

# Freeze-drying breast milk retains more of its healthy properties

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A study at the CEU Cardenal Herrera University in Valencia confirms freeze-drying as an effective alternative means of storing breast milk to the deep-freezing typically used at milk banks.

Researchers at the Universidad CEU Cardenal Herrera (Cardenal Herrera CEU University, CEU-UCH) worked alongside experts at Valencia's La Fe Hospital and its milk bank, one of the eight currently operational in Spain. They found that freeze-drying is a viable storage method for [breast milk](#), leading to no microbiological contamination and no loss of its health benefits for infants. In particular, its antibacterial properties remain uncompromised.

Published in the *Journal of Pediatric Gastroenterology and Nutrition*, this study is one of few to evaluate this storage method and the first to analyse its effect on its antibacterial capacity, one of the most important properties of breast milk.

Freeze-drying is used in the pharmaceutical industry to preserve the active chemical properties of sensitive fluids and compounds. Currently, only one milk bank in the world (in France) uses this storage method, reflecting the relative lack of studies into its capacity to preserve the natural properties of breast milk. Researchers at CEU-UCH recently joined experts at La Fe Hospital's milk bank to carry out tests to address this unknown, focusing the antibacterial properties of breast milk.

The study was carried out by analysing 125 breast milk samples donated

by a total of 65 mothers to the La Fe Hospital milk bank, which is always constantly striving to find innovative storage methods that preserve all of its natural properties, in this case collaborating with CEU-UCH.

The results? Dolores Silvestre, primary investigator at CEU-UCH's Breast Milk Research Group, tells us that "freeze-drying was indeed confirmed as a more effective storage method than freezing at  $-20^{\circ}\text{C}$ , and equally as effective as freezing at  $-80^{\circ}\text{C}$ , in terms of preserving antibacterial properties".

This finding joins results from earlier studies showing that freeze-drying compromises neither the nutritional nor the functional properties of breast milk, unlike deep-freezing, where these properties can deteriorate over long periods. The researchers conclude that it is a viable alternative to freezing, recommending it be deployed across all milk banks.

## **The antibacterial properties of breast milk**

Silvestre explains: "the [antibacterial properties](#) of breast milk is very important, because it contributes the development of a rich intestinal flora, protecting against infections and improving tolerance to different foods. These [properties](#) are essential –she adds– in the case of the main intended recipients of donor breast milk: namely, premature or low birth weight babies, whose immune systems are underdeveloped".

CEU-UCH researchers from the Pharmacy department Jaime Salcedo and Dolores Silvestre, who leads the University's Breast Milk Research Group, and Mari Carmen López Mendoza, a food science and technology researcher in the Veterinary Faculty of CEU-UCH, made up the research team, alongside doctor María Gormaz, from the Neonatal Unit at the "La Fe" Hospital. Italian student Elisabetta Nogarotto also collaborated in this research during her Erasmus stay, presenting these

results in her final dissertation.

**More information:** Jaime Salcedo et al. Human Milk Bactericidal Properties, *Journal of Pediatric Gastroenterology and Nutrition* (2015).  
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