



PROJECT 2016-2018

# NUTRITIONAL SYNERGY BETWEEN DAIRY PRODUCTS AND OTHER FOOD NUTRIENTS



Principal Investigator:

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Number of students trained  
(MSc, PhD, Post-Doc):

N/A

TOTAL BUDGET

\$203,596

## INVESTMENT PARTNERS

Agriculture and  
Agri-Food Canada

## OBJECTIVE:

Polyunsaturated fatty acids (PUFA) are known to have health benefits. However, an increase in PUFA supply may result in oxidation during gastrointestinal digestion, producing toxic products associated with degenerative diseases. Evidence suggests that milk components can alter the gastrointestinal environment and prevent nutrients from degradation. This study used a food model with high PUFA concentration to investigate the potential interaction between dairy products and nutrients from other foods during in-vitro digestion and its nutritional consequences.

## KEY OUTCOMES:

- The addition of milk (pasteurized or sterilized) greatly reduced the formation of toxic products from PUFA, mostly due to antioxidant properties of caseins. This suggests that milk consumption can increase the antioxidant status in the gastrointestinal environment and protect against toxic lipid products.
- The antioxidant activity of milk was further increased when combined with other antioxidants, polyphenol-rich beverages (i.e. grape juice, black/green tea), suggesting a synergistic interaction between milk components and polyphenols.
- When used for emulsion formation, milk had a protective effect against PUFA oxidation during digestion, suggesting that milk can be used as an emulsifier for production of emulsions to offer better protection of PUFA during digestion.
- During intestinal digestion, there were higher quantities of fatty acids available for absorption when PUFA was ingested with whole or skim milk. The combination with polyphenol-rich beverages further increased this effect. This suggests that adding milk to a meal that contains PUFA could potentially enhance the positive health effects associated with the consumption of PUFA.

## BENEFITS TO THE DAIRY INDUSTRY

- The study provides evidence that milk has antioxidant properties and may protect nutrients from degradation, and that in combination with other foods, these benefits can further increase.
- Processors may be able to use this information for formulation of novel foods. This information may also be useful to health professionals and policy makers to show the importance of considering a balanced diet.

## SCIENTIFIC PUBLICATIONS

Antioxidant activity of milk and polyphenol-rich beverages during simulated gastrointestinal digestion of linseed oil emulsions. 2019.  
[ncbi.nlm.nih.gov/pubmed/31229066](https://ncbi.nlm.nih.gov/pubmed/31229066)

Effect of milk proteins and food-grade surfactants on oxidation of linseed oil-in-water emulsions during in vitro digestion. 2019.  
[ncbi.nlm.nih.gov/pubmed/31126445](https://ncbi.nlm.nih.gov/pubmed/31126445)