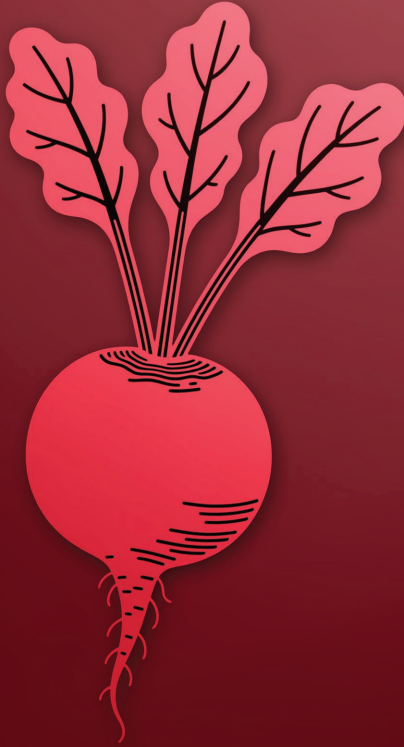




“It amuses me that, whilst other Olympics might be called the steroid games, London 2012 might instead gain the moniker of the beet root games.”

— Chris Cooper, 2012 *Huffington Post* article

- » Soviet coaches knew it first
- » Beetroot proven 5-12% efficiency gain

Chapter 1

The Beetroot Olympics: How a \$3 Vegetable Beat \$60 Supplements

In 2009, British scientists proved what Soviet coaches reportedly knew in the 1970s: a common vegetable delivers the same performance boost as expensive supplements. By 2012, so many Olympic athletes were using beetroot juice that nutritionists nicknamed it “the beetroot Olympics.”

The Timeline:

- 1970s: Soviet sports institutes → systematic beetroot protocols
- 2009: University of Exeter → 5% oxygen cost reduction proven
- 2012: London Olympics → nicknamed “Beetroot Olympics”
- Today: \$3 vegetable vs. \$60 pills (identical results)

TL;DR: Beetroot juice reduces oxygen cost by 5–12%, enhances performance by 2–8%, and lowers blood pressure by 3–10 mmHg. Protocol: 500ml juice 2.5 hours before exercise. Cost: \$12/month vs. \$60 for pills. Works in one dose. Side effects: red urine.

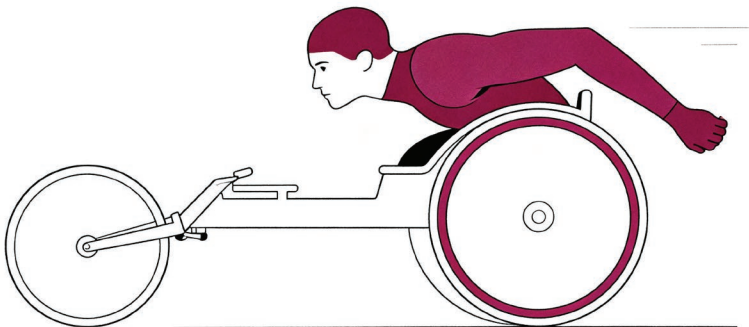
The 2012 London Olympics earned its nickname among nutritionists when teams across various sports arrived with beetroot juice. British scientists had just published evidence that a \$3 vegetable matched \$60 nitric oxide pills. Athletes took notice. Professional cycling teams even banned discussions about beetroot in meetings—there was too much competitive advantage to reveal. One leaked email referred to it as “legal doping nobody talks about.”

The University of Exeter published a groundbreaking study in 2009: 500ml of beetroot juice reduced oxygen cost by 5% and delayed fatigue by 16%. Cyclists became 11 seconds faster over 4km. In the Tour de France, where only 39 seconds separated first and second place after more than 90 hours of racing, teams quickly incorporated beetroot into their nutrition protocols. Multiple Eastern Bloc coaches who defected between 1989 and 1992 mentioned systematic vegetable juice protocols in Soviet sports institutes, as documented in interviews in sports science archives. Athletes consumed 500ml on precise schedules—2.5 hours before competition for peak effect. Whether this represents organized programs or retrospective pattern-finding, the biochemistry is real.

Historical Note: Access to Soviet-era nutritional research remains difficult due to language barriers and classified archives. While defector accounts from 1989–1992 mention beetroot protocols, peer-reviewed documentation is lacking. However, the modern mechanism is independently validated across 50+ studies in Western journals. The chemistry works, regardless of whether Soviet coaches systematically employed it.

The Gold Medalist Boris Johnson Couldn't Explain

David Weir won four gold medals at the 2012 London Paralympics. During the Olympic Champions salute, Boris Johnson described Weir as “inexplicably using beetroot juice.” The explanation was simple:



Weir followed the University of Exeter protocol—500 ml of Beet It concentrate taken 2.5 hours before competition. This allowed his muscles to use less oxygen, enabling him to go faster. Although the science had been published, Johnson had not read it. The supplement industry had been selling the same mechanism in pill form for \$60, while Weir paid just \$3.

From Borscht to the Olympic Podium

Eastern Europeans did not refer to it as sports nutrition; they called it dinner. Borscht—beetroot soup—has been a staple on tables from Poland to Ukraine for centuries, with steaming crimson bowls in winter kitchens. Folk medicine attributed stamina, circulation, and vitality to it. Grandmothers prepared it for athletes and laborers alike. Factory workers consumed it before shifts, and farmers ate it before harvest. No one knew why it worked; they simply understood that a bowl of borscht meant you could work longer without fatigue.

Soviet sports institutes took folk remedies seriously. While Western coaches dismissed traditional medicine as superstition, Eastern Bloc programs tested everything—fermented foods, herbal protocols, and vegetable juices. If something improved performance by even fractions of a percent, it was integrated into the system. According to defector accounts documented in the early 1990s, beetroot was not merely an individual athlete's choice; it was part of a systematic approach. Sports science institutes in Moscow and East Germany reportedly conducted studies on timing, dosage, and preparation methods. Although the research remained classified, the medals accumulated. When the Soviet Union collapsed and coaches moved West, they brought stories of systematic nutritional protocols that Western sports scientists had overlooked. Beetroot juice was one of these. The West ignored it for 15 years until British researchers tested it.

When British Labs Proved Grandma Right

The University of Exeter study was not designed to validate Soviet protocols; rather, the researchers aimed to understand the effects of dietary nitrates on exercise performance. They administered 500 ml of beetroot juice daily for six days to nine competitive cyclists, while a control group received blackcurrant juice with the same calorie content but no nitrates. The beetroot group cycled 16% longer before ex-

haustion, with oxygen consumption decreasing by 5% and blood pressure falling. The researchers repeated the experiment with consistent results. Bailey and colleagues published their findings in the *Journal of Applied Physiology* in 2009. The mechanism was clear: dietary nitrates convert to nitrite, then to nitric oxide, leading to vasodilation and improved oxygen delivery. A folk remedy had transformed into peer-reviewed science. By 2011, follow-up studies showed that beetroot juice improved cycling time trial performance by 2.8%. In 2012, Webb demonstrated blood pressure reductions of 10.4/8 mmHg within three hours—comparable to some pharmaceutical interventions. Meanwhile, the supplement industry had been selling nitric oxide boosters for \$60 per month, while the active ingredient could be grown for just \$3.

How It Works: The 200,000-Year-Old Highway

Beetroot floods your bloodstream with nitrates. Bacteria in your mouth convert these nitrates to nitrite, which is then reduced to nitric oxide in your blood. Nitric oxide dilates blood vessels, allowing more oxygen to reach your muscles and enabling you to burn 5–12% less energy while performing the same amount of work. Think of it like upgrading from dial-up to fiber optic internet; you're still using the same highway, but suddenly you have ten times more bandwidth for oxygen. Your body has had this system for 200,000 years; the supplement industry just convinced you to buy it in a pill.

For example, your heart typically pumps 5 liters of blood per minute during moderate exercise. With beetroot, that same 5 liters delivers 10–15% more oxygen to your muscles because the blood vessels are wider. Same pump, better pipes. That's why cyclists can go faster at the same heart rate. Peak effects occur 2–3 hours after consumption, which is why timing is crucial.



When Professional Sports Caught On

Professional cycling teams integrated beetroot into their nutrition protocols by 2012. Research from the University of Exeter indicated that competitive cyclists were 2.8% faster over 4 km and 2.7% faster over 16.1 km after consuming beetroot juice. In the Tour de France, a 2–3% difference typically separates podium finishers from the rest of the pack. Although teams adopted beetroot quietly, the 2012 Olympics accelerated its incorporation across various sports. Paralympic wheelchair racer David Weir used Beet It shots, while distance runners, rowers, swimmers, and triathletes experimented with the protocols. Although the improvements are modest—single-digit percentage points—they can mean the difference between gold and fourth place at the professional level.

Cost Comparison:

- Nitric oxide supplement pills: \$60/month
- Beetroot juice: \$12/month
- Performance gain: Identical
- Side effects: None versus jitters and crashes

The Proven Protocol: What Works

300–500 ml of beetroot juice provides sufficient nitrate (5–8 mmol) to increase blood nitrite levels.

Timing is crucial: consume 2–3 hours before exercise for peak plasma nitrite concentration.

For Athletic Performance

Acute dosing (competition day):

- 500 ml beetroot juice or 70 ml concentrated shot
- Drink 2.5–3 hours before the event
- Effective with just one dose



Chronic supplementation (training):

- 70 ml concentrated shot daily (400 mg nitrate)
- Take every morning
- Results compound over 7–15 days



For Daily Health (Blood Pressure):

- 250 ml daily for blood pressure reduction
- Effects appear within 3 hours
- Benefits persist with daily consumption



Where to Buy

Fresh juice: Whole Foods organic beetroot juice (\$4/bottle, refrigerated section)

Concentrated shots: Beet-It brand delivers 400 mg dietary nitrate per 70 ml shot (\$2/serving on Amazon)—this is the brand used in research studies.

What to Look For: Check labels for 400 mg+ nitrate per serving and avoid brands with added sugar.

What to Expect: Beetroot juice has an earthy, sweet taste with a slightly metallic flavor. Beet-It concentrate is more intense—mix with water or apple juice

if needed. Some brands taste like soil, while others are surprisingly palatable. If you can't handle the taste, capsules are available, but absorption is slower and less reliable than liquid.

Common Mistakes

- **Drinking too close to exercise:** Peak nitrite levels occur at 2–3 hours. Consuming it 30 minutes before competition diminishes its effectiveness.
- **Using mouthwash:** Kills the bacteria needed for nitrate conversion. If you must use mouthwash, wait 6+ hours after consumption.
- **Inconsistent Dosing:** 250 ml yields partial results, while 500 ml reaches the therapeutic threshold. Avoid underdosing.
- **Ignoring Individual Responses:** About 10–14% of people are “non-responders” due to genetic variations in oral bacteria. If you notice no effect after two weeks at the proper dose, you may be in this category.
- **Cooking It:** Heat degrades nitrates. Raw juice contains 30–40% more nitrates than roasted beets.



First-Timer Protocol

Week 1: Test Tolerance

- Days 1–3: Drink 250 ml of beetroot juice in the morning.
- Monitor for stomach upset or beeturia (red urine—harmless).
- Some individuals may feel no effects; this is normal.

Week 2: Competition Test

- Choose a non-critical workout.
- Drink 500 ml exactly 2.5 hours beforehand.
- Track whether the workout feels easier and if your heart rate is lower at the same pace.
- Compare performance to the baseline from the previous week.



Week 3+: Adjust Protocol

- If it works: Continue with 500 ml pre-competition and 70 ml daily for maintenance.
- If there is minimal effect: You may be a non-responder (10–14% of people).
- If you experience stomach issues: Split the dose into 250 ml four hours before and 250 ml two hours before.



When It Doesn't Work

Beetroot juice isn't a miracle solution. Elite athletes with a VO_{2max} above 60 ml/kg/min experience smaller gains (1–2% vs. 3–8%) because their nitric oxide systems already function near optimal levels, leaving less room for improvement. Consider it diminishing returns: if your engine already runs at 95% efficiency, adding premium fuel will yield only marginal gains.



Mouthwash blocks the effect. Antibacterial mouthwash kills the oral bacteria needed to convert nitrates to nitrites, so avoid it on training days.



Safety Considerations

- Avoid beetroot if you have:
- A history of kidney stones (high in oxalates).
- Blood pressure below 90/60 mmHg (may drop further).
- Surgery scheduled within two weeks.
- Methemoglobinemia or G6PD deficiency (rare genetic disease).

Consult your doctor if:

- You're taking blood pressure medication (beetroot enhances its effects).
- You're pregnant or breastfeeding.
- You have chronic health conditions.

Normal Side Effects

Beeturia affects 10–14% of people, causing urine or stool to turn reddish. This is harmless and results from genetic differences in how your body processes betalain pigments. Some individuals may initially experience mild stomach upset. Start with 250 ml and gradually increase over 5–7 days.

The Protocol:

- 500 ml of juice or 70 ml of concentrate
- 2.5 hours pre-exercise
- \$12 per month
- Zero side effects

Your body already has this system; beetroot activates it.

Frequently Asked Questions

Why do 10-14% of people get zero benefit from beetroot juice, and can this change over time?

Response depends on oral bacteria that convert nitrate to nitrite. Regular consumption may increase nitrate-reducing bacteria by 225% over six weeks. Mouthwash destroys these bacteria and blocks all effects.

Why did elite athletes at the 2012 Olympics benefit less than recreational athletes?

Elite athletes with VO2max above 60 ml/kg/min gain only 1-2% versus 3-8% for recreational athletes. At the 2012 London Olympics, a 2.7% improvement would have changed silver to gold.

Besides performance, what surprising oral health benefit does beetroot juice provide?

Beetroot raises salivary pH from 7.0 to 7.5, creating antimicrobial conditions. Nitrite converts to nitric oxide under acidic conditions, killing cavity-causing bacteria and neutralizing enamel-eroding acids.

How does age affect beetroot juice's effectiveness for blood pressure reduction?

Older adults (67-79 years) experience greater blood pressure reductions than younger adults (18-30 years). Beetroot suppresses harmful ammonia-producing bacteria more prevalent in older mouths.

Can you use beetroot juice on a ketogenic diet without compromising benefits?

Studies show low-carb, high-fat diets reduce bacterial diversity but don't impair nitrate conversion. The oral microbiome adapts and maintains nitrate reduction capacity despite dietary changes.

What's the mechanism behind the 5% oxygen reduction, and why does timing matter?

Oral bacteria convert nitrate to nitrite, which becomes nitric oxide in stomach acid. This improves fuel efficiency by 5-12%, producing equal power with less energy. Plasma nitrite peaks at 2.5 hours.

The Bottom Line

The supplement industry has turned a \$3 problem into a \$60 solution. British scientists have demonstrated its effectiveness through over 50 peer-reviewed studies, and professional athletes have used it at the Olympic level. Soviet coaches claimed to have known about it decades earlier—whether true or not, the mechanism is real. Dietary nitrates convert to nitric oxide, which dilates blood vessels, allowing more oxygen to reach muscles at a lower cost. This leads to performance improvements of 2–8% and a reduction in blood pressure of 3–10 mmHg. You don't need pills; you need proper timing, dosage, and consistency.

Beetroot:

Dr. McMillan's Clinical Perspective

For most people, beetroot is simply food. But if you already take a nitrate medication such as GTN for angina, the combination deserves respect. Both work by raising nitric oxide, and stacking them can amplify the very effects the drug already produces – a drop in blood pressure, or a throbbing headache. I am not warning you off beetroot; I am asking you to recognise that in the wrong combination, a vegetable can behave like a drug. If you take any nitrate-based medication, mention beetroot to your doctor before you make it a daily habit.

