

Firefight for Firepower

John A. Wise, Ph.D., Reveals Why Beta-Alanine Is a True Muscle-Power Intensi-Fire

by Jerry Brainum

What limits muscular gains? Certainly not training hard enough will prevent an acceptable rate of progress. Not paying enough attention to diet will also inhibit rapid gains in muscular size and strength. On a more elemental level, however, muscle fatigue is a major damper of muscular gains. The actual causes of muscle fatigue during training can vary, ranging from a lack of sufficient carbs and calories to dehydration. But the most familiar sign of impending fatigue during any particular set is an intense burning sensation in the trained muscles.

This burn is caused by a buildup of lactic acid, although it's the acid part, rather than the lactate portion, that is the true problem. If you could douse the fire that causes muscle flame-out during a set, you should be able to train harder, and thus speed gains in size and strength.

Creatine is considered one of the most effective food supplements. While creatine works mainly by increasing muscle energy stores, a secondary effect is that creatine provides some muscle-buffering effects. In short, it helps to soak up acid produced during hard training. That increased acid, among other effects, inhibits energy production in working muscle.

But the primary muscle-buffering substance is an amino acid product called L-carnosine.

Carnosine is a dipeptide, consisting of two amino acids—beta-alanine and histidine—bonded together. Several studies clearly show that the limiting factor for carnosine synthesis in muscle is beta alanine.

Beta-alanine is a comparatively obscure nutrient, and is one of the few known “beta” amino acid. Other amino acids are “alpha” amino acids and are found in the natural “L” configuration, or “D” configuration, which isn't usable by the human body. Beta-alanine exists in several foods, mainly protein foods, and also forms part of the structure of the B-complex vitamin, pantothenic

acid. Beta-alanine is metabolized into acetic acid, better known as vinegar in its dilute form.

To find out the facts about using beta-alanine, I interviewed John A. Wise, Ph.D. Dr. Wise is qualified to discuss the topic because he has co-authored most of the recent studies examining the athletic use of beta-alanine supplements. He is currently the chief science officer of Natural Alternatives International in San Marcos, California. Will beta-alanine make a difference in your training? Read on to find out.

JB: What is beta-alanine, and how does it work in the body?

JW: Beta-alanine is an amino acid that isn't involved in structural proteins. Its function is to combine with another amino acid, histidine, to form a dipeptide. That dipeptide serves as a buffer in the muscle. In human muscle, this dipeptide combination of beta-alanine and histidine is called L-carnosine.

JB: Can the body synthesize beta-alanine?

JW: Yes, the body can synthesize beta-alanine. But the synthesis is under some kind of limited control. Using a supplemental form of beta-alanine can significantly increase the synthesis.

JB: When were the effects of carnosine first discovered by scientists?

JW: Scientists have speculated about the effects of carnosine for some time, based on the known effects of other dipeptides existing in muscle. Something in muscle was providing a buffering, or anti-acidity, effect. The debate was just how much these intramuscular dipeptides contributed to intramuscular buffering.

JB: Why would a bodybuilder want to use a beta-alanine supplement?

JW: The main advantage for a bodybuilder using beta-alanine would be a training effect similar in magnitude to creatine, although the effect of beta-alanine differs from that of creatine. Using

creatine allows you to train harder and recover faster. That's also the category that beta-alanine falls into. By increasing muscle levels of carnosine, beta-alanine use allows you to train harder and longer before fatigue sets in.

JB: So would it be fair to say that while beta-alanine isn't a direct anabolic promoter, such as the case with hormones, by promoting increased training intensity with less fatigue, it would promote gains in muscle size and strength?

JW: Yes, exactly.

JB: Since carnosine is the key to how beta-alanine works, why not just use carnosine supplements?

JW: Carnosine does work as a supplement, but it's very expensive. In addition, using it in doses that are efficacious as an ergogenic aid would cost hundred of dollars a month. We also know that ingested L-carnosine is rapidly degraded into beta-alanine and histidine as soon as it enters the blood through the activity of the enzyme, carnosinase. As such, there is no advantage to using direct carnosine. Beta-alanine is far less expensive, and it's the limiting factor to promoting carnosine synthesis in muscle.

JB: Some studies seem to show that ingested carnosine is more rapidly taken up in slow-twitch or endurance muscle fibers rather than the fast-twitch muscle fibers. In other words, would using a supplement that promotes carnosine synthesis in muscle, such as beta-alanine, be more suitable for use in endurance events?

JW: Current research shows that beta-alanine affects both types of muscle fibers. The effect in anaerobic, or fast-twitch, effects would be greater because this is the type of activity where you get an increased acid buildup in the muscles. The levels of carnosine are also higher in fast-twitch fibers compared to slow-twitch fibers, regardless of training. Using supplemental beta-alanine results in an average increase of muscle carnosine content by 60 percent.

JB: Since carnosine consists of two amino

acids bonded together, namely beta-alanine and histidine, wouldn't ingesting extra histidine also lead to increased muscle levels of carnosine?

JW: No, because histidine is used in protein-synthesis reactions throughout the body, and increasing it merely leads to increased amino acid competition. On the other hand, beta-alanine is not involved in protein synthesis reactions and thus would directly be used for carnosine synthesis in muscle.

JB: Some new supplements contain both beta-alanine and histidine, does this serve any purpose other than looking good on the label?

JW: Adding histidine, for reasons discussed earlier, is superfluous when added to a supplement that already contains beta-alanine. It's similar to adding L-arginine, a precursor to creatine, to a supplement that contains creatine.

JB: Some companies also add both simple carbohydrates and caffeine along with beta-alanine in the belief that carbs and caffeine are synergistic with beta-alanine and make it work better. Any truth to this?

JW: Simple carbs, such as glucose, can increase the uptake of beta-alanine into muscle. The effect relates to increased insulin secretion induced by the simple sugars. Insulin is known to promote the entry of all amino acids—including beta-alanine—into muscle. Caffeine has its own ergogenic effect, but that effect is independent of the effect of beta-alanine.

JB: Some studies show that ingesting antioxidant nutrients, such as vitamin E, boosts beta-alanine uptake. Is that true?

JW: We don't have any evidence that antioxidant nutrients would boost beta-alanine uptake or increase carnosine synthesis in muscle.

JB: What about combining creatine with beta-alanine? Would that be a beneficial combination?

JW: A couple of studies do show that beta-alanine is synergistic with creatine, but not all studies show this effect. It depends on how you

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measure the performance effects. The main effect of creatine is to increase energy levels in muscle through increasing the phosphocreatine content. The phosphate portion also provides a minor buffering effect. The main effect of beta-alanine is to increase the buffering capacity of muscle. Since both supplements work differently in muscle, they can provide a synergistic effect. But, again, this effect isn't always evident.

JB: What is the optimal dosage of beta-alanine for bodybuilding purposes, and would using more work better?

JW: Taking more than the suggested dosages doesn't seem to increase the beneficial effects of beta-alanine. We've looked at various dosages, such as 3.2 grams and 6.4 grams per day, and there is little difference in effect between the two doses. The carnosine increase in muscle that results from beta-alanine ingestion is time dependent. You don't get a loading effect in the muscle, as is the case with creatine. Using supplemental creatine promotes a rapid increase in muscle creatine content. This doesn't happen with beta-alanine, which produces a more gradual increase in muscle carnosine content.

Using a beta alanine supplement leads to a rapid increase in blood levels of beta-alanine, but that level also drops quickly, too. Based on that, we feel that taking several small doses of beta-alanine seems to be more effective. This involves ingesting beta-alanine two to four times a day. The most efficacious dose of beta-alanine is about one to 1 1/2 grams taken two to four times a day.

JB: Is there an optimal time to ingest beta-alanine supplements?

JW: Our studies don't point to any particular optimal time schedule for ingesting beta-alanine supplements. The important aspect involves supplementing over time so that you get increased levels of carnosine in the muscle.

JB: Are there any side effects linked to using beta-alanine?

JW: Compared to creatine, there is no increase in hydration, or water retention, when using beta-alanine supplements. The only side effect we've found is a slight flushing effect similar to, but on a smaller scale, as the B-complex vitamin, niacin. This happens mainly when larger doses are used.

For those who find this effect uncomfortable, using smaller doses more often eliminates it. Ingesting beta-alanine with simple sugars also blocks the flush effect.

JB: Some studies show that creatine works better in younger people. Does this also apply to beta-alanine?

JW: Some data shows that carnosine levels in the body drop as you get older. As such, increasing carnosine levels through supplemental beta-alanine use may be even more effective for those over age 40, in whom carnosine levels are often lower.

JB: Since some studies show that bodybuilders usually show elevated muscle carnosine levels, why would they need to use a beta-alanine supplement?

JW: Our studies have clearly shown that even in trained athletes, who do have elevated muscle carnosine levels, you can still increase carnosine levels further through using beta-alanine supplements. This would translate into a significant performance gain, even for world class or champion athletes.

JB: Are there any stimulant effects, such as that linked to other supplements such as ephedrine and caffeine, with beta-alanine?

JW: There are no stimulant effects associated with beta-alanine usage.

JB: How long does it typically take to notice any benefits from using beta-alanine supplements?

JW: The shortest studies we've done is two weeks, but I'd say you would likely notice beneficial effects after two to four weeks of beta-alanine supplementation.

JB: What specifically would a bodybuilder notice after using beta-alanine, such as increased strength, muscle endurance, and so on?

JW: Increased reps, quicker recovery between reps—and a definite training effect, along with increased training recovery.

JB: Are there any known drug interactions with beta-alanine?

JW: No, there isn't.

JB: How would you say beta-alanine com-

pares with existing popular food supplements, such as creatine?

JW: I believe beta-alanine use is going to be equivalent to creatine. I think beta-alanine is going to be a safe, legal, and effective supplement that can have an effect on performance-based training. How much benefit anyone gets from beta-alanine is strongly related to how hard the person trains. As such, beneficial effects from beta alanine will be more apparent in harder-training people.

JB: So there is enough existing research to claim that beta-alanine is an effective supplement?

JW: Without question, there is. In fact, when you compare the level of research on beta-alanine and the evidence for efficacy, beta-alanine research is superior to that of creatine when the latter supplement was initially introduced to commercial sales.

JB: Can any company sell beta-alanine since it's a natural product?

JW: My company has a patent on the use of beta-alanine for athletic usage. We have three national and multiple international patents pertaining to beta-alanine usage. Companies that want to add beta-alanine to a supplement would need to obtain a license from us first.

JB: Are there any health benefits associated with increasing carnosine levels in the body through beta alanine supplements?

JW: Carnosine can serve as an antioxidant, and as such it can have anti-aging effects. Carnosine levels do decrease with age, and I think this decrease would adversely affect normal activity levels.

JB: Some scientists suggest that carnosine is a natural inhibitor of the aging process because it inhibits the production of AGE, or advanced glycation endproducts that are known to produce aging effects in many tissues and organs of the body. In fact, some isolated cell studies have shown complete cellular regeneration when aging cells are exposed to carnosine. Since the effects of increased carnosine levels in the body have been known for some time, why hasn't a beta-alanine supplement been introduced until now?

JW: The most recent studies that document the effectiveness of beta-alanine are just now being published. We've presented data about beta-alanine at professional meetings for several years, and this initial data is now being published widely in professional journals. This recent publicity about the research is what has prompted the new interest in beta-alanine.

JB: Does beta-alanine have any particular taste?

JW: No, it has no discernable taste.

JB: What is your feedback thus far from athletes who've used beta-alanine supplements?

JW: A number of elite athletes have used beta-alanine during training for major international competitions and have experienced record-breaking performances.

JB: Are there any known medical contraindications to using beta-alanine supplements?

JW: At this time, we don't know of any medical condition that would prevent anyone from using a beta-alanine supplement.

JB: Beta-alanine is known to share the same amino acid transport mechanism as taurine, another amino acid. Does this mean that

taurine use should be separated from beta-alanine intake?

JW: This could be a potential problem because of the competition issue. But we have not seen any depletion of taurine levels in muscle in any of our studies. A few studies used supplements that contained creatine, taurine and beta-alanine, and those studies showed no negative effects on either beta-alanine or taurine uptake.

JB: Should beta-alanine be used in a cyclical style?

JW: We have no data suggesting that you would need to discontinue beta-alanine usage. Unlike creatine, there is no known decrease in beta-alanine absorption with continued use, thus making cycling the supplement unnecessary.

Editor's note: If you would like to try beta-alanine, the patented formula is in the new supplement Red Dragon, available soon for \$29.95 (120 capsules). Call 1-800-447-0008 or visit www.Home-Gym.com. **IM**