Microbubbles point the way to a revolution in food processing

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Researchers at the University of Sheffield have found a more efficient way to dry products for food manufacture, using tiny, hot bubbles.

Instead of boiling a product to evaporate water - the most common technique used by industry - the Sheffield team injected hot microbubbles through the liquid, causing the water to evaporate without boiling.

Professor Will Zimmerman, who led the study, explains: "We've applied this principle, called 'cold boiling' to separate water from methanol. Although conventional bubbles have been used in evaporation processes before, they still transfer a lot of their heat to the mixture. This wastes a lot of energy, and can also 'cook' the mixture, which in most cases makes it unusable.

"The process we have developed involves applying the right concentration of hot microbubbles to a thin layer of liquid. This causes the water to vaporise with very little heating of the mixture."

The ability of microbubbles to draw heat out of a liquid can be exploited in many industrial processes, from food processing to biofuel production.

Professor Zimmerman's team is currently working on a pilot project with South Yorkshire-based company, Carbon Sequestration Ltd., using the technique to remove excess water from whey, commonly used as an

animal food. If whey is overheated when its water content is removed, it loses much of its nutritional value.

More information: "Evaporation dynamics of microbubbles", by William B. Zimmerman, Mahmood K Al-Mashhadani and H.C. Hemaka Bandulasena is published in *Chemical Engineering Science*.

Provided by University of Sheffield