THE WINNING BOOST

NUTRIGARDENS
BEET BOOST
OVERVIEW

Preload with BeetBoost to go faster, to go longer and to recover quicker. BeetBoost is not just any beetroot juice. BeetBoost harnesses powerful nutrients from a unique combination of a vegetable and a fruit: beetroot and tart cherry. The inorganic nitrates from beetroot juice convert to nitric oxide, a molecule that improves cardiovascular health and, potentially, exercise performance. The anthocyanins from tart cherry provide both antioxidant and anti-inflammatory properties—which are not usually found together in food—that are protective against signs and symptoms of exercise-induced muscle damage.

BEETBOOST IS THE KEY TO UNLOCK THE POWER TO ENHANCE SPEED AND ENDURANCE NATURALLY.
BeetBoost concentrates these two foods by extracting the liquid and combining both into a powder to empower the athlete to optimize the pre-, intra- and post-exercise demands. The safe and efficacious BeetBoost “shot” can help an athlete reach optimal sport performance because beetroot:

- Lowers blood pressure
- Reduces oxygen cost of exercise
- Enhances intermittent exercise
- Sustains mental clarity
- Increases power output
- Improves vascular function at altitude
- Enhances neuromuscular efficiency
- Accelerates recovery

IN THIS REPORT, WE PROVIDE THE EVIDENCE-BASED RESEARCH ON SELECT SPORT PERFORMANCE PARAMETERS THAT ARE ENHANCED BY BEETROOT JUICE AND TART CHERRY.

BIOACTIVE PROPERTIES OF BEETROOT

Beetroot is the taproot part of a beet plant. Beets are loaded with inorganic nitrates. Dietary nitrate is the best—and natural—way to take in nitrate because of its high bioavailability and almost 100% absorption (Clifford, Howatson, West, & Stevenson, 2015).

After eating beetroot, nitrate is converted to nitrite by bacteria in our saliva. In the stomach, some nitrite converts to nitric oxide, and the remaining nitrite is circulated and stored in the blood. Nitrite is converted to nitric oxide during low oxygen availability and low pH—conditions that occur in skeletal muscle during exercise (Richardson, Noyszewski, Kendrick, Leigh, & Wagner, 1995).

Nitric oxide is a gas that is crucial to biological processes and the effectiveness to proper physiological functioning (Kelly et al., 2014). It acts as a vasodilator, which relaxes and increases blood flow to muscle. This enhances efficiency of oxygen uptake in muscles during strenuous exercise.
Nitric oxide enhances skeletal muscle function via (Stamler & Meissner, 2001):

- Blood flow to muscles from vasodilation and energy release from the mitochondria (powerhouse of the cell)
- Muscular contraction from increased calcium release
- Neurotransmission
- Glucose uptake

A study confirmed that nitrates—and not other nutrients found in beetroot—are responsible for the beneficial physiological effects (Lansley, Winyard, Bailey, et al., 2011). Therefore, beetroot juice is the ideal exogenous nitric oxide donor (Clifford, Bell, West, Howatson, & Stevenson, 2016).

Subsequently, research on oral nitrates has grown the past few years because nitrates increase nitric oxide synthesis. The body does produce nitric oxide, but it is quickly produced and broken down. Therefore, a dietary nitrate source is needed to help produce more nitric oxide in the body.

BEETROOT JUICE ENHANCES SPORT PERFORMANCE: WHAT THE SCIENCE SAYS

Evidence-based research repeatedly shows nitrate supplementation aids exercise performance—from a simple walking distance in sedentary people to performance enhancement in elite athletes. A “shot” of beetroot juice—the liquid naturally taken from beetroot—is a safe and reliable way to harness the power of inorganic nitrates for exercise performance.

LOWERS BLOOD PRESSURE

Research supports the ability of beetroot juice to improve the function of the inner lining of blood vessels and to lower blood pressure (Bailey et al., 2010; Vanhatalo et al., 2010; Webb et al., 2008).

In 2008 Webb et al. randomized 14 healthy people to drink 500 ml of beetroot juice or water within 30 min. Blood pressure was taken every 15 min after 1 h and 3 h of drinking beetroot juice. Measurement continued every hour up to 6 h and a final reading at 24 h.

THE RESULTS:

- Blood pressure began dropping after 1 h
- Peak difference in systolic blood pressure at 2.5 h (a drop of 10.4±3.0 mmHg) and diastolic blood pressure at 3 h (a drop of 8.1±2.1 mmHg)
- Systolic blood pressure reduced by ~6 mmHg at 24 h (106.2±2.8 mmHg) compared to 1h (112.4±3.4 mmHg)

As the amount of nitrite in the blood increased, systolic blood pressure decreased with an average reduction of -10.4 / 8 mmHg.

Further support of the blood pressure-lowering effects also are found from a few days of nitrate loading (Larsen, Weitzberg, Lundberg, & Ekblom, 2007; Vanhatalo et al., 2010) or at least 2.5 hr after acute nitrate supplementation (Vanhatalo et al., 2010; Webb et al., 2008).

WHY IS THIS IMPORTANT? Nitric oxide is a powerful vasodilator that regulates blood pressure. Nitric oxide may reduce the risk for: prehypertension, hypertension and other consequences of blood vessel complications. Low blood pressure is a sign of good cardiovascular efficiency.
REDUCES OXYGEN COST TO ENHANCE EXERCISE CAPACITY

**Oxygen is vital to release the energy that powers muscle.** Athletes are under constant energy demand, especially during submaximal exercise (~85% of max heart rate). Increasing oxygen availability can enhance muscle efficiency.

The first study investigating nitrate supplementation (not beetroot juice) and exercise efficiency found a decrease in oxygen cost during a multi-stage test on a bike. On average, nitrate supplementation increased resting blood nitrite levels (the precursor to nitric oxide—the molecule responsible for physiological benefits) by 82% and decreased VO2 by 5% (Larsen et al., 2007). This study showed the benefits of nitrate supplementation; however, dietary nitrate supplementation from beetroot juice is a safer approach.

**THE RESULTS FOR BEETROOT JUICE:**

- Moderate-intensity exercise: steady-state VO2 reduced by 5%
- High-intensity exercise: nitrates delayed the time to reach peak VO2—increasing time to exhaustion by 16% (11.3 min for beetroot vs. 9.7 min for placebo)

In 2010 Bailey et al. followed up with another study to explore why dietary nitrate supplementation reduces oxygen cost of exercise. Seven men drank either 500 ml/day of beetroot juice or placebo for six consecutive days. The men completed low- and high-intensity step exercise tests on the final three days.

*Group mean oxygen uptake (VO2) during low-intensity (A) and high-intensity (B) exercise after dietary nitrate and placebo supplementation. Nitrate supplementation lowered the amount of oxygen needed during low-intensity and high-intensity exercise.*
THE RESULTS FOR BEETROOT JUICE DRINKERS:

- Low-intensity exercise: decreased submaximal VO2
- High-intensity exercise: increased time to exhaustion by 25%

Beetroot juice can also reduce the oxygen cost of walking and running. In 2011 Lansley et al. had nine healthy, physically active men to drink 500 ml/day of beetroot juice or placebo for six days. On days 4 and 5, the men completed treadmill exercise tests. On day 6, they completed knee-extension exercise tests.

Compared to a placebo, beetroot juice lowered the oxygen cost for:

- Walking: 0.87±0.12 l/min for placebo and 0.70±0.10 l/min for beetroot juice
- Moderate-intensity running: 2.26±0.27 l/min for placebo and 2.10± 0.28 l/min for beetroot juice
- Severe-intensity running: 3.77±0.57 l/min for placebo and 3.50±0.62 l/min for beetroot juice

Beetroot juice led to a 15% increase in time to exhaustion during severe-intensity running (7.6±1.5 min for placebo and 8.7±1.8 min for beetroot juice) (Lansley, Winyard, Fulford, et al., 2011).

WHY IS THIS IMPORTANT? Endurance performance depends on muscle efficiency. An improvement in muscle efficiency leads to the ability to work longer for the same amount of energy input—this increases tolerance to exercise. Beetroot juice can improve time-to-exhaustion with no adverse effects. The lower oxygen cost of low-intensity exercise may be due to a lower energy (i.e., adenosine triphosphate) cost of muscle contraction. Beetroot juice allows athletes to better tolerate high-intensity exercise for a longer period of time.

ENHANCES INTERMITTENT EXERCISE

Intermittent (stop-and-go) exercise that occurs in team sports quickly leads to exhaustion. Athletes constantly search for ways to delay muscle fatigue.

Thompson et al. (2015) explored sprint performance during intermittent exercise in 16 male team sport players (field hockey, football and rugby players). The athletes drank 140 ml/day of either nitrate-rich beetroot juice or a placebo for seven days. This nitrate-loading protocol led to a total consumption of ~800 mg (or 1 liter) of beetroot juice (Thompson et al., 2015). On the last day, they completed an intermittent exercise test on an exercise bike:

- Two 40-minute periods—separated by 15 minute break—consisting of 6 sec max effort sprints

Each player completed each test twice, once with nitrate-rich beetroot juice and once with the placebo. The results for nitrate-rich beetroot juice compared to placebo:

- Increased total work done during the sprints by ~3.5%

Nitrates may alter the contraction of type II (fast-twitch) muscle fibers extensively used in the burst-like activity of intermittent exercise. These muscle fibers fatigue quickly, and nitrates can help delay the fatigue. A soon-to-be published study suggests that dietary nitrate supplementation has greater physiological effects (i.e., increasing oxygen delivery) on type II muscle fibers because of the lower amount of oxygen (i.e., partial pressure of oxygen, PO2) in these fibers compared to type I (slow-twitch) muscle fibers (Jones, Ferguson, Bailey, Vanhatalo, & Poole, 2016).

WHY IS THIS IMPORTANT? Enhancing prolonged intermittent exercise reflects the type of performance characteristics of team sport athletes. The duration and variable intensity levels of team sports, such as repeated sprints, would benefit from beetroot juice increasing oxygen delivery to muscles to meet energy demands.
SUSTAINS MENTAL CLARITY  Adapted from Thompson et al. (2015).

The separation of winners from losers may come down to quick and accurate-decision making. As time during competition increases, the ability to think clearly may decrease. **Increasing blood flow to the brain helps shuttle in oxygen and nutrients for clearer thinking.**

The aforementioned Thompson et al. (2015) study that found an improvement in sprint performance also tested cognitive function of the athletes during the second half of the bike test. The athletes completed cognitive tests to evaluate accuracy and speed at making decisions. They found that beetroot juice slowed down the decline in mental clarity commonly experienced during prolonged exercise.

**THE RESULTS FOR BEETROOT JUICE DRINKERS:**

- Shorter reaction time during the second half of the test (817 ± 118 ms for beetroot juice vs. 847 ± 118 ms for placebo)
- Improved reaction time of 3% for beetroot juice drinkers between first and second half of the tests

**WHY IS THIS IMPORTANT?** **Accurate decision-making is critical for team sport performance.** Fatigue causes athletes to lose mental clarity as the game progresses. This impacts reaction time and the ability to make the right decision when the game is on the line. Enhancing blood flow to the brain increases the supply of oxygen and nutrients to the brain. This can help maintain optimal reaction time.

**INCREASES POWER OUTPUT TO ENHANCE PERFORMANCE IN LESS TIME**

In many athletic events, competitive athletes need to conquer a certain distance in the shortest time possible. By delaying time to exhaustion, beetroot juice helps extend the maximum amount of physical exertion a person can sustain. This is when BeetBoost comes into play for optimal sport performance.

In 2011 Lansley et al. used nine competitive male cyclists to evaluate nitrate supplementation and power output for the same VO2 (i.e., finishing the distance more quickly) in 4-km and 16.1-km time trials. The athletes drank 500 ml of beetroot juice or placebo 2.5 hr before the time trials.
THE RESULTS:
- All athletes completed both time trials faster after drinking beetroot juice
- Beetroot juice increased the average power output during both time trials by:
  - 2.8% for 4-km performance
  - 2.7% for 16.1 km performance

In 2012 Cermak, Gibala and van Loon investigated if six days of nitrate supplementation would improve time-trial performance for 12 trained male cyclists. The cyclists drank 140 ml/day of beetroot juice for six consecutive days. Then they completed 1 h of submaximal cycling followed by a 10-km time trial (Cermak, Gibala, & Van Loon, 2012).

THE RESULTS FOR BEETROOT JUICE:
- Lowered VO₂ during submaximal exercise—3.5% at 45% Wmax and 5.1% at 65% Wmax
- Improved time trial performance by 953±18 sec for beetroot juice vs. 965±18 sec for placebo (~15.9 minutes compared to ~16.1 minutes)
- Boosted power output by 2.1% (294±12 W for beetroot juice vs. 288±12 W for placebo)

WHY IS THIS IMPORTANT? Nitrates improve cycling efficiency and time trial performance in trained cyclists for events lasting between 5-30 minutes. An improvement in time-to-exhaustion can translate into an improvement in time trial performance. Enhanced exercise efficiency may lead to improved performance.

IMPROVES VASCULAR FUNCTION DURING LOW OXYGEN AVAILABILITY AT HIGH ALTITUDES

Vascular function is crucial in environments of high altitude because there is low oxygen availability (hypoxia) and thinner air. This forces the body to work harder to provide muscles with oxygen. In fact, during conditions of hypoxia there is a greater potential for nitrite to convert to nitric oxide (Vanhatalo et al., 2011). Therefore, increasing dietary nitrate as the precursor to nitric oxide is a strategy to combat hypoxic conditions.

In 2015 Bakker et al. used 11 healthy people to investigate the effects of beetroot juice on endothelial function at 3700 m (equivalent to about twice the elevation as Denver, Colorado). The researchers found beetroot juice improved vascular function. They concluded that beetroot juice is a dietary strategy to maintain optimal peripheral vascular function (Bakker et al., 2015).
In 2014 Kelly et al. used 12 healthy athletes to investigate beetroot juice related to exercise tolerance in hypoxic and normal oxygen environments. Each athlete completed moderate- and high-intensity bike tests: twice in normal conditions and twice in hypoxic conditions. For three days before the tests, the athletes drank 140 ml/day of beetroot juice or placebo.

**THE RESULTS FOR BEETROOT JUICE DRINKERS IN HYPOXIA:**

- Moderate-intensity exercise: steady-state VO2 was lower (1.91±0.28 l/min for beetroot juice and 2.05±0.25 l/min for placebo)
- Severe-intensity exercise: tolerance improved (214 ± 43 sec for beetroot juice and 197±28 sec for placebo)

**WHY IS THIS IMPORTANT?** High altitude (at least 1,500 m or 4,921 ft above sea level) results in a decrease in the partial pressure of oxygen (PO2), which affects oxygen transport between blood and muscles. Consequently, this decreases endurance performance at altitude. **Beetroot juice is useful for athletes who train at altitude for improved sea-level performance and/or compete at a higher altitude.**
ENHANCES NEUROMUSCULAR EFFICIENCY

In 2016 Flanagan et al. investigated a beetroot extract-based supplement and its effect on neuromuscular function. The 14 resistance-trained men drank either the nitrate-rich supplement or placebo for three days and then completed a heavy resistance exercise.

THE RESULTS FOR NITRATE-RICH SUPPLEMENT:
- Lower initial muscle firing rates at rest
- Lower average and maximum firing rates over the period of heavy resistance exercise

THE RESULTS FOR NITRATE-POOR SUPPLEMENTATION:
- Increased average and maximum muscle firing rates by the end
- Increased oxygen consumption more frequently

The researchers concluded that a nitrate-rich beetroot extract-based supplement might enhance neuromuscular efficiency during heavy resistance exercise.

WHY IS THIS IMPORTANT? Resistance exercise, such as lifting heavy weights, is metabolically taxing, especially compared to cardio exercises. It is important to improve neuromuscular efficiency so that the nervous system can optimally recruit muscles during strenuous exercise.

ACCELERATES RECOVERY

Recovery is not optimized without the right preparation. Eccentric muscle contractions—used in decelerating, sprinting, plyometrics and jumping—are continually performed during strength and conditioning exercises to increase muscle size and strength. Eccentric contractions cause primary muscle damage (G. Howatson & van Someren, 2007) and lead to an inflammatory response that impairs muscle function (Glyn Howatson & van Someren, 2008).

Consequently, structural damage to the muscle results, especially from frequent, or rarely performed, eccentric muscle contractions. This may result in signs and symptoms associated with exercise-induced muscle damage (EIMD), which include:
- Increase in muscle soreness
- Reduction in muscle function (Paulsen, Mikkelsen, Raastad, & Peake, 2012)
- Inflammatory response (Pizza, Peterson, Baas, & Koh, 2005)

Other bioactive ingredients in beetroot juice make it an ideal nutritional supplement to accelerate recovery. Nitric oxide may act as an anti-inflammatory (Jädert et al., 2012). The high nitrate content of beetroot is accompanied with phenolic acids, flavonoids, carotenoids and betalains. Betalains provide antioxidant, anti-carcinogenic and anti-inflammatory properties (El Gamal et al., 2014).

The first study to demonstrate the recovery power from beetroot juice is from Clifford, Bell, West, Howatson and Stevenson (2016). The study explored the effect of an acute dose of beetroot juice on recovery using 30 healthy, recreationally active men. The strenuous eccentric-heavy exercise consisted of 100-drop jumps because high intensity plyometric exercise is suggested to result in significant EIMD (Glyn Howatson et al., 2012). All jumps had a 10 s rest, and there was a 2 min rest following each set of 20 jumps.
Participants received either:
- High dose of beetroot juice
- Low dose of beetroot juice
- Placebo

Participants took their assigned treatments (high, low or placebo):
- **DAY OF EXERCISE** (3 servings)
  - One 30 min post-exercise
  - One 2 h post-exercise
  - One with dinner
- **24 H POST-EXERCISE** (2 servings) Adapted from Clifford et al. (2016).
  - One 30 min after leaving the lab
  - One with dinner
- **48 H POST-EXERCISE** (2 servings)
  - One 30 min after leaving the lab
  - One with dinner

The men performed counter movement jumps (CMJ)—a rapid descent into a squat followed by a vertical jump with max force. They were instructed to keep hands on their hips to prevent the aid of an arm swing. In between each of the three jumps there was a 30 sec passive recovery.

THE RESULTS:
- **High beetroot juice supplementation for 3 days produced the quickest recovery of CMJ 48 h and 72 h post-exercise**
- **Muscle soreness reduced** 24–72 h post-exercise from drinking the low concentration (125 ml) and high concentration (250 ml) beetroot juice
WHY IS THIS IMPORTANT? Recovery is crucial to any successful training program. The study demonstrates the importance of continual consumption of beetroot juice to aid recovery so that athletes can return to training without EIMD holding the athlete back.

BIOACTIVE PROPERTIES OF TART CHERRY

Athletes experience EIMD from inflammation and increased oxidative stress—the cellular damage caused by free radicals produced by strenuous exercise. The skin of tart cherry contains the phytochemical anthocyanin, an anti-inflammatory and the same enzyme used in pain relievers (i.e., ibuprofen). Anthocyanins are powerful antioxidants and anti-inflammatories that alleviate EIMD, which helps accelerate recovery.

Anthocyanins combat the enzymes that cause inflammation from strenuous exercise. In fact, the anthocyanin antioxidant capability has demonstrated to be 100 times more powerful than glutathione (van Acker, Tromp, Haenen, van Der Vijgh, & Bast, 1995). Glutathione is an antioxidant produced by the body and is possibly the most important antioxidant because it is found in every cell in the body. A food that contains phytochemicals with both antioxidant and anti-inflammatory properties is ideal (G Howatson et al., 2010)—hence, the tart cherry.

Some athletes may drink tart cherry after exercise. Yet, the efficacy of tart cherry does not start post-exercise. The studies reporting quicker muscle function recovery used tart cherry juice leading up to athletic events.

TART CHERRY ACCELERATES RECOVERY: WHAT THE SCIENCE SAYS

REDUCES MUSCLE STRENGTH LOSS AND ALLEVIATES PAIN

Intense exercise can lead to muscle pain hours and days after exercise. Muscular pain increases 24-96 h post-exercise and peak muscle soreness occurs around 24-48 h post-exercise (Semark, Noakes, St Clair Gibson, & Lambert, 1999). Tart cherry can help fight pain so that pain does not keep an athlete out on the sideline.

In 2006 Connolly et al. used 14 men to evaluate the effects of tart cherry on EIMD from two sets of 20 maximal eccentric elbow flexion contractions. The men drank their assigned tart cherry juice or placebo: four days before, the day of, and four days after the exercise. The participants drank two 237-ml servings per day (taken morning and night).
Two weeks later, the men repeated the exercise using the opposite arm (to avoid the repeated bout effect in which a protective effect may result from habitual bouts of damaging exercise) (Connolly, McHugh, Padilla-Zakour, Carlson, & Sayers, 2006).

**THE RESULTS OVER FOUR DAYS FOLLOWING ECCENTRIC EXERCISE:**
- Strength loss was less for tart cherry juice drinkers
  - 22% with placebo
  - 4% with tart cherry juice
- Pain was lower for tart cherry juice drinkers

Long distance running can lead to EIMD that results in inflammation and a decrease in the ability to generate muscle force.

In 2010 Kuehl, Perrier, Elliot & Chesnutt conducted a randomized controlled trial to evaluate the effects of tart cherry juice on soreness in 54 healthy runners participating in a downhill, relay race that started at a high altitude and finished at sea level.

The 197-mile run was done over 24 hours. The runners drank 355 mL of tart cherry juice or placebo twice daily for seven days before the race and on the day of the race.

**TART CHERRY JUICE DRINKERS REPORTED:**
- Smaller increase in pain compared to placebo drinkers immediately post-race (assessed using a visual analog scale)
- More willing to drink tart cherry juice in the future
- Greater satisfaction with pain alleviation due specifically to the juice

Researchers concluded that drinking tart cherry juice for 7 days before and during the event could alleviate post-run EIMD (Kuehl, Perrier, Elliot, & Chesnutt, 2010).

**WHY IS THIS IMPORTANT?** About 60 million people use non-steroidal anti-inflammatory drugs (NSAIDs) to alleviate pain, and habitual use of NSAIDs can result in kidney failure and heart complications (“Tart Cherry Juice Reduces Muscle Pain and Inflammation,” n.d.). Pain medications can also hurt the stomach lining. Tart cherry juice is a feasible and more healthful alternative to pain medications because it has demonstrated to reduce the acute loss in muscle function by aiding recovery following strenuous exercise.

**ACCELERATES RECOVERY BY REDUCING INFLAMMATION**

Tart cherries can decrease inflammation. The primary antioxidant action of anthocyanins is their donation of electrons or hydrogen atoms to free radicals, which increase during eccentric contractions and aerobic exercise, and worsen the damage of muscle cells (Mastaloudis, Morrow, Hopkins, Devaraj, & Traber, 2004). This makes anthocyanins strong scavengers of free radicals.

In 2010 Howatson et al. explored tart cherry juice and its effect on accelerating recovery and reducing muscle damage, inflammation and oxidative stress using a placebo-controlled study. Runners from the London marathon drank either tarty cherry juice or placebo for five days before, during and two days following the marathon.
SOME OF THE MEASURES TAKEN BEFORE, IMMEDIATELY AFTER AND TWO DAYS AFTER THE MARATHON INCLUDED:

- EIMD: knee-extension strength, muscle soreness, creatine kinase (CK)
- Inflammation: interleukin-6 (IL-6), C-reactive protein (CRP)
- Oxidative Status: total antioxidant status

THE RESULTS FOR TART CHERRY DRINKERS COMPARED TO PLACEBO:

- Strength recovered quickest
- No difference in biomarkers of damage—a trend toward decreased CK values
  - Peak CK values 24 h post-exercise was 21% lower for cherry juice vs. placebo (2227 IU/L vs. 2814 IU/L)
- Inflammatory markers IL-6 and CRP significantly reduced
  - IL-6 post-race was 41.8 pg/mL for tart cherry and 82.1 pg/mL for placebo
  - CRP lower at 24 h and 48 h for tart cherry drinkers
- Total antioxidant capacity increased

Researchers concluded that tart cherry juice aids recovery of muscle function following strenuous exercise due its increase in total antioxidative capacity and reduction of inflammation. The pre-exercise dosage strategy of five days at two times per day decreased inflammation and oxidative stress and accelerated recovery of muscle strength.

WHY IS THIS IMPORTANT? EIMD yields inflammation, strength loss, oxidative stress and pain. Reducing these effects is critical to optimal recovery so that athletes are not hindered from returning to training or competing. The antioxidant and anti-inflammatory properties of tart cherries are beneficial to athletes wanting to avoid the symptoms of EIMD without relying on alternative therapies, such as over-the-counter pain relievers. Athletes employ different therapies to reduce EIMD. Yet, a dietary approach that takes advantage of nutrients in food to alleviate pain is ideal. The studies demonstrate tart cherry intake should be taken in the days leading up to strenuous event. Tart cherry in BeetBoost provides a simple, low-cost way to protect against EIMD and naturally enhance recovery.
Not just any tart cherry will provide these benefits. Montmorency tart cherry contains the highest anti-inflammatory content of all foods. The anthocyanins in cherries inhibit cyclooxygenase-1 and -2 (COX-1, COX-2) activity (Seeram, Momin, Nair, & Bourquin, 2001). Blocking COX-2 has showed to reduce inflammation in skeletal muscle (Bondesen, Mills, Kegley, & Pavlath, 2004). Montmorency tart cherry anthocyanins reduce COX-2 activity by 36.6%, which is suggested to be similar to NSAIDs (Bondesen et al., 2004).

**WHY NOT TAKE IN OTHER DIETARY SOURCES OF DIETARY NITRATE?**

Why not just eat beetroot or green, leafy vegetables to take in nitrates? Beetroot has 250 mg (>4 mmol) nitrate per 100 g (Hord, Tang, & Bryan, 2009). This is considered as a relatively rich source of nitrates (Ysart et al., 1999). The nitrate in other sources is questionable because it is difficult to quantify the exact intake amount and concentration that actually enters blood circulation to produce an active effect.

Most of the studies use around 8-mmol of nitrates per day (~500 mg/day). To take in the same amount of nitrate through nitrate-rich foods would require eating 200-300 g of spinach or beetroot (Lundberg & Govoni, 2004). Therefore, BeetBoost is a concentrated beetroot juice that is a feasible alternative to eating unrealistic amounts of nitrate-rich foods.

With BeetBoost, there is no question of the amount of dietary nitrates. BeetBoost takes into account that too much nitrate can lead to saturated levels of nitric oxide that results in no additional benefits (Wylie et al., 2013). The amount of nitrates in BeetBoost allows for a large enough nitrate load to be taken quickly and conveniently before training or competition.

**WHAT ABOUT JUICING YOUR OWN BEETROOT JUICE? JUICING AT LEAST SIX BEETS MAY BE IMPRACTICABLE COMPARED TO DRINKING BEETBOOST BECAUSE IT IS:**

- Time-consuming
- Messy
- Expensive

**BEETROOT + TART CHERRY: ONE OF A KIND**

**BeetBoost** is a natural, functional food that enhances sport performance. There are no synthetic ingredients to question. BeetBoost contains a single serving of six beets and standardization of anthocyanins to 35 tart cherries. BeetBoost’s beet blend and tart cherry blend serve as a double-edged sword for powering sport performance and recovery. BeetBoost is a powerful, unmatched combination that separates itself from other commercial beetroot juice products.
REFERENCES


