

E

Methodological Problems Associated with Laboratory Values and Food Composition Data for B Vitamins

TABLE E-1 Methodological Problems with Laboratory Values for B Vitamins

	Thiamin	Riboflavin	Niacin	B ₆
Are precise, accurate methods available?	Yes	Yes	Yes	Yes
What is known about the analytic sensitivity and specificity of the methods?	Good	Good	Good	Good
Is there good agreement in results from use of different methods?	Yes	Yes	Yes	Yes, for most
Is there good agreement in results if different laboratories use the same methods?	Yes	Yes	Yes	Fair
Over time, how have changes in methods affected estimates?	Generally lower because of more specific chromatographic separation (especially high-performance liquid chromatography)			

Folate	B ₁₂	Pantothenic Acid	Biotin	Choline
Needs improvement	Yes	Needs improvement	Being improved	Yes
Good, but incomplete assays for all forms	Fair; some metabolite interference noted	Needs improvement	Variable	Mass spectrometry specific to 5 pmol
No, see Gunter et al., 1996 ^a	No, e.g., <i>Euglena gracilis</i> gives lower values than does <i>Lactobacillus leichmannii</i>	Fair, limited	No	Yes
No, see Gunter et al., 1996 ^a	No, nonisotopic and radioassays do not agree closely	Fair	Fair, limited	Yes
Trends vary depending on method.	Radioassays were unreliable before 1978. Recent introduction of nonisotopic assays has led to higher results.	Little change in methods	Generally lower now	No change

continued

TABLE E-1 Continued

	Thiamin	Riboflavin	Niacin	B ₆
How are problems with methods addressed in the report?	Not necessary	Earlier under- and over-estimations of flavins noted.	Questions for research	Not necessary

^a Gunter EW, Bowman BA, Caudill SP, Twite DB, Adams MJ, Sampson EJ. 1996. Results of an international round robin for serum and whole-blood folate. *Clin Chem* 42:1689–1694.

TABLE E-2 Methodologic Problems with Obtaining Food Composition Data for B Vitamins

	Thiamin	Riboflavin	Niacin	B ₆
Are precise, accurate methods available? ^a	Substantial, acceptable quality	Substantial, acceptable quality	Substantial, acceptable quality	Substantial, acceptable quality
Is there good agreement in results using different methods?	Fair when allowance is made for specificity differences			
Over time, how have changes in methods affected estimates?	None noted	About the same or slightly lower	None noted	Slightly higher now

^a Ratings for the B vitamins (but not for choline) are taken from Life Sciences Research Office/Federation of American Societies for Experimental Biology. 1995. *Third Report on Nutrition Monitoring in the United States*. Washington, DC: U.S. Government Printing Office.

^b Quality of data was rated moot if it was considered unlikely that improved data for that food component would make a difference in the assessment of nutrition-related health status and the assignment of nutrition monitoring priority status (LSRO/FASEB, 1995).

Folate	B ₁₂	Pantothenic Acid	Biotin	Choline
Detailed subsections, questions for research	Need for internal reference is stated and values given when available; questions for research.	Questions for research	Short subsection	Not necessary

Folate	B ₁₂	Pantothenic Acid	Biotin	Choline
Conflicting, variable quality	Conflicting, quality moot ^b	Conflicting	Lacking, being improved	Substantial, acceptable quality
No, see Gregory (1997), Martin et al. (1992), Pfeiffer et al. (1997), Tamura et al. (1997) ^c	No, tissue methods poorly developed	—	Insufficient comparisons to assess	Yes, but very limited experience
New methods give somewhat higher results for some foods	—	—	—	Old estimates were too high, early assay not specific

^c Gregory JF 3rd. 1997. Bioavailability of folate. *Eur J Clin Nutr* 51: S54–S59; Martin DC, Francis J, Protetch J, Huff J. 1992. Time dependency of cognitive recovery with cobalamin replacement: Report of a pilot study. *J Am Geriatr Soc* 40:168–172; Pfeiffer CM, Rogers LM, Gregory JF 3rd. 1997. Determination of folate in cereal-grain food products using trienzyme extraction and combined affinity and reversed-phase liquid chromatography. *J Agric Food Chem* 45:407–413; Tamura T, Mizuno Y, Johnston KE, Jacob RA. 1997. Food folate assay with protease, α -amylase, and folate conjugase treatments. *J Agric Food Chem* 45:135–139.