

**PowerBar** POWER TO PUSH



PowerBar Playbook Series | U.S. Version



## A COMPREHENSIVE GUIDE TO **BETA ALANINE**

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Information presented in this booklet is intended to impart general fitness, nutrition and health information. Nestlé is not engaged in rendering medical advice or services. The information presented in this booklet is not intended for diagnostic or treatment purposes. You should consult your doctor for medical advice or services, including seeking advice prior to undertaking a new diet or exercise program. Advance consultation with your doctor is particularly important if you are under eighteen (18) years old, pregnant, breastfeeding, or have health problems. Never disregard professional medical advice or delay in seeking it because of something you have read in this booklet.

**Want to be a better athlete? The muscle fatigue-fighting power of beta-alanine can help you reach that goal. In this guide you'll find out exactly what you need to know about beta-alanine: what it is; how it works; and, most importantly, how to make it work for you. Read on to learn more.**

## WHAT IT IS

Beta-alanine is an amino acid that occurs naturally in your body and in foods that contain protein. It's also a research-supported dietary supplement that can help athletes enhance their high-intensity performance.

**Muscle carnosine is critically important for fighting fatigue during high-intensity exercise, and supplementing with beta-alanine boosts muscle carnosine levels.**

## HOW IT WORKS

During events requiring sustained high-intensity effort — such as running or cycling up steep grades; pushing hard to the finish in a marathon, triathlon, or bike race; cross-training in the gym; running intervals or middle distances on the track; or competing all out in any number of sports — there is a substantial breakdown of muscle glycogen, causing large increases in lactic acid (LaH). This lactic acid immediately separates into lactate (La-) and hydrogen ion (H<sup>+</sup>), and the large increase in H<sup>+</sup> during intense exercise is a major contributor to fatigue. Not only does H<sup>+</sup> produce that all-too-familiar burning sensation, it impairs the ability of your muscles to contract — so you can't generate the force needed to make that extra burst up the hill, to sprint to the finish line, or to complete that one final lift.



PowerBar® Elite Series HIGH INTENSITY Sustained Release Beta Alanine dietary supplement

Your ability to sustain high-intensity exercise is impacted by a natural biochemical molecule in your muscles called carnosine. Carnosine acts as a buffer by helping to neutralize the buildup of muscle acids that occurs during high-intensity exercise. The more carnosine you have, the better you're able to perform at a HIGH INTENSITY. That's because with less acid present, your muscles are able to generate full power for longer. This enables you to train harder and longer and to reap the performance benefits that come from pushing the limits of high-intensity training.

Beta-alanine is a key player in this fatigue-fighting story because it serves as a critical amino acid building block for carnosine. Research shows that supplementing with beta-alanine boosts muscle carnosine. PowerBar® Elite Series HIGH INTENSITY Sustained Release Beta Alanine dietary supplement gets the job done.

PowerBar® Team Elite™ athlete  
**KYLE MARCOTTE**



PHOTO BY: TRISTAN BROWN

**PowerBar HIGH INTENSITY tablets** take the guesswork out of supplementing with beta-alanine!

PowerBar® Team Elite™ athlete  
**JOSH COX**



PHOTO BY: JOHN SEGESTA

## POWERBAR BETA ALANINE SUPPLEMENT HAS BEEN SHOWN TO BOOST CARNOSINE LEVELS IN 4–8 WEEKS

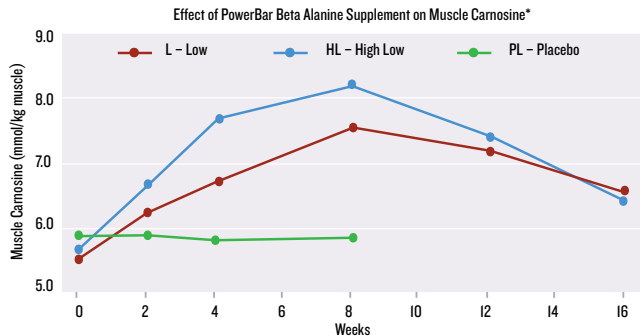
Study design: In an 8-week study, healthy subjects were given either:

- 1.6 grams/day of beta-alanine
- 3.2 grams/day of beta-alanine for 4 weeks (loading phase), followed by 1.6 grams/day of beta-alanine (maintenance phase) for another 4 weeks
- Placebo (no beta-alanine)

Each two-tablet serving of PowerBar Beta Alanine supplement provides 1.6 grams of beta-alanine.

Results: In comparison to the control (no beta-alanine):

- Low-dose beta-alanine (1.6 grams/day) boosted muscle carnosine by 35% after 8 weeks.
- The combination of 3.2 grams/day of beta-alanine for 4 weeks, followed by 1.6 grams/day for 4 weeks, produced a 45% increase in muscle carnosine.
- Muscle carnosine level appears very stable, as only 31% washed out from its peak after 4 weeks, and only 58% was lost after 8 weeks post-supplementation.



The study used PowerBar Beta Alanine supplement at two different dosing regimens. The high low (HL) dose was 3.2 grams/day for 4 weeks, followed by 1.6 grams/day for 4 weeks, which showed significantly greater muscle carnosine synthesis than a low (L) dose of 1.6 grams/day for 8 weeks.

Stellingwerff T, Anwander H, Egger A, Buehler T, Kreis R, Boesch C, Decombaz J. The Effect Of Two  $\beta$ -alanine Dosing Protocols On Muscle Carnosine Synthesis and Washout. *Med Sci Sports Exerc* 2010; 42: S929.

\*Product tested was a prototype formula.

# Taking beta-alanine daily led to a **22% increase** in total training volume per workout.



Certified for Sport™  
www.nsf.org

## QUALITY AND PURITY YOU CAN TRUST

PowerBar® Elite Series HIGH INTENSITY Sustained Release Beta Alanine dietary supplement is NSF Certified for Sport™. That means the product is independently tested in accredited laboratories to ensure that the actual contents of the supplement match those printed on the label. In addition, NSF certification is your assurance that there are no ingredients present that are not openly disclosed on the label. NSF Certified for Sport™ certification means that PowerBar HIGH INTENSITY tablets have what they claim to have and have passed NSF's stringent independent testing on more than 150 banned substances and contaminants. It's a product that you can trust.



PowerBar® Elite Series HIGH INTENSITY Sustained Release Beta Alanine dietary supplement tablets

## POWERBAR ON THE SCIENTIFIC CUTTING EDGE

Muscle carnosine is critically important for fighting muscle fatigue during high-intensity exercise, and beta-alanine is the key nutritional building block that enables you to boost muscle carnosine levels. Now PowerBar makes it easy to reap the benefits of beta-alanine with the new PowerBar Elite Series HIGH INTENSITY Sustained Release Beta Alanine dietary supplement.

PowerBar HIGH INTENSITY tablets feature an innovative formulation designed to promote optimal absorption. The proprietary sustained-release technology in the tablets is designed to deliver a steady release of beta-alanine from the digestive tract to the circulatory system. By avoiding sharp spikes in the bloodstream, less beta-alanine is lost in the urine. Instead, more beta-alanine is available for muscle uptake and the making of muscle acid-buffering carnosine.

## COACHES AND ATHLETES TAKE NOTICE

Most well-designed studies looking at beta-alanine supplementation are showing benefits for high-intensity performance, and the sports world is taking notice. The following are just a few examples:

- With men performing a 6-minute high-intensity bout of cycling, those taking 4 weeks of beta-alanine supplementation **reduced exercise-induced acid conditions** in comparison to those taking a placebo without beta-alanine. (Baguet 2010a)
- In a study where men were asked to cycle at 110% of their average power output during the final stretch of intermittent interval training, **time to exhaustion was increased by 12%** after 4 weeks of supplementing with beta-alanine. (Hill 2007)
- With men and women engaged in endurance exercise, daily beta-alanine supplementation for 1 month produced a **13–16% increase in physical working capacity**. (Stout 2006, Stout 2007)
- With rowers taking beta-alanine for 7 weeks, **muscle carnosine increased by 45%**. In addition, the group taking beta-alanine was **4.3 seconds faster** in the 2000 meters versus those taking a placebo. (Baguet 2010b)



- With resistance exercise-trained men placed on a 30-day, high-intensity weight training regimen with 90 seconds rests between sets, taking beta-alanine daily led to a **22% increase in total training volume** per workout. (Hoffman 2008)

## HOW TO MAKE IT WORK FOR YOU

To supplement effectively with beta-alanine, adhere to the following research-supported protocol:

- **Plan to start supplementing with PowerBar HIGH INTENSITY tablets** about 4 weeks before you ramp up your high-intensity training. These first 4 weeks you will follow a “loading phase” and thereafter a “maintenance phase.”
- **Loading phase:** During the first 4 weeks, take two PowerBar HIGH INTENSITY tablets twice daily (i.e., four tablets daily, a total dose of 3.2 grams of beta-alanine). Space the two doses at least 3 hours apart. For example, take two tablets at 10 a.m. and another two tablets at 1 p.m.
- **Maintenance phase:** After 4 weeks of use, take two tablets once daily (for a total daily dose of 1.6 grams of beta-alanine) and continue this for the duration of your high-intensity training or competition season. Research indicates that carnosine levels remain elevated for up to about 9 weeks after beta-alanine supplementation is discontinued. (Baguet 2009)
- **In the off-season, discontinue taking beta-alanine.** Plan to start up again, beginning with the loading phase, about 4 weeks before you increase your high-intensity training.

PowerBar® Team Elite™ athlete  
**ANDY POTTS**

# PUSH YOUR LIMITS

PHOTO BY: LARRY ROSA



PowerBar® Team Elite™ athlete  
BELINDA GRANGER



PHOTO BY: LARRY ROSA

## SCENARIO 1: ENDURANCE OR TRACK ATHLETE

You are an endurance or track athlete with competitions in the spring and summer (March through September). Recommended beta-alanine supplementation regimen:

- Starting in February, take two PowerBar HIGH INTENSITY tablets twice daily — space the two doses at least 3 hours apart (3.2 grams/day).
- Continue this loading phase until the end of February.
- Starting in March, take two tablets once daily for the duration of your competitive season (1.6 grams/day).
- During the off-season, discontinue supplementing with beta-alanine.

## SCENARIO 2: TEAM SPORT ATHLETE

You play competitive soccer, basketball, football, or hockey. You ramp up your training in the late summer (e.g., August) and compete regularly through the fall and winter. Recommended beta-alanine supplementation regimen:

- Starting in July, take two PowerBar HIGH INTENSITY tablets twice daily — space the two doses at least 3 hours apart (3.2 grams/day).
- Continue this loading phase until the end of July.
- Starting in August, take two tablets once daily and continue this for the duration of your training and competitive season (1.6 grams/day).
- During the off-season, discontinue supplementing with beta-alanine.

## SCENARIO 3: STRENGTH TRAINING ATHLETE

You lift weights in the gym and plan to embark on an intensive strength training regimen in the winter (e.g., January) to build lean muscle. Recommended beta-alanine supplementation regimen:

- Starting in December, take two PowerBar HIGH INTENSITY tablets twice daily — space the two doses at least 3 hours apart (3.2 grams/day).
- Continue this loading phase until the end of December.
- Starting in January, take two tablets once daily and continue this for the duration of your intensive training regimen (1.6 grams/day).
- Discontinue supplementing with beta-alanine if you dial back the intensity of your workouts.



PowerBar® Team Elite™ athlete  
SAMANTHA MCGLONE



PHOTO BY: JOHN SEGESTA

## PAIRING BETA-ALANINE WITH WORKOUTS FOR MAXIMUM BENEFIT

The beneficial effects of beta-alanine supplementation have been shown to be optimized when muscle acid production is at its highest during training, such as training with limited rests. This will vary based on your activity or sport. For example:

- For endurance athletes, greater benefits are likely when training close to the lactate threshold, or at that point where if you go any harder, lactic acid will start to accumulate in your muscles so you can't sustain the effort. (Wilson 2010)
- Resistance training athletes will likely experience greater increases in workout volume and strength by doing 8–12 reps at 60–85% of repetition maximum than by doing 1–5 reps at 85–100% of repetition maximum. (Wilson 2010)
- For intermittent high-intensity team sports, greater gains can be expected by moderately high-intensity training that can be sustained over 30–90 seconds, in comparison to very high-intensity exercise that can only be sustained for 15 seconds or less. (Wilson 2010) — for example, a shift playing ice hockey has the edge over sprinting 100 meters.



PowerBar® Elite Series HIGH INTENSITY  
Sustained Release Beta Alanine tablets



**NSF<sup>®</sup> Certified for Sport<sup>™</sup>**  
certification means that **PowerBar**  
**HIGH INTENSITY** tablets have what  
they claim to have, and have **passed**  
**NSF's stringent independent**  
**testing** on more than **150 banned**  
**substances and contaminants.**

## PRODUCT FEATURES AND BENEFITS

POWERBAR® PRODUCTS ARE DESIGNED TO BE USED IN COMBINATION TO MEET YOUR SPORTS NUTRITION NEEDS:  
Mix and match to meet the demands of your training and competitions.

		PROTEIN (GRAMS)	CARBS (GRAMS)	KEY FEATURES	SUGGESTED USES
	PowerBar® Performance Energy bar	8–9g/bar	44–46g/ bar	Maximum energy delivery with PowerBar® C2MAX dual source energy blend <sup>1</sup> ; cramp-crushing™ electrolytes <sup>2</sup> ; low in fat	Before and during higher-intensity exercise
	PowerBar® Fruit Smoothie Energy bar	6g/bar	43g/bar	Maximum energy delivery with PowerBar® C2MAX dual source energy blend <sup>1</sup> ; cramp-crushing™ electrolytes <sup>2</sup> ; low in fat	Before and during higher-intensity exercise
	PowerBar® Energy Gel*	0g/ packet	27–28g/ packet	Maximum energy delivery with PowerBar® C2MAX dual source energy blend <sup>1</sup> ; cramp-crushing™ electrolytes <sup>2</sup> ; 0g fat	Before and during higher-intensity exercise
	PowerBar® Energy Blasts gel filled chews*	3g/ packet	45g/ packet	Customized energy delivery with bite-sized gel-filled chews and PowerBar® C2MAX dual source energy blend <sup>1</sup>	Before and during moderate- and high-intensity exercise
	Ironman PERFORM™ sports drink	0g/ 20 fl oz	42g/ 20 fl oz	Maximum energy delivery with PowerBar® C2MAX dual source energy blend <sup>1</sup> ; cramp-crushing™ electrolytes <sup>2</sup>	Before and during exercise
	Ironman PERFORM™ sports drink mix	0g/ 20 fl oz	42g/ 20 fl oz	Maximum energy delivery with PowerBar® C2MAX dual source energy blend <sup>1</sup> ; cramp-crushing™ electrolytes <sup>2</sup>	Before and during exercise
	PowerBar® Energy Bites	5g/ serving	26g/ serving	Customized energy delivery with bite-sized pieces and PowerBar® C2MAX dual source energy blend <sup>1</sup>	Before and during moderate-intensity exercise
	PowerBar Harvest® Energy bar	10g/bar	42–43g/ bar	Long-lasting energy with 5 grams of fiber per bar	Before and during moderate-intensity exercise
	PowerBar® Pure & Simple Energy bar	5g/bar	22–23g/ bar	Calorie-smart, long-lasting energy	Before and during moderate-intensity exercise
	PowerBar® Triple Threat® Energy bar	10–11g/ bar	30–32g/ bar	Long-lasting energy with protein to support muscle growth and repair	Before and during moderate-intensity exercise
	PowerBar® Nut Naturals Energy bar	10g/bar	20–21g/ bar	Long-lasting energy with protein to support muscle growth and repair	Before and during moderate-intensity exercise
	PowerBar® Prio® I10 Plus nutrition bar	5g/bar	15–17g/ bar	Calorie-smart energy	Before and during exercise
	PowerBar® Recovery bar	12g/bar	30g/bar	Carbs to replenish muscle glycogen, protein to support muscle growth and repair, and fat to help restore muscle lipids	After exercise
	Ironman RESTORE™ sports drink mix	7g/ 20 fl oz	50g/ 20 fl oz	Rehydration with carbs to replenish muscle glycogen, and protein to support muscle growth and repair	After exercise
	PowerBar ProteinPlus® Bites	20g/ serving	34g/ serving	Provides customized protein delivery to help build lean muscle along with exercise	Before and/or after exercise
	PowerBar ProteinPlus™ protein powder drink mix	20g/ 8 fl oz	7g/ 8 fl oz	Protein to help build lean muscle	Before and/or after exercise
	PowerBar ProteinPlus® protein bar	23g/bar	35–39g/ bar	Protein to help build lean muscle	Before and/or after exercise
	PowerBar ProteinPlus® 30g protein bar	30g/bar 3.5g leucine	33g/bar	Protein with added leucine to support muscle growth and repair	Before and/or after exercise
	PowerBar® Elite Series HIGH INTENSITY Sustained Release Beta Alanine dietary supplement**			 <ul style="list-style-type: none"> <li>• Helps enhance high-intensity performance***</li> <li>• NSF Certified for Sport™</li> <li>• Steady supply of beta-alanine</li> </ul>	<ul style="list-style-type: none"> <li>• Increases muscle carnosine, which buffers muscle acids</li> <li>• Designed for endurance, strength, and team athletes</li> </ul>

\* Please refer to product labels, as some varieties of PowerBar® Energy Blasts gel filled chews and PowerBar® Energy Gels contain caffeine, which is not recommended for children 18 and under or pregnant women.

\*\* For adult use only.

\*\*\* These statements have not been evaluated by the U.S. Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

1. Formulated with PowerBar® C2MAX dual source energy blend, a 2:1 glucose-to-fructose blend found to deliver 20–50% more energy to muscles than glucose alone and to improve endurance performance by 8%.

2. Contains per labeled serving 180–200 mg sodium, a key electrolyte lost in sweat that is associated with muscle cramping in some athletes.

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