The Creamatocrit Plus™: A New Centrifuge for Measuring Creamatocrits with Mothers’ Milk

Paula P. Meier, RN, DNSc, FAAN1; Janet L. Engstrom, RN, PhD2; CNM; Joyce L. Zuleger, RN, BSN1; Judy E. Motykowski, RN, BSN3; Ushanalini Vasan, MD1; Werner A. Meier, MD1; Tracey M. Williams, BS3; Peter E. Hartmann, PhD3

Special Care Nursery, Rush University Medical Center, Chicago, IL; 2Department of Maternal-Child Nursing, University of Illinois at Chicago; 3Department of Biochemistry, University of Western Australia

BACKGROUND
The creamatocrit is a simple, inexpensive, and accurate technique for estimating the lipid concentration and caloric density in mothers’ milk. Although the creamatocrit has been used widely in published research, it has only recently been incorporated into the clinical management of infants who are fed mothers’ milk. The creamatocrit technique is especially useful in the neonatal intensive care unit (NICU) to guide the fractionation and feeding of high-lipid, high-calorie hindmilk and composite (full-pumping) milk, for a total of 36 milk specimens. For each milk specimen, two investigators performed six creamatocrit measures. Two each using the Creamatocrit Plus™, the standard centrifuge with a hematocrit reader, and the standard centrifuge with digital calipers. Investigators were blinded to each other’s measures. Intra- and interrater reliability was determined by comparing the mean differences within and between clinicians’ creamatocrit values obtained with the 3 measurement techniques. Equivalence was determined by comparing actual creamatocrit values obtained with the 3 measurement techniques. A 3-ml sample of each milk specimen was frozen at ~80°C until direct laboratory measures of lipid concentration and caloric density were performed (Univ of Western Australia). Biochemists were blinded to creamatocrit values, and whether specimens were foremilk, hindmilk, or composite milk. Accuracy was established by regression analysis to determine the relationship between creamatocrit and direct measures for lipid concentration and caloric density. The resulting regression equation was used to estimate lipid concentration and caloric density for the 36 creamatocrit measures. Then, the mean differences between the actual and estimated lipid and caloric values were compared.

RESULTS
There were no significant differences for intra- and interrater reliability among the three measurement techniques, indicating that values obtained with the Creamatocrit Plus™ were as reliable as current standards.

CONCLUSIONS
Results for intra- and interrater reliability and equivalency of technique indicate that the Creamatocrit Plus™ performs comparably to the standard centrifuge using either the hematocrit reader or digital calipers. Results reveal that the Creamatocrit Plus™ provides excellent accuracy in estimates of lipid concentration and caloric density.

IMPLICATIONS
The user-friendly features of this device make it feasible for use in any clinical or research setting, especially in the NICU where portability, physical space constraints, professional staff time, and noise level are crucial considerations. The excellent reliability, equivalency, and accuracy results indicate that the Creamatocrit Plus™ can replace traditional measurement techniques that include the beaker and thermostat laboratory centrifuge, the hematocrit reader, and digital calipers.

SELECTED REFERENCES

ACKNOWLEDGEMENT
This study was funded by Separation Technology, Inc., Aston, PA.