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# OC38: Introduction of plasma vitamin C and Ferric Reducing Antioxidant Power into a combined biomarker with plasma carotenoids increases the association with fruit and vegetable intake

Y. Jin[1,2,3], M. H. Gordon[2,3], D. Alimbetov[2,3,4], M. F.-F. Chong[2,3,5], T. W. George[2,3,6], J. P. E. Spencer[2,3], O. B. Kennedy[2], K. M. Tuohy[2,7], A.-M. Minihane[2,8], and J. A. Lovegrove[2,3]
For The FLAVURS study group

[1]*Department of Health Sciences, Liverpool Hope University, Liverpool L16 9JD, UK,* [2]*Hugh Sinclair Unit of Human Nutrition,* [3]*Institute of Cardiovascular and Metabolic Research, Department of Food and Nutritional Sciences, the University of Reading, Whiteknights, PO Box 226, Reading RG6 6AP, UK,* [4]*Department of Bioengineering, Cell Technologies and Cell Therapy, Centre for Life Sciences, Nazarbayev University, 53 Kabanbay Batyr Ave., Astana, 010000, Kazakhstan,* [5]*Clinical Nutrition Research Centre, Singapore Institute for Clinical Sciences, A\*STAR, 14 Medical Drive, #07–02, Singapore 117599,* [6]*Ellison Building, Department of Applied Sciences, Faculty of Health and Life Sciences, Northumbria University, Newcastle Upon Tyne NE1 8ST, UK,* [7]*Research and Innovation Centre, Fondazione Edmund Mach, via Mach 1, 38010 San Michele all'Adige, Trento, Italy and* [8]*Norwich Medical School, University of East Anglia, Norwich NR4 7TJ, UK*

Monitoring of fruit and vegetable (F&V) intake is fraught with difficulties. Available dietary assessment methods are associated with considerable error and use of biomarkers offers an attractive alternative[1]. Few studies to date have examined the use of plasma biomarkers to monitor or predict F&V intake of volunteers consuming a wide range of intake from both habitual F&V and manipulated diets. This study combined plasma vitamin C and carotenoid concentrations with Ferric Reducing Antioxidant Power (FRAP) as an integrated biomarker of F&V intake and compared the predictive powers of each single and integrated biomarker for F&V intake. Data from a randomized, controlled, dietary intervention study (FLAVURS) ($n = 154$) in which the test groups had observed sequential increases of 2·3, 3·2 and 4·2 portions of F&V every 6-wk across an 18-wk period was used in this study. A modified integrated plasma biomarker was devised which included plasma vitamin C, total carotenoids and FRAP values, and this gave a better correlation with F&V intake ($r = 0.516$, $P < 0.001$) than the individual biomarkers ($r = 0.332$, $P < 0.001$; $r = 0.417$, $P < 0.001$; $r = 0.136$, $P = 0.099$ respectively). Inclusion of urinary potassium concentration did not significantly improve the correlation. The modified integrated plasma biomarker more accurately predicted F&V intake to within 2 portions of the actual intake in $54.3 \pm 4.9\%$ of the population compared with plasma carotenoid concentration ($48.3 \pm 11.3\%$), although this difference did not reach statistical significance ($P > 0.05$). Either plasma carotenoid concentration or the integrated biomarker could be used to distinguish high and low F&V consumers.

1. Pollard J, Wild CP, White KL *et al.* (2003) *Eur J Clin Nutr* **57**, 988–998.

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