Title: Riboflavin Concentrations in Lactating Women over the First 8 Months Postpartum

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Abstract:

Riboflavin (vitamin B2) is an essential water-soluble vitamin with a central role in energy metabolism and cell function. Riboflavin is actively secreted into breastmilk during lactation, where it supports infant growth and development. Riboflavin is light-sensitive, and exposure upon processing and collection will lead to rapid degradation and underestimation of its true concentration in biological samples. We determined whether light-protected sample handling results in higher plasma riboflavin concentrations than previously reported and to explore relationships between riboflavin exposure (area under the concentration-time curve [AUC]), supplementation dose, and postpartum timepoint. Plasma samples were drawn from lactating women at 3–5 weeks, 3–4 months, and 6–8 months after delivery. Plasma samples were drawn into light-protected tubes, immediately foil-wrapped after drawing, placed on ice, and processed under reduced UV conditions. Concentrations were measured by liquid chromatography–tandem mass spectrometry (LC-MS/MS). Plasma riboflavin concentrations in our group were consistently higher than in a comparable study of lactating women in which light-protective handling did not occur. These findings suggest that photodegradation during sample handling likely contributed to the lower concentrations reported previously. We also explored whether plasma area under the concentration–time curve (AUC) is associated with reported dose of riboflavin supplementation, whether AUC differs across study days, and whether AUC values differ significantly by timepoint. No significant associations or differences were found. These findings highlight the importance of standardized light-protection protocols in research on riboflavin measurement, as well as research into factors such as supplementation that may affect the pharmacokinetics of riboflavin.

Keywords: Riboflavin, vitamin B2, lactation, plasma, light degradation, LC-MS/MS, pharmacokinetics