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Abstract

Changes to Breast Milk Composition following Increased Maternal Sugar and Fat Consumption †

Ellen Ward [1,*], Ni Yang [2], Beverly S. Muhlhausler [1,3], Gabriela E. Leghi [3], Merryn J. Netting [4], Matthew J. Elmes [2] and Simon C. Langley-Evans [1]

1 Commonwealth Scientific and Industrial Research Organisation (CSIRO), Adelaide 5000, Australia
2 School of Biosciences, University of Nottingham, Loughborough LE12 5RD, UK
3 School of Agriculture, Food and Wine, University of Adelaide, Adelaide 5064, Australia
4 Women and Kids Theme, South Australian Health and Medical Research Institute (SAHMRI), Adelaide 5000, Australia
* Correspondence: ellen.ward@csiro.au
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Abstract: Human milk is influenced by maternal habitual diet, yet we do not fully understand the short-term effects of dietary variations on breast milk macronutrient concentrations. This study aimed to determine if increasing sugar and fat consumption would impact breast milk protein, lactose and lipids. Nine mothers who were exclusively breast-feeding consumed three diets; a control, a higher fat diet and a higher sugar diet at least 1 week apart. Breast milk samples were collected hourly and analysed for concentrations of protein, lactose, triglycerides and cholesterol. Breast milk triglycerides responded to both intervention diets with significantly higher concentrations in comparison to the control diet ($p < 0.001$). Cholesterol concentrations increased more in response to the higher sugar diet than the higher fat diet ($p < 0.005$). Lactose concentrations increased in response to the higher fat diet ($p = 0.006$), and protein decreased in response to the higher fat diet ($p = 0.05$). Variations in breast milk composition were observed over the day with triglyceride and cholesterol concentrations highest at the end of day ($p < 0.001$), and lactose and protein concentrations peaking at hour 10 ($p < 0.001$). Manipulating maternal consumption of fat and sugar impacted concentrations of human milk triglycerides, cholesterol, lactose and protein. Fluctuations were also seen in milk macronutrients in response to time of day.

Keywords: human milk; diet; triglycerides; protein; lactose; maternal nutrition; lactation

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Data Availability Statement: Data from this study will be archived in the University of Nottingham Repository (https://nottingham-repository.worktribe.com) on the completion of EW's PhD studies following the 4 January 2024 and will also be available through the University of Nottingham eTheses database (https://eprints.nottingham.ac.uk/etheses/).

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