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Abstract

Immediate Point-of-Care Testing of Breastmilk Sodium and Potassium Concentrations in Women with Mastitis †

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† Presented at the Australian Breastfeeding + Lactation Research and Science Translation Conference (ABREAST Conference 2023), Perth, Australia, 10 November 2023.

Abstract: Sodium (Na) and potassium (K) concentrations in breastmilk are often used as biomarkers to define mastitis in lactating women and can be measured with small portable point-of-care ion-selective electrodes (ISEs). The aim of this study was to test the ISEs at the point of care for accuracy and acceptability in women with mastitis. Up to 5 mL of expressed breastmilk from the affected breast of 43 women with mastitis was collected at three timepoints (day 1, 3, and 10). Immediate Na and K ISE testing was later compared to the laboratory measure of inductively coupled plasma–op-tical emission spectrometry (ICP-OES). The results revealed a statistically significant difference in Na and K concentrations between the point-of-care and laboratory testing (both $p = 0.001$, Wilcoxon signed-rank test); however, the difference was not statistically significant when compared for Na:K ratio ($p = 0.49$, Wilcoxon signed-rank test). The Bland–Altman limits of agreement were acceptable, with the majority of measurements lying within two standard deviations of the mean (Na: 94%; K: 95%; and Na:K: 96%). The testing techniques were significantly correlated for Na ($R^2 = 0.79$, $p = 0.001$) and Na:K ($R^2 = 0.99$, $p = 0.001$). Overall, participants rated the ISE point-of-care testing as very acceptable. In conclusion, immediate ISE point-of-care testing for breastmilk Na:K ratio in women with mastitis is clinically accurate and acceptable.

Keywords: breastmilk; biomarkers; sodium; potassium; ion-selective electrode; point-of-care; inductively coupled plasma–optical emission spectrometry; lactation; mastitis; breast inflammation

Citation: Heron, E.L.; Lai, C.T.; McKenna, L.J.; McArdle, A.M.; Geddes, D.T. Immediate Point-of-Care Testing of Breastmilk Sodium and Potassium Concentrations in Women with Mastitis. *Proceedings* **2023**, *93*, 1. https://doi.org/10.3390/proceedings2023093001

Academic Editors: Debra J. Palmer and Nicolas L. Taylor

Published: 19 December 2023

Author Contributions: Conceptualization, E.L.H., L.J.M., A.M.M. and D.T.G.; methodology, E.L.H., C.T.L., L.J.M. and D.T.G.; validation, E.L.H. and C.T.L.; formal analysis, E.L.H. and C.T.L.; investigation, E.L.H.; resources, C.T.L. and D.T.G.; data curation, E.L.H. and C.T.L.; writing—original draft preparation, E.L.H. and C.T.L.; writing—review and editing, E.L.H., C.T.L., L.J.M., A.M.M. and D.T.G.; supervision, C.T.L., L.J.M., A.M.M. and D.T.G.; funding acquisition, E.L.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Mercy Health Small Grants 2021/2022 and 2022/2023. Author and Ph.D. candidate, E.H., received an Australian Government Research Training Program Scholarship (https://www.dese.gov.au/research-block-grants/research-training-program). The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Mercy Health Human Research Ethics Committee (2021-007, 6 May 2021).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data sharing not applicable.

Acknowledgments: Medela AG (Switzerland) is acknowledged for their kind loan of a hospital-grade breast pump; Angela Jacques for her statistical analysis assistance; and Xiaojie Zhou and Oscar Del Borrello for their technical support.

Conflicts of Interest: D.T.G. declares participation in the Scientific Advisory Board of Medela AG. C.T.L. and D.TG. receive a salary from an unrestricted research grant from Medela AG, administered by The University of Western Australia. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results. All other authors declare no conflict of interest.