

Pasteurization inactivates COVID-19 virus in human milk, finds new research

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A team of medical researchers has found that in human milk, pasteurization inactivates the virus that causes COVID-19, confirming milk bank processes have been safe throughout the pandemic, and will remain safe going forward, too.

The study—published this month in the *Journal of Pediatrics and Child Health*—was a partnership between UNSW and a multidisciplinary team from Australian Red Cross Lifeblood Milk.

There are five human [milk](#) banks in Australia. As the COVID-19 pandemic evolves, these milk banks continue to provide donated [breast milk](#) to preterm babies who lack access to their mother's own milk. Donors are screened for diseases, and milk is tested and pasteurized to ensure that it is safe for medically fragile babies.

"While there is no evidence that the [virus](#) can be transmitted through breast milk, there is always a theoretical risk," says Greg Walker, lead author and Ph.D. candidate in Professor Bill Rawlinson's group at UNSW Medicine.

"We've seen in previous pandemics that pasteurized donor human milk (PDHM) supplies may be interrupted because of safety considerations, so that's why we wanted to show that PDHM remains safe."

For this study, the team worked in the Kirby Institute's PC3 lab to experimentally infect small amounts of frozen and freshly expressed breast milk from healthy Lifeblood Milk donors.

"We then heated the milk samples—now infected with SARS-CoV-2—to 63°C for 30 minutes to simulate the pasteurization process that occurs in milk banks, and found that after this process, they did not contain any infectious, live virus," Mr Walker says.

"Our findings demonstrate that the SARS-CoV-2 virus can be effectively inactivated by pasteurization."

The researchers say their experiments simulated a theoretical worst-case scenario.

"The amount of virus we use in the lab is a lot higher than what would be found in breast milk from women who have COVID-19—so we can be really confident in these findings," Mr Walker says.

Dr. Laura Klein, Research Fellow and Lifeblood Milk senior study author, explains that the purpose of the research was to provide evidence behind what people already expected.

"Pasteurization is well known to inactivate many viruses, including the coronaviruses that cause SARS and MERS," she says.

"These findings are also consistent with a recent study that reported SARS-CoV-2 is inactivated by heat treatment in some contexts."

Kirby Institute researcher and study co-author,

Associate Professor Stuart Turville, says this work was a first.

"We've been working in real time to grow and make tools against this new pathogen, which has been an exponential learning curve for everyone involved. This work and many others that are continuing in the PC3 lab tell us how we can be safe at the front line working with this virus in the real world."

More information: Gregory J Walker et al. SARS-CoV-2 in human milk is inactivated by Holder pasteurization but not cold storage, *Journal of Pediatrics and Child Health* (2020). DOI: [10.1111/jpc.15065](https://doi.org/10.1111/jpc.15065)

Provided by University of New South Wales

Cold storage doesn't inactivate the virus

The researchers also tested if storing SARS-CoV-2 in human milk at 4°C or -30°C would inactivate the virus—the first time a study has assessed the stability of experimentally infected SARS-CoV-2 in human milk under common storage conditions.

"We found that cold storage did not significantly impact infectious viral load over a 48-hour period," Mr Walker says.

"While freezing the milk resulted in a slight reduction in the virus present, we still recovered viable virus after 48 hours of storage."

The researchers say the fact that SARS-CoV-2 was stable in refrigerated or frozen [human milk](#) could help inform guidelines around safe expressing and storing of milk from COVID-19 infected mothers.

"For example, we now know that it is particularly important for mothers with COVID-19 to ensure their expressed breast milk does not become contaminated with SARS-CoV-2," Dr. Klein says.

"But it's also important to note that breastfeeding is still safe for mothers with COVID-19—there is no evidence to suggest that SARS-CoV-2 can be transmitted through breastmilk."

Donated breast milk is recommended by the World Health Organization when mother's own milk is not available to reduce the risks of some health challenges premature babies can face. Lifeblood Milk has provided donor milk to over 1500 babies born premature in 11 NICUs across New South Wales, South Australia, and Queensland since launching in 2018.

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