Lactic acid bacteria can extend the shelf life of foods

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Researchers at the National Food Institute, Technical University of

Denmark, have generated a lactic acid bacterium that efficiently secretes a food-grade preservative when grown on dairy waste.

Researchers at the National Food Institute have come up with a solution that can help combat both food loss and food waste: They have generated a natural lactic acid bacterium, which secretes the antimicrobial peptide nisin, when grown on dairy waste.

Nisin is a food-grade preservative, which can extend the shelf life of foods, and thus can be used to reduce food waste. The discovery also makes it possible to better utilize the large quantities of whey generated when cheese is made.

Nisin is approved for use in a number of foods, where it can prevent the growth of certain spoilage microorganisms as well as microorganisms that make consumers sick. It can for instance inhibit spore germination in canned soups and prevent late blowing in cheeses—without affecting its flavor.

In theory, nisin could be added to fresh milk to extend its shelf life. However, different countries have different rules stating what types of products nisin may be added to and in which amounts.

Extra step toward better use of whey

Many dairies are already turning a profit by extracting protein and lactose from the many tons of whey they generate, which they use in e.g. infant formula and sports nutrition. What is left behind can still be used to produce nisin.

In addition to ensuring better resource utilization, there may be a financial gain from producing nisin: Most commercially available nisin products contain 2.5% nisin and cost approximately 40 euro per

kilogram.

The work related to isolating the nisin secreting lactic acid bacteria has been described in further detail in a scientific article in the *Journal of Agricultural and Food Chemistry*: Efficient Production of Nisin A from Low-Value Dairy Side Streams Using a Nonengineered Dairy Lactococcus lactis Strain with Low Lactate Dehydrogenase Activity.

A special topic portal on the National Food Institute's website showcases some of the many ways in which the institute works to create sustainable technological solutions in the area of food. Read e.g. about projects that transform side streams into new ingredients and foods.

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More information: Ge Zhao et al. Efficient Production of Nisin A from Low-Value Dairy Side Streams Using a Nonengineered Dairy Lactococcus lactis Strain with Low Lactate Dehydrogenase Activity, *Journal of Agricultural and Food Chemistry* (2021). DOI: 10.1021/acs.jafc.0c07816

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