The intake of boron in healthy free-living subjects

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In healthy men consuming their habitual diet, we have shown that supplementation with boron results in increases in the concentrations of plasma oestrogen and testosterone (1). It is clear that the potential impact of boron warrants further investigation particularly to clarify the important dietary sources and quantify the daily intake since these could contribute to the observed effects. The aim of this study was to determine the concentration of boron in selected foods and to estimate the daily intake of boron in healthy men and women.

Participants were non-smokers, in apparent good health and did not consume any nutritional supplements or medication. Mean (range) ages were 32 (20-53) years and 24 (21-46) years; and body mass indices were 24 (21-28) kg/m^2 and 20 (18-23) kg/m^2, for 17 males and 15 females respectively. Each subject was asked to weigh, where possible, all food and liquids consumed for seven consecutive days. The boron content of selected food items was analysed by using a colourimetric method. Energy and nutrient intakes were analysed using the NUTTAB database of Australian foods.

High concentrations of boron (1.0-4.5 mg/100 g) were found in nuts, dried fruits, legumes and avocado; moderate concentrations (0.1-0.6 mg/100 g) were found in fresh fruit and vegetables and honey; trace or minimal concentration of boron (0.01-0.06 mg/100 g) were found in foods from animal sources such as meat, cheese and butter.

The nutrient intakes of the male and female subjects is shown as mean (± SD) in the Table below. The boron intake in male and female subjects was similar. Because wine contributes appreciable amounts of boron, the values with and without wine consumption were analysed. In the wine drinkers, wine contributed an average of 1.00 ± 0.65 mg/d in males (n = 6) and 0.67 ± 0.37 mg/d (n = 5) among the females. Boron intake correlated positively with energy, dietary fibre and plant protein but not with carbohydrate intake.

	Males	Females	All subjects
n	17	15	32
Total energy (MJ)	10.5 ± 3.8	6.89 ± 1.75	8.93 ± 3.58
Protein (g)	107 ± 24	69 ± 12	89.4 ± 27
(% energy)	(17.2)	(16.5)	(16.9)
Fat (g)	92 ± 28	53 ± 12	73 ± 29
(% energy)	(32.3)	(28.7)	(30.6)
Carbohydrate (g)	307 ± 70	222 ± 30	267 ± 69
(% energy)	(46.9)	(53.5)	(50.0)
Dietary Fibre (g)	31.7 ± 14	21.8 ± 6.6	27.4 ± 12.6
Plant protein (g)	45 ± 20	27 ± 8.6	37 ± 19
Alcohol (g)	15.1 ± 10.9	5.8 ± 3.8	11.5 ± 9.8
(% energy)	(3.4)	(1.5)	(2.5)
Boron (mg)	2.3 ± 1.3	2.2 ± 1.1	2.2 ± 1.2

The amount of boron ingested through food is similar in magnitude to supplements which have been shown to induce hormonal changes in clinical trials. This suggests that boron is a significant component of fruit and vegetables and may contribute to the physiological effects of the non-nutrient content of those foods.

1. Naghii MR, Samman S. The effect of boron supplementation on selected cardiovascular risk factors in healthy subjects. Biol Trace Elem Res (in press).