Microwave Vacuum Dehydrated, Shelf-Stable Cream

Progress report to the DPO
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Cream market outlook

- Growth in the category, but strong competition from non-dairy products

U.S. whipping cream market size, by product, 2015 - 2025 (USD Million)

- Consumers prefer fresh products, without preservatives, which drive offline sales

- Online sales anticipated to have fastest growth: CGAR of 8.5% from 2019 to 2025

Source: https://www.grandviewresearch.com/

Opportunity and need for innovation in the shelf stable, preservative free category!
Project goal

Develop a method to manufacture a novel, shelf stable cream product using a process (microwave vacuum drying) that allows the dehydrated cream to be reconstituted with minimal effort and energy and retain the functionality of the initial cream.

Anticipated benefits for the Dairy Industry

- Expanded dairy presence in the shelf stable product category
- Increased cream sales, especially online and on the export market
Project objectives

**Objective 1.1:** Optimization of VMD drying of heavy cream as an innovative way to preserve milk fat.

**Objective 1.2:** Create a dehydrated cream that can be easily redispersed in water to achieve the initial structure and properties.

**Objective 2.1:** Investigate the effects of protein-to-fat ratio and lactose content on the drying properties of cream and reconstitution of dehydrated cream.

**Objective 2.2:** Evaluate the shelf-life of dried cream (fat oxidation, microbiological quality) as a function of composition and storage conditions.

*This report*

- **Objective 1.2:** Create a dehydrated cream that can be easily redispersed in water to achieve the initial structure and properties.

*Ongoing*

- **Objective 2.2:** Evaluate the shelf-life of dried cream (fat oxidation, microbiological quality) as a function of composition and storage conditions.
Technical accomplishments since last report

1. Effect of process on product structure and quality:
   
   - Demonstrated that the final product, after reconstitution with water, has a similar structure as the initial cream, leading to similar functionality

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Red: fat globules; Green: protein
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Initial, unhomogenized cream
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Homogenized cream, before MVD
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Reconstituted MVD homogenized cream
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Purple: phospholipids
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Technical accomplishments since last report

2. Product functionality:
The reconstituted MVD cream can be converted into whipped cream that has a texture comparable to the whipped initial cream.
Other accomplishments

• **Invention disclosure** filed with Cornell Technology Licensing (first step in the patenting process)

• **Publications:**
  – Two research papers on the MVD of concentrated milk (completed project) published
  – A research paper on MVD of cream completed, awaiting submission

• **Presentations:**
Acknowledgments

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THANK YOU!