Polyphenols and athletic performance

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Effect of Dietary Antioxidants, Training, and Performance Correlates on Antioxidant Status in Competitive Rowers

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The beneficial effects of exercise and a healthy diet are well documented in the general population, but poorly understood in elite athletes. Previous research in elite athletes suggests that regular consumption of an antioxidant-rich diet enhances antioxidant defenses but not performance. The purpose of this study was to investigate the impact of habitual diet and/or exercise training status on performance and antioxidant status in elite athletes.

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ORIGINAL ARTICLE

Effects of dietary antioxidants on training and performance in female runners

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Abstract
Exercise-induced oxidative stress is implicated in muscle damage and fatigue which has led athletes to embark on antioxidant supplementation regimes to negate these effects. This study investigated the intake of vitamin C (VC) (1 g), blackcurrant (BC) juice (15 mg VC, 300 mg anthocyanins) and placebo in isocaloric drink form on training progression, incremental running test and 5-km time-trial performance. Twenty-eight trained female runners (age: 31 ± 8.7; mean ± SD) completed three blocks of high-intensity training for 3 weeks, followed by a washout (~3.7 weeks). Changes in training and performance with each treatment were assessed with a mixed linear model, adjusting for performance at the beginning of each training block. Markers of oxidative stress included protein carbonyl, malondialdehyde (MDA), angiotensin II, vitamin C, uric acid, and erythrocyte enzyme activity of superoxide dismutase, catalase and glutathione peroxidase were measured. There was a likely harmful effect on mean running speed during training when taking BC (1.3 g), 90% confidence limits ± 1.3%. Effects of the two treatments relative to placebo on mean performance in the incremental test and time trial were unclear, but runners faster by 1 SD of peak speed demonstrated a possible improvement on peak running speed with BC juice (1.9%, ± 2.5%). Following VC, certain oxidative markers were elevated: catalase at rest (23% ± 21%), protein carbonyls at rest (27% ± 38%) and superoxide dismutase post-exercise (8.3% ± 9.3%). In conclusion, athletes should be cautious about taking VC chronically, however, BC may improve performance in the elite.

Keywords: Sports performance, ergogenic aids, sports nutrition

Impact of Dietary Antioxidants on Sport Performance: A Review

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Abstract
Many athletes supplement with antioxidants in the belief this will reduce muscle damage, immune dysfunction and fatigue, and will thus improve performance, while some evidence suggests it impairs training adaptations. Here we review the effect of a range of dietary antioxidants and their effects on sport performance, including vitamin E, quercetin, resveratrol, beetroot juice, other food-derived polyphenols, spirulina and N-acetylcysteine (NAC). Older studies suggest vitamin E improves performance at altitude, with possible harmful effects on sea-level performance. Acute intake of vitamin E is worthy of further consideration, if plasma levels can be elevated sufficiently. Quercetin has a small beneficial effect for exercise of longer duration (>100 min), but it is unclear whether this benefit exists. Resveratrol benefits trained rodent models, more research is needed in athletes. Meta-analysis of beetroot juice studies has revealed that the nitrate component of beetroot juice had a substantial but unclear effect on performance when averaged across athletes, non-athletes and modes of exercise (single dose 1.4 ± 2.0 %, 5.0 ± 15.6%). The use of spirulina enhances endurance performance. Intravenous NAC improved endurance cycling performance and reduced muscle fatigue. On the basis of vitamin E and NAC studies, acute intake of antioxidants is likely to be beneficial. However, chronic intakes of most antioxidants have a harmful effect on performance.

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Key Points

Chronic consumption of dietary antioxidants is likely harmful.
An exception is chronic consumption of polyphenols such as epicatechin and resveratrol, which in combination with training appear beneficial.
Acute intake of vitamin E and N-acetylcysteine may offer athletes a performance benefit around competition time.
Lawrence, 54, an accountant and a founder of the New Covent Garden Soup Company, says: 'When we first did beetroot juice I thought it was a very small market. Yet last month we had sales of £56,000 for the 2½fl oz [70ml] concentrated shots alone, fuelled by {athletes}.
'The shots now account for about ten per cent of the business, while Beet-It accounts for half of the £5million turnover.'

Read more: http://www.thisismoney.co.uk/money/news/article-2170878/Beet-It-beetroot-juice-shots-James-White-drinks-Olympic-boost.html#ixzz3xv6uAOuY
Thank-you

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