

Researchers develop dissolvable, easy-to-use milk capsules

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The new milk capsules could be an alternative to plastic containers. Credit: Martha Wellner / MLU

Have your coffee without spilling the milk: Researchers at Martin Luther University Halle-Wittenberg (MLU) have developed a milk capsule that dissolves when placed in a hot drink. Not only does this reduce the

consumption of packaging material, the capsules are easier to use than conventional plastic containers. The research group published its findings in the journal *Chemical Engineering & Technology*.

The new [milk](#) capsules essentially could be compared to sugar cubes filled with milk or condensed milk. "A crystalline crust forms a type of packaging around the capsules that easily dissolves in hot liquid," explains Martha Wellner, who developed the process as part of her PhD studies at MLU's former Centre of Engineering Sciences under Professor of Engineering Joachim Ulrich.

The production of the capsules is relatively simple. First a solution of milk and the desired sugar, or any other non-sweet material which gives the coating properties, is produced and placed in a mould. As the solution cools, the excess sugar moves to the edge of the liquid, forming crystals. The milk-sugar solution fills up the interior. Wellner, a nutritional scientist, conducted multiple trials to examine which materials and which cooling processes delivered the best results.

Currently there are two options for milk containers: sweetened and lightly sweetened. The researchers are still working on an unsweetened sugar free version. The capsules can be produced in various shapes and stored at room temperature. Once the milk has been encapsulated it can keep for at least three weeks. "Our processes can also be used for other liquids. For example, we can also encapsulate fruit juice concentrate," explains Wellner.

Joachim Ulrich came up with the idea of the encapsulation process years ago. His team has been studying crystal formation processes for many years, searching for ways to apply them in industry, for example in the production of pills. "We have already studied different encapsulation processes as part of other PhD projects, however with other aims in mind," says Ulrich. He believes the new, environmentally friendly

development has a lot of potential applications. "For example, the capsules could replace the small, extremely unpractical coffee creamer packaging that is used in great quantities at conferences or on airplanes."

The scientists already registered a patent for the process in 2015; however, there is still no final product on the market. Before this could happen, it has to be investigated whether the milk capsules meet all necessary and legal requirements for groceries in general and also whether the hassle-free containers can be produced as industrial products.

More information: Martha Wellner et al, Design of Dissolvable Milk Containers for Convenient Handling, *Chemical Engineering & Technology* (2017). [DOI: 10.1002/ceat.201600714](https://doi.org/10.1002/ceat.201600714)

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