



# Reduce contamination from grains and powdered food

**A method for scalable, non-thermal or low temperature pasteurization of powdered or particulate food.**

## Applications

- Pasteurization of grains (wheat, corn, etc.), and spices
- Pasteurization of powdered foods (NFDM, flour, ground black pepper, etc.)
- Disinfecting cosmetic and pharmaceutical products
- Disinfecting liquid and solid form consumer materials

## Key Benefits & Differentiators

- **Highly effective pasteurization:** microbial count reduction by over 3-5 logs. Better than conventional hot air/steam technique.
- **Low cost** equipment. Energy efficient process reduces capital and operational costs compared to UV technology.
- **Maintain food quality** by not heating food beyond 60°C with no chemical or physical damage to food. Fully non-thermal processing for some applications.
- **Quick processing** supports high throughput rate.
- **Easy implementation** in processing units; works well with food on conveyor.
- Can be integrated easily in most flour mills and powdered food processing facilities, with no added operator supervision.

## Problem

Microbial contamination of grains, powdered food ingredients and read-to-eat food products can result in serious illness upon consumption. Therefore, food manufacturers are required to implement pasteurization procedures to decontaminate their products before packaging. In addition, recalls of food are expensive and can damage manufacturers' reputations. Using traditional thermal methods such as hot air or steam can change the quality of food, and are not suitable for pasteurization of flour or other powdered or particulated foods. In addition, poor heat transfer properties render this process inefficient. Non-thermal treatment methods such as X-rays and UV light, on the other hand, can cause significant chemical and physical damage to the food. Therefore, an efficient and effective food pasteurization method with minimum quality changes is needed.

## Solution

Researchers at the University of Minnesota have developed a novel method for pasteurization of food using intense pulsed light and low temperature microwave technology, along with a photocatalyst and a microwave absorbent, to effectively decontaminate granular or powdered food and food ingredients while using low energy. This process has been shown to reduce the microbial count in wheat kernels by over 3-5 logs in less than 30 seconds. As the product temperature during processing is maintained under 60°C, no (or minimal) change in food quality is seen. In addition, this process is directly applicable to powdered or particulated foods

Technology ID

2019-244

## Category

Engineering & Physical  
Sciences/Chemicals  
Engineering & Physical  
Sciences/Materials  
Life Sciences/Pharmaceuticals  
Agriculture & Veterinary/Food  
Science & Nutrition

## Learn more



such as wheat flour, non-fat dry milk (NFDM), spices, wheat kernels, etc. Researchers have tested the effectiveness of this process by inactivating a variety of microbial contaminants (such as *C. sakazakii*, *E. faecium*, *B. cereus*) that are commonly found in food.

## Phase of Development

Working continuous system prototype. Tested several foods and characterized efficiency with respect to system parameters.

## Researchers

Roger Ruan, PhD

*Professor, Bioproducts and Biosystems Engineering*

[External Link](#) (bbe.umn.edu)

## Publications

[\*Effects of intense pulsed light on Cronobacter sakazakii inoculated in non-fat dry milk\*](#)

*Journal of Food Engineering*, Volume 238, December 2018, Pages 178-187

## Ready for Licensing

This technology is now available for license! The University is excited to partner with industry to see this innovation reach its potential. Please contact us to share your business' needs and your licensing interests in this technology. The license is for the sale, manufacture or use of products claimed by the patents.