Processing of donor human milk: is there something better than Holder pasteurization?

Prof Guido E. Moro
Italian Association of Human Milk Banks (AIBLUD)

Fresh mothers' milk is the first choice not only for term infants but also for preterm infants [1,2]. In these tiny infants, fresh mothers' milk, when administered within 24 hours, does not require routine culturing or heat treatment [3]. In contrast, donor human milk needs to be checked microbiologically and should undergo heat treatment and storage procedures. For human milk banks, pasteurization at 62.5 °C for 30 minutes (the Holder method) is recommended [4]. Holder pasteurization allows a good compromise between microbiological safety and nutritional/biological quality of donor human milk; but it is also well known that this method affects some of the nutritional and biological properties of human milk and decreases its nutritional value [5].

To overcome the limitations of Holder pasteurization, different methodologies of human milk treatment are under investigation. Rapid pasteurization at 72 °C for 5–15 seconds (High-Temperature Short-Time = HTST) is a method that seems superior to Holder pasteurization. Although already established in food industry, the advantages of HTST technology were tested only at small laboratory scale for human milk. Recently we tested a device specifically designed to provide human milk banks with the technology they need to ensure a safe and lower-impact pasteurization process that is suitable for processing different volumes of donations. The device can pasteurize up to 10 L of milk per hour, with a minimum volume of 100 ml. The system is designed to be cleaned-in-place after each pasteurization run and sanitized immediately prior to the next use, being thus more suitable for treating pools of milk from different donors than milk from single donations.

The efficacy of the new HTST device was assessed on inoculated Listeria monocytogenes, Staphylococcus aureus and Chronobacter sakazakii, as well as on raw human milk bacteria. The milk biochemical quality after HTST pasteurization was assessed in comparison to a standard Holder pasteurization by determining the secretory IgAs (sIgAs) content, the protein profile as well as the lysozyme and Bile Salt Stimulated Lipase (BSSL) activities. No pathogen or bacteria growth was detected after HTST pasteurization with the new instrument. Changes in the protein profile were observed in the milk after both processes. The sIgAs content and BSSL activity were significantly higher in the milk pasteurized with the new device than in the same milk treated by the standard Holder pasteurization. In conclusion, the new HTST apparatus 1: can effectively pasteurize human milk with a better retention of sIgAs content and BSSL activity 2; and comply with human milk banking safety requirements.

References

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