



Dancing to the beet

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Beetroot juice is well-known in the sports community as a postworkout must and performance enhancer. This unassuming vegetable is becoming a popular supplement and superfood promoted as enhancing mental alertness, focus, lower blood pressure, and exercise stamina. But is the hype all it's made out to be?

Background

Beets are a root vegetable like carrots, turnips, and parsnips, and they're available in a variety of shapes and colors. Beets' rich colors come from betalains, which are nitrogen-containing pigments that are considered to be free radical scavengers. Beets provide high quantities of essential vitamins and minerals, including folate, potassium, iron, magnesium, manganese, sodium, zinc, copper, and selenium. The leafy top of the beet provides more nutritional value than the bulbous root, but it is the root—and its juice—that are used, and studied, more often.

Is there a benefit?

Most research on beetroot juice focuses on its cardiovascular benefits, including lowered blood pressure and increased exercise stamina. The benefits are tied to its naturally high concentration of nitrate, which is rapidly absorbed in the gut and converted to nitric oxide in the blood. Ingestion of beetroot juice results in significant increases in plasma levels of nitric oxide, which has a vasodilatory effect, increasing oxygen and nutrient delivery, within 3 hours.

One study showed a significant reduction of systolic and diastolic blood pressure in hypertensive patients who drank 250 mL of beet juice daily over the course of 4 weeks. Kapil and colleagues conducted a randomized, phase 2, double-blind, placebo-controlled study published in the February 2015 issue of *Hypertension*. The authors randomly assigned 68 patients with hypertension to receive either 250 mL beetroot juice or 250 mL of nitrate-free beetroot juice daily for

4 weeks. Results showed reduction in blood pressure for the nitrate group as well as improvement in endothelial function and reduction in arterial stiffness with no change observed in the placebo group.

Beetroot juice has also been shown to improve muscle efficiency and endurance, promoting muscle recovery, relieving fatigue, and reducing inflammation and muscle damage, making it a favorite supplement among athletes.

One study showed that trained cyclists drinking 2 cups of beet juice daily shaved approximately 12

seconds off their 10-kilometer time trials while also benefiting from reduced maximum oxygen output.

In addition to improving exercise endurance, beetroot juice has been demonstrated to improve and modulate regional cerebral blood flow in the prefrontal cortex during cognitive tasks. Knowing that beet roots' high concentration of nitrates (also found in celery, cabbage, and spinach) help to expand blood vessels, Petrie and colleagues designed a randomized double-blind placebo-controlled study to examine how that increased blood flow and oxygen uptake affected the aging brain in conjunction with exercise.

Over a 6-week period, researchers studied 26 hypertensive, sedentary older adults with a mean age of 65.4 years randomly assigned to moderate intensity exercise and beetroot juice or placebo. Participants received 560 mg of nitrate or a placebo containing 1.1 mg nitrate. Pre- and postintervention MRI scans revealed improved neuroplasticity in the primary motor cortex, somatosensory cortex, and midline supplementary motor regions in the patients who exercised and consumed beetroot juice. The study was published in the September 2017 issue of *The Journals of Gerontology: Series A*.

Dosage

Beetroot is available as a concentrated juice or powder and as gummies and chewables. Then there is always the vegetable itself, which can be eaten cooked, added raw to smoothies, or juiced. While there is no official suggested dose, study doses ranged from 100 mL to the more common dose of 250 mL/day.

What to tell your patients

Beets are a healthy addition to any diet. The juice is considered safe, even as a concentrate, in supplements, smoothies, and as a food additive. Advise patients that, though perhaps surprising, it is harmless to have pink or red urine or stools from drinking beetroot juice.

Few adverse effects have been reported, but caution those with already low blood pressure to monitor carefully when drinking beet juice regularly. Patients subject to calcium oxalate kidney stones should avoid beetroot juice as beets are high in oxalate content. ■