

Comparison of dietary analysis methods for human folate bioavailability studies

AE de Ambrosis¹, J Arcot¹, J Paterson¹, AK Shrestha¹, P Haber²

¹Dept of Food Science & Technology, The University of New South Wales, Sydney

²Drug and Alcohol Department, Royal Prince Alfred Hospital, Sydney

Accurate folate analysis of foods is essential for bioavailability studies. Direct folate analysis may be too laborious for large-scale studies and the current data on the folate content of Australian foods is limited. Can the UK food composition tables be substituted in the absence of Australian data? This study was performed in order to assess the validity of obtaining folate values in subject diets using UK food composition tables (1) and weighed food record sheets (method 1) compared to a food duplication method and direct folate analysis (method 2).

Healthy female subjects (n = 6) with no previous history of pregnancy or miscarriage were screened for the following criteria: serum folate 6.0–30.0 nmol/L, red blood cell folate 360–1400 nmol/L and absence of certain prescribed drug use. Two double blind crossover trials were conducted using a test dose of pteroyl-glutamic acid (138 µg aqueous folic acid) in each case. In trial 1, the subjects were maintained on a low folate basal diet (< 200 µg/day) for 48 hours by means of self-selection from a low folate food list in order to satisfy a 24-hour collection of postdose urine and faeces. In trial 2, the subjects were maintained on the same basal diet for 72 hours in order to satisfy a 48-hour collection of postdose urine and faeces. During both trials, the subjects were asked to provide an accurate weighed food record of all foods eaten during the test period whilst also being instructed to collect in a bag the same amount of all foods eaten during the test period. The folate content of the food samples was measured through a modified tri-enzyme extraction and *L.casei* microbiological assay (2). This study revealed that direct chemical analysis of foods (method 2) in formulating a low-folate diet would be more reliable.

Subject number	Folate intake µg/day			
	Trial 1 ¹	Trial 1 ²	Trial 1 ¹	Trial 2 ²
3	57 ± 14	116	140 ± 13	38
5	129 ± 7	63	144 ± 4	71
6	91 ± 20	110	119 ± 13	71
7	141 ± 22	133	85 ± 7	56
8	151 ± 14	91	222 ± 25	106
9	56 ± 4	139	204 ± 26	45

¹mean ± SEM from microbiological assay; ²average measured from weighed food record sheets and the UK food composition tables

1. McCance RA, Widdowson EM. McCance and Widdowson's the composition of foods. Cambridge: The Ministry of Agriculture, Fisheries and Food, 1991.
2. Shrestha AK, Arcot J, Paterson J. Folate assay of foods by traditional and tri-enzyme treatments using cryoprotected *Lactobacillus casei*. Food Chemistry 2000; 71: 545-552.