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To cite this version:
Amélie Deglaire, Samira de Oliveira, Olivia Ménard, - Amandine Bellanger, Fredéric Carrière, et al.. The impact of human milk pasteurization is lower on the preterm than on the term milk digestion. 3rd international congress of the european milk bank association, Oct 2015, Lyon, France. hal-02743118

HAL Id: hal-02743118
https://hal.inrae.fr/hal-02743118
Submitted on 3 Jun 2020

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The impact of human milk pasteurization is lower on the preterm than on the term milk digestion

A. Deglaire1,2* & S.C. de Oliveira1,2, O. Ménard1,2, A. Bellanger, F. Carrière3, V. Briard-Bion1,2, J. Jardin1,2, E. Dirson4, D. Dupont1,2, C. Bourlieu1,2

1 INRA, UMR 1253 Science et Technologie du Lait et de l’œuf, Rennes, France
2 Agrocampus Ouest, UMR 1253 Science et Technologie du Lait et de l’œuf, Rennes, France
3 CNRS, Aix Marseille Université, UMR7282 Enzymologie Interfaciale et de Physiologie de la Lipolyse, Marseille, France
4 CHU Rennes, Lactarium - Unité Nutrition et Diététique Infantile, France
5 CHU Rennes Univ Hosp, Dept Paediat, 16 boulevard de Bulgarie, 35203 Rennes, France

*amelie.deglaire@agrocampus-ouest.fr

Mother’s own milk is the ideal infant food for optimal nutrition and growth. When not available, pasteurized donor milk can be administered. Pasteurization has structural and biochemical consequences on term milk digestion1,2. Whether similar results would be observed for preterm milk remains unknown and was thus the aim of our study.

An in vitro dynamic system was used to simulate digestion. Preterm human milk (n = 5 donors) was digested using preterm infant digestive parameters while for term milk (n = 5 donors), term infant digestive parameters were employed3,4. Each type of milk was digested as raw or pasteurized (62.5°C, 30 min) in triplicate. Digesta were sampled regularly in the gastric compartment (over 90 or 120 min for preterm or term milk, respectively) and over 180 min in the intestinal compartment. Structural changes were evaluated by confocal microscopy and laser light scattering. Proteolysis was followed by SDS-PAGE submitted to densitometry and by quantitative peptide analysis using tandem mass spectrometry coupled to liquid
chromatography. Lipolysis was evaluated by gas chromatography and thin layer chromatography fitted to flame ionisation detector.

Lipolysis degree was in overall significantly lower in pasteurized than in raw milk in both preterm and term conditions, but the extent of the difference was lower for the preterm than for the term condition. Gastric proteolysis was somewhat lower in the preterm than in the term milk. The impact of pasteurization on gastric proteolysis differed according to the protein structure with β-casein being hydrolysed significantly slower and lactoferrin being hydrolysed significantly faster in term pasteurized milk compared to term raw milk. This was not statistically significant in preterm milk. Similarly, the peptidome differed between raw and pasteurized milk to a lesser extent in the preterm than in the term condition. In both preterm and term conditions, pasteurization impacted the protein susceptibility to aggregation during digestion. These results demonstrate that pasteurization had a lower impact on digestion of preterm milk compared to term milk. Such results have to be confirmed by in vivo studies.

References: