pathways have been explored to valorize SNFs in milk and their co-products, the ability of dairy processors to adopt a technology is contingent on multiple factors particular to each company and its economic rent.
- These factors together make valorizing SNFs and their co-products a technological, economic, and environmental issue.
- This project aims to generate technical-economic and environmental data in order to enable the development of an integrated approach to valorizing SNFs in milk and their co-products in the Quebec context.

## Objectives

The overall objective of the project is to develop, in a Quebec context, technical-economic and environmental scenarios to promote the valorization of solids-not-fat in milk and the co-products resulting from its processing. Four specific objectives are proposed:

1) Estimate the volumes of whey, whey permeate, and milk permeate produced in Quebec and map their geographic production zones.
2) Determine, based on the scientific literature and patents, the most promising valorization pathways for whey and permeates.
3) Develop technical-economic and environmental scenarios for the valorization of whey and permeates according to industry specifics (volumes, types of co-products) and the geographic locations of companies.
4) Generate a decision-making support tool adapted to Quebec companies to identify the optimal avenues of valorization for co-products.

## Results and potential benefits

The expected results in terms of economic, environmental, and social benefits are as follows:

- Economic: Propose viable markets/valorization pathways for SNFs in milk and their co-products (whey, permeates) according to industry specifics.
- Environmental: Identify technological approaches to reduce the environmental footprint associated with the SNF valorization.
- Social: Better address the concerns of citizens and consumers regarding the implementation of eco-efficient valorization pathways for solids-not-fat and their co-products resulting from milk processing.

It is important to note that the approach taken in Quebec will potentially be transferable and applicable to the rest of Canada.

## Innovative aspects

- Mapping of the volumes of SNF and the co-products generated according to the geographic areas of production in Quebec.
- The use of a simulation tool to characterize the technical-economic and environmental performance of co-product valorization scenarios.
- Development of a decision-making support tool adapted to Quebec companies to identify the optimal avenues of valorization for co-products.

## Professional trained

- **Jules Larouche**, bachelor's degree in food science and technology at Université Laval: Knowledge gained in exploring the challenges and issues faced in the Quebec and Canadian dairy industries related to the valorization of SNFs in milk and their co-products, experience in searching databases, and compilation and exploitation of the results obtained
- **Juan Esteban Castañeda Sanchez**, future master's student in food science at Université Laval (anticipated start in September 2022). Development of technical-economic and environmental scenarios.

## For further information

Knowledge transfer strategies:

- A literature review on the most promising valorization pathways for SNFs in milk and their co-products
- Public outreach presentations for Quebec and Canadian farmers and processors
- Presentation of results at the Forum Techno and the Novalait annual meeting.

## Financial contributions

- Novalait
- CRIBIQ
- Canadian Dairy Commission

**Total budget: $241,262**

## Contact persons

### Project supervisor:

**Alain Doyen**
Department of Food Sciences

Université Laval
INAF / Pavillon Paul-Comtois
2425, rue de l'Agriculture
Quebec City, QC G1V 0A6

418 656-2131 ext. 405454
alain.doyen@fsaa.ulaval.ca

### Contributors:

**Yves Pouliot**
Université Laval

**Julien Chamberland**
Université Laval

**Guillaume Brisson**
Université Laval

**Alphonse Singbo**
Université Laval