RELATION BETWEEN SERUM FOLATE AND FOLATE INTAKE IN WOMEN

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Folic acid is protective against neural tube defects. Folic acid fortification of flour, bread, breakfast cereals, fruit juice and vegetable juice was recommended by the NHMRC in 1994 and accepted by the National Food Authority in June 1995. The NHMRC also noted, 'the need to monitor intakes and blood values of folate in specific population subgroups'. Recent intake could perhaps be monitored by serum folate. No studies have considered the relation between nutritional level folic acid supplementation and serum folate in non-pregnant adult females. We carried out two separate studies focusing on this group.

The first study aimed to determine this relation. Nineteen women, 20-35 years, consumed 125 and 250 μg folic acid daily (as quarters and halves of Blackmores 500 μg folic acid tablets, Balgowlah, NSW) for one week each. The lower dose was taken first, followed by a supplement-free week and then the higher dose. Blood was drawn from the arm and serum produced by centrifugation. Folate was analysed by homogeneous enzyme binding assay kit (CEDIA Vitamin B-12 and Folate assays, Microgenics Corporation, Concord, CA, USA).

A linear relationship between serum folate and supplement intake was observed, with an increase of 2.2 ng/ml per 250 μg supplement. The purpose of graphing this relation was to use serum folate to estimate folate intake. However, this could not be used with confidence because the intake that was calculated to correspond to the baseline serum concentration was 830 μg/day. Normal intakes are estimated as ranging from 120-460 μg/day (NHMRC 1994).

The time to reach maximum serum concentration was considered in the second study. Serum folate is said to reflect intake over the past 'few days' (Kohlmeier 1995). We were asking the meaning of 'few'. Seventeen women, 19-25 years consumed 200 μg folic acid (donated by Roche Vitamin and Fine Chemicals, Frenchs Forest, NSW), in a 0.1M sodium bicarbonate solution, daily for 31 days. Blood for serum folate analysis was collected on days 0, 10, 16, 21, 24 and 31 and analysed as in the previous study.

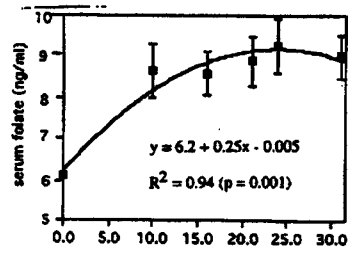

Figure. Increase in serum folate (ng/ml) during 31 day supplementation with 200 μg folic acid/day.

It was found that 70% of the total increase occurred by day 10 but that the serum folate concentration did not reach a maximum (3 ng/ml) until approximately days 20-24 (Figure). The folate intake versus serum folate relation was plotted again using the results of these and nine other studies from the literature. It appeared to be linear and a serum folate concentration of approximately 2.8 ng/ml was found to correspond to a folate intake of 200 μg/day.

KOHLMEIER, L. (1995). Am. J. Clin. Nutr. 61: 702S.
NH and MRC (1994). 'Expert panel on folate fortification of the National Health and Medical Research Council'; report to the 117th session of council, Sydney.

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