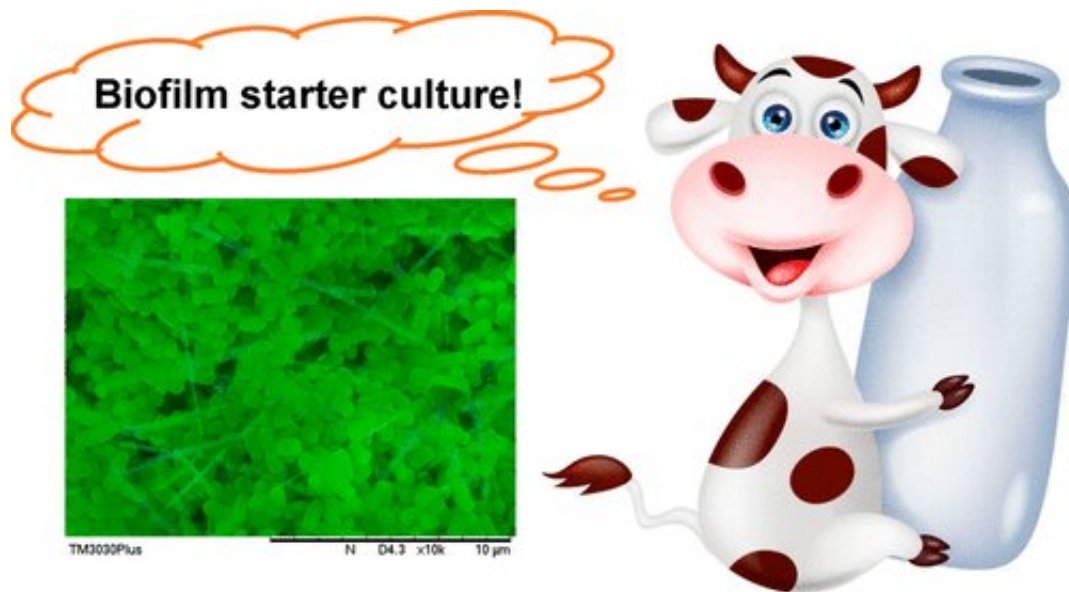


Healthier dairy products with bacterial films and nanofiber membranes

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Credit: American Chemical Society

Bacterial biofilms are typically the target of heavy-duty cleaning regimens, but these films aren't always bad news. In fact, growing them on thin sheets of nanofibers is a great way to produce a fermented milk product that can deliver hardy probiotics to the digestive tract, according to research just published in ACS' *Journal of Agricultural and Food Chemistry*.

Biofilms consist of [bacterial cells](#) that are tightly packed together in an extracellular matrix (ECM). Most prior biofilm research has focused on

films formed by [pathogenic bacteria](#), and more particularly on how to prevent their formation or how to detach or destroy the films. Meng-Xin Hu and colleagues instead wanted to find the best growing conditions for the useful bacteria *Lactobacillus plantarum*, found in fermented [food products](#) such as yogurt. They were interested in ensuring that this organism could survive storage on the supermarket shelf, as well as transit through the stomach, which remains a challenge for most probiotics.

The researchers grew the bacteria on cellulose acetate membranes that mimic the structure of natural ECM. The huge surface area of these nanofiber membranes provided a scaffold for the bacteria. The microbes successfully formed colonies and then biofilms, which were used to ferment milk, on the membranes. The bacteria in biofilms were more resistant to simulated digestion than free-floating *L. plantarum*. During fermentation, the biofilms continually released live bacterial cells into the milk. Once the fermented milk was stored, the released cells retained in the milk were much longer-lived than cells in fermented milk produced by free-floating *L. plantarum*. The researchers say their findings lay the foundation for the use of biofilm-integrated nanofiber membranes as starter cultures in biotechnology and fermentation industries.

More information: Meng-Xin Hu et al. Probiotics Biofilm-Integrated Electrospun Nanofiber Membranes: A New Starter Culture for Fermented Milk Production, *Journal of Agricultural and Food Chemistry* (2019). [DOI: 10.1021/acs.jafc.8b05024](https://doi.org/10.1021/acs.jafc.8b05024)

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