

## Ultraviolet light – enlightening the pasteurization of human milk

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Donor human milk is considered the best alternative when mothers' own milk is not available for preterm infants. To prevent the transmission of pathogens from a donor to an infant the donor human milk is pasteurized. The pasteurization process is defined by national and local milk banking guidelines but is most commonly the Holder method. This heat treatment (62.5°C for 30 minutes) is capable of destroying common vegetative bacteria and viruses found in human milk. However, bioactive components in human milk are only partially preserved during this process. Alternative pasteurization technologies other than thermal have the potential to optimize the quality of pasteurized donor human milk.

Ultraviolet-C (UV-C) irradiation at a wavelength of 254 nm causes DNA damage on bacteria, fungi and viruses and thereby inactivating them. Our research indicates that UV-C irradiation not only matches the safety standard of Holder pasteurization by inactivating bacteria it significantly improves the retention of bioactive components in human milk. This method reduced vegetative bacteria by 5-log<sub>10</sub>. Furthermore, no loss of bile salt stimulated lipase, alkaline phosphatase and fatty acids were observed. The retention of sIgA, lactoferrin and lysozyme was significantly higher after UV-C irradiation with 89%, 87% and 75%, respectively compared to Holder pasteurization with 49%, 9% and 41%, respectively. Additionally, the bacteriostatic property of human milk was not significantly altered through UV-C pasteurization.

Further research is required to confirm inactivation of viruses and the retention of other components in human milk, however these results suggest that UV-C pasteurization has the potential to provide a higher quality of donor human milk, that may benefit the preterm infant in terms of health outcomes where mothers' own milk is unavailable.

Christen L, Lai CT, Hartmann B, Hartmann PE, Geddes DT. Ultraviolet-C irradiation: A novel pasteurization method for donor human milk. *PLoS ONE*, 2013, 8, e68120  
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0068120;jsessionid=7D75008DC115237A6046CC6E9F009366>

Christen L, Lai CT, Hartmann B, Hartmann PE, Geddes DT. The effect of UV-C pasteurization on bacteriostatic properties and immunological proteins of donor human milk. *PLoS ONE*, under review