



# Pulsed electric field processing of dairy proteins

## A method of using pulsed electric field processing to modify functional properties of dairy proteins

**IP Status:** US Patent Pending; Application number 18/649,533

### Applications

- Milk protein concentrate processing
- Micellar casein concentrate processing
- Processing of proteins for food and beverage industry

### Key Benefits & Differentiators

- **Easily integrated improvement:** This technology can be easily added into existing processing lines
- **Lower energy requirement, carbon footprint and temperature requirements:** Optimized use of pulsed electric field increases efficiency
- **High retention of nutrition and protein flavor:** Optimized approach minimizes processing

### Technology Overview

Milk protein concentrates (MPC) and micellar casein concentrates (MCC) are milk-derived, high protein ingredients that are used in products like high protein beverages, bars, and yogurts due to their excellent nutritional quality. Processing these concentrates is challenging due to protein-protein interactions and higher calcium content in milk proteins resulting in their aggregation during storage and processing. Common existing approaches for processing these dairy proteins include mechanical methods such as high shear treatment or thermal processing, as well as nonmechanical treatments such as enzymatic or chemical modifications. These techniques lower the nutritional quality of the proteins as well as being complex and time intensive.

Researchers at the University of Minnesota have developed a method for processing dairy proteins using a pulsed electric field (PEF). This method allows for the customization of finished protein product characteristics towards improved processability through changes in viscosity and solubility while maintaining or marginally modifying the natural dietary and sensorial aspects of the proteins. The optimized PEF method results in significantly reduced processing costs via a reduction in viscosity while concentrating which leads to improved material throughput and energy efficiency. This technology can be easily added into existing processing lines, making integration straightforward. The optimized PEF processing method decreases costs associated with dairy protein processing without compromising on nutrition or taste.

### Phase of Development

#### TRL: 4

Gathered initial experimental data, pilot scale test designed for the (pre- and post-) process, and working prototype developed for processing equipment.

### Technology ID

2022-300

### Category

All Technologies  
Engineering & Physical  
Sciences/Instrumentation,  
Sensors & Controls  
Engineering & Physical  
Sciences/Processes  
Agriculture & Veterinary/Food  
Science & Nutrition

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## Desired Partnerships

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## Researchers

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- [Tonya C Schoenfuss, PhD](#) Adjunct Associate Professor, Department of Food Science and Nutrition

## References

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