

## Novel powdered milk method yields better frothing agent

## July 23 2019



Researchers were able to generate a powder that can be used as a natural foaming agent. A potential application is the use in vending machines for cappuccino coffee, as the foam is abundant and lasting. Below is a comparison of two cappuccino coffees ... one made with standard skim-milk powder and the other using powder obtained with high-pressure jet spraying and drying. Credit: Federico Harte, Penn State



A novel method of processing—using high-pressure jets to spray milk and then quickly drying the spray—yields skim milk powders with enhanced properties and functionality, according to Penn State researchers, who say the discovery may lead to "cleaner" labels on foods.

"Food manufacturers know consumers would like to see products that have ingredients that they can recognize," said Federico Harte, professor of <u>food</u> science. "The hope offered by our work is that we will be able to use <u>milk proteins</u> as emulsifiers or as foaming agents in <u>food products</u> in which a clean label is important, such as ice cream."

Milk proteins yielded by his new processing method could replace food emulsifying and foaming agents such as carrageenan, agar, albumin, alginates, glycerol monostearate, polysorbate, saccharides and lecithin, Harte pointed out.

"On the label, it would just say, '<u>milk</u> proteins'—that is something all consumers can recognize, nothing is synthetic," he said. "Concerns about 'clean labels' are growing in the food industry—these are definitely buzzwords. There is no legal definition for what a clean label is, but the best way I can define it is a label that my grandmother can recognize all the ingredients."

There is nothing wrong with most of these unfamiliar ingredients, so far as we know, Harte added. But, increasingly, consumers do not want them, so the <u>food industry</u> hopes to remove synthetic ingredients such as emulsifiers and foaming agents from the labels of foods, using this novel processing technology.

Among the most promising properties researchers saw in the skim milk powder created by high-pressure jet spraying and drying milk were marked increases in foam expansion and foam-volume stability. That means the skim milk powder is a great candidate for use in lattes, Harte



explained.

"The thing that we found most attractive was the enhanced foaming properties, and we may be able to develop vending machine mixing powders consisting of just milk and coffee that will create a long-lasting foam," he said. "How long do we need foam to last in hot lattes? Perhaps not for hours, but think about a bottled cold cappuccino coffee—that is where we need a longer-lasting foam."

High-pressure jet processing of food is a completely new concept, Harte pointed out, and he has been experimenting with the idea for about four years at Penn State. His latest research, recently published in the *Journal of Food Engineering*, was conducted in a pilot plant in the Rodney A. Erickson Food Science Building. The study focused on a device that pressurized pasteurized, skim milk using an intensifier pump, and then sprayed the milk through a diamond or sapphire nozzle.

The liquid exits the nozzle as a jet of fine droplets that collide with the air, forming an aerosol. Then the spray is quickly dried to obtain skim milk powders. In comparison to liquids, Harte noted, powders possess a broader spectrum of applications due to the inherent shelf-life stability and lower cost associated with their transportation and storage.

The challenge now is to scale-up the process for industry, Harte explained. And it will not be easy.

"The flow-through of these pumps is relatively low, that is the number one difficulty," he said. "We need to achieve a throughput that is attractive to industry. We are talking about a few liters per minute now, and industry needs hundreds of liters per minute. How do we get from here to there? We are discussing with the manufacturers of the pumps ways to scale this up."



**More information:** Charith A. Hettiarachchi et al, Spray drying of high pressure jet-processed condensed skim milk, *Journal of Food Engineering* (2019). DOI: 10.1016/j.jfoodeng.2019.04.007

## Provided by Pennsylvania State University

Citation: Novel powdered milk method yields better frothing agent (2019, July 23) retrieved 27 April 2024 from <u>https://techxplore.com/news/2019-07-powdered-method-yields-frothing-agent.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.