

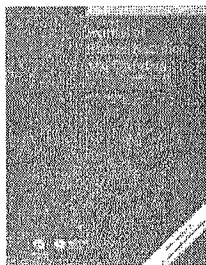
Availability of micronutrients from dried, encapsulated fruit and vegetable preparations: a study in healthy volunteers

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Article first published online: 25 DEC 2001

DOI: 10.1046/j.1365-277x.2000.00206.x

Issue



Journal of Human Nutrition and Dietetics

Volume 13, Issue 1, ([doi/10.1111/jhn.2000.13.issue-1/issuetoc](https://doi.org/10.1111/jhn.2000.13.issue-1/issuetoc)) pages 21–27, February 2000

Additional Information

How to Cite

Leeds, A. R., Ferris, E. A. E., Staley, J., Ayesh, R. and Ross, F. (2000), Availability of micronutrients from dried, encapsulated fruit and vegetable preparations: a study in healthy volunteers. *Journal of Human Nutrition and Dietetics*, 13: 21–27. doi: 10.1046/j.1365-277x.2000.00206.x

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Publication History

1. Issue published online: 25 DEC 2001
2. Article first published online: 25 DEC 2001
3. **Accepted for publication:** September 1999

- Abstract
- [Article \(/doi/10.1046/j.1365-277x.2000.00206.x/full\)](https://doi.org/10.1046/j.1365-277x.2000.00206.x/full)
- [References \(/doi/10.1046/j.1365-277x.2000.00206.x/references\)](https://doi.org/10.1046/j.1365-277x.2000.00206.x/references)
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Keywords:

ascorbic; acid; α -tocopherol; β -carotene; fruits & vegetables; malondialdehyde; supplements

Background High levels of consumption of fruit and vegetables, which contain antioxidant nutrients including vitamins C and E as well as β -carotene, are associated with reduced rates of atherosclerotic arterial disease and some cancers. Low plasma levels of these micronutrients are associated with an increased risk of chronic degenerative disease. While increasing consumption of fruit and vegetables would be desirable, many factors including cost tend to prevent this. Preparations of the active components of fruit and vegetables encapsulated to achieve convenience may contribute to solving this problem.

Aims This study was designed to determine whether two such supplements prepared from dehydrated fruit and vegetable extracts (Juice Plus+™ Fruit and Juice Plus+™ Vegetable) would result in elevation in blood concentrations of antioxidants to levels associated with lower disease risk.

Methods Sixteen healthy subjects (eight male, eight female, aged 18–52 years) were screened to exclude disease and to exclude any individual with a serum β -carotene below $0.05 \mu\text{mol L}^{-1}$, and were divided into two groups of eight, each to consume either the fruit or vegetable preparation. Four days before administration of the capsules the subjects commenced a low β -carotene diet. Venous blood samples for determination of vitamin C, vitamin E (as α -tocopherol) and β -carotene were taken in the morning on days 0, 2, 4, 6 and 7, after a 10-h fast. Two capsules of either the fruit preparation (containing vitamin E 30 mg, vitamin C 150 mg and β -carotene 6 mg) or vegetable preparation (containing vitamin E 30 mg, vitamin C 50 mg and β -carotene 9 mg) were taken on days 0–6 inclusive with a 610-kcal breakfast (47% energy from fat).

Results Serum β -carotene levels rose significantly by $0.56 \mu\text{mol L}^{-1}$ and $0.54 \mu\text{mol L}^{-1}$ after fruit and vegetable preparations, respectively, by day 7, vitamin E levels rose significantly by $3.1 \mu\text{mol L}^{-1}$ after the fruit preparation but not after the vegetable preparation and vitamin C rose significantly from 28 to $62 \mu\text{mol L}^{-1}$, and from 32 to $50 \mu\text{mol L}^{-1}$ after the fruit and vegetable preparations, respectively. Plasma malondialdehyde, regarded as a general indicator of peroxidation, fell significantly by $19 \times 10^{-5} \mu\text{mol L}^{-1}$ (about a 40% reduction) in both treatment groups.

levels into the ranges associated with reduced risk of disease and that this reduces the concentration of a general measure of lipid peroxidation. Further studies, especially in those with disease characterized by increased oxidative stress, are indicated.

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