STUDY SUMMARY

Apples to Osmoles?

Differences in Osmolality Reporting for Enteral Formulas and Implications for Clinical Interpretation

Blackmer A, Huhmann MB, Klosterbuer A

A Research Summary based on: Poster#P53 at ASPEN26 Nutrition Science and Practice Conference, February 14-17, 2026, Long Beach, California.
J Parenter Enteral Nutr. 2026; 50: S71-S332.

WHY WAS THIS STUDY DONE?

- Osmolality is the concentration of free particles in solution[1,2]
- Reported enteral nutrition (EN) formula osmolality is typically 280-875 mOsm/kg H_2O
- Despite common perception, there's little evidence to suggest that higher EN osmolality alone causes gastrointestinal (GI) intolerance / diarrhea[1,3,4]
- Yet, clinicians often use osmolality as a factor when choosing EN, particularly for patients transitioning to peptide formulas with previous intolerance to standard EN
- Thus, variability in analytical methodologies and reporting practices may limit clinical utility of osmolality comparisons

This study aimed to compare osmolality of common pediatric and adult EN peptide-based formulas using standard methodologies[5-8] to assess variability across formulas with different ingredients, caloric densities, and manufacturers.

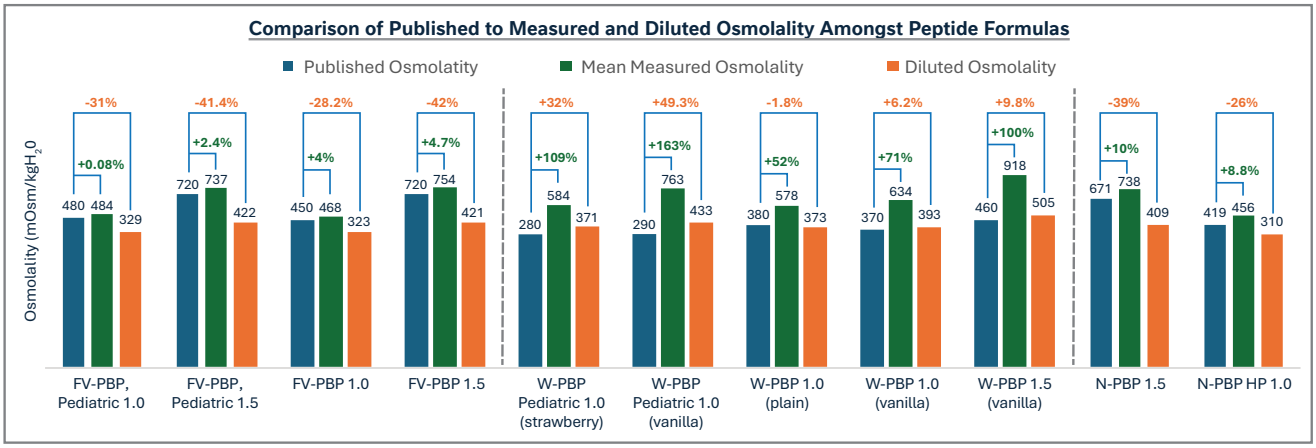
HOW WAS THIS STUDY PERFORMED?

- Nine commercially available pediatric and adult plant-based peptide-based (PBP) formulas were identified:
  - FV-PBP: including fruit and vegetable ingredients (Compleat® Peptide formulas, Nestlé Healthcare Nutrition, US); n=4
  - W-PBP: without fruit and vegetable ingredients (Kate Farms® Peptide formulas, Kate Farms Inc, US); n=5
- Measured osmolality was determined using vapor pressure osmometry (Vapro® Vapor Pressure Osmometer, Wescor Model 5600), which is recommended for products with osmolality 100-3,000 mOsm/kg H_2O or increased viscosity and has been adopted as an industry standard for medical foods internationally[5-8]
- Samples were tested in triplicate with averages compared to osmolality values published on manufacturer websites
- Based on prior reporting,[8] additional samples diluted 1:1 with 200 mOsm/kg H_2O NaCl solution were measured to assess impact of dilution

Post-Hoc Secondary Analysis

- A secondary analysis was performed using the same methodology as described to evaluate non-plant-based peptide formulas (N-PBP) (Abbott Nutrition; Vital® 1.5 and Vital® HP 1.0).

STUDY RESULTS



- For FV-PBP, measured osmolality was 0.08-2.4% higher and 4-4.7% higher for pediatric and adult formulas, respectively
- For W-PBP, measured osmolality was 109-163% higher and 52-100% higher for pediatric and adult formulas, respectively
- For N-PBP, measured osmolality was 8.8-10% higher than published osmolality
- Use of diluted samples increased the variability for FV-PBP and N-PBP but decreased variability for W-PBP
- Differences in measured versus published osmolality were greater for products with higher caloric density

DISCUSSION AND FUTURE DIRECTIONS

- Notable differences were observed for W-PBP, with measured osmolality more than two-times higher than published in three of five samples.
  - Although minor discrepancies may be expected due to analytical variability, formula homogeneity, storage conditions, and shelf-life changes, differences of 200-400 mOsm/kg H_2O would not be anticipated; formula dilution did not fully explain the differences.
- For FV-PBP, measured osmolality compared to published osmolality was within 5% of all formulas, suggesting good agreement.
- Future research may focus on expanding analysis on additional EN formulas.

CONCLUSIONS

This analysis underscores the need for standardized methodology and reporting practices to enable meaningful comparisons of osmolality across EN formulas. Clinicians should remain aware of differences when considering osmolality as part of formula selection

To access the full publication and additional Compleat® studies, visit: www.nestlemedicalhub.com/compleatevidence

USE UNDER MEDICAL SUPERVISION

1) Roberts S, Kirsh R. Enteral nutrition formulations. In The ASPEN Adult Nutrition Support Core Curriculum. American Society for Parenteral and Enteral Nutrition 2017. 2) Sadowska A, et al. Molecules. 2021 Sep 15;26(18):5607. 3) Barrett JS, et al. JPEN 2009;33(1):21-26. 4) Edes TE, et al. Am J of Med. 1990;88(91): 91-93. 5) Sweeney TE and Beuchat CA. Am J Physiol. 1993;264: R469-R480. 6) National Health Commission of the People's Republic of China; State Administration for Market Regulation. GB 5009.301.2025. National Food Safety Standard – Determination of Osmotic Pressure in Food. 7) Adams ET Jr, et al. Methods Enzymol. 1978;48:69-154. 8) Cassady B, et al. JAND 2023; 123(10): A-25.

Financial support provided by Nestlé Health Science.