

Sports Nutrition Supplements: Worth the Risk?



KEY POINTS

- ✓ Don't believe the hype – most sports nutrition supplements do not work as advertised.
- ✓ If a supplement does work, particularly if it quickly increases muscle mass or produces rapid weight loss, it may contain prescription drugs or other banned substances, and be both illegal and potentially harmful.
- ✓ There are many internet resources to help athletes, parents, coaches, and sports health professionals make informed decisions about dietary supplements.
- ✓ The most effective way to improve performance is to combine proper training with adequate rest, nutrition, and hydration. Athletes may consider these basics to be boring, but research repeatedly demonstrates that nothing works better.

INTRODUCTION

The marketplace for dietary supplements in the U.S. (estimated at more than \$30 billion annual sales for 2012) is often characterized as a place where junk-science abounds, benefit claims are not to be trusted, products are sometimes contaminated with banned substances, and the reputations of truly efficacious supplements are tainted by their snake-oil brethren. That scenario is certainly the case with sports nutrition supplements, a sub-set of the overall dietary supplement market, which often tempt athletes with promises of sleek, powerful bodies produced by pills, potions, and powders.

Athletes and coaches are understandably willing to consider almost any idea that promises improved performance. New ideas involving sports equipment, training techniques, and nutritional interventions are often greeted enthusiastically by coaches and athletes, put into practice before adequate testing has occurred, and touted anecdotally as the latest-and-greatest idea to hit the sporting world. While most sports

health professionals would advise a more cautious approach to integrating new ideas into an athlete's training regimen, the fact of the matter is that coaches and athletes have always been - and will always be - the initial arbiters of proposed innovations. For that reason, it should not be surprising that over 85% of college athletes are estimated to consume dietary supplements of one sort or another.

Coaches and athletes are exposed to a constantly churning mix of new ideas. In sports, most new ideas have a short lifespan; an idea that was once new is rapidly superseded by the next "improvement". This is particularly so in the area of sports nutrition, where there has historically been a rapid and seemingly endless series of product introductions, some of which make remarkable claims for superior performance, at times accompanied by remarkable risks.

JUNK SCIENCE IS THE RULE, NOT THE EXCEPTION

Confronted with a constantly changing array of sports nutrition products, the claims for which often appear to bear convincing scientific support, it is not surprising that athletes and coaches have difficulty distinguishing fact from fiction. This confusion is due to the large number of dietary supplements, the steady introduction of new products, the inability of the FDA to adequately regulate the ingredients and claims made for such products, the unavoidable and considerable lag time in conducting product- or ingredient-specific research, and the confusion resulting from intriguing product benefit claims. Although there is little doubt that some sports nutrition products provide demonstrable benefits when properly used (e.g., sports drinks, creatine, caffeine, post-exercise protein intake), the claims for other products and nutritional interventions are often dubious, ill-founded, unproven, and abysmally deficient of scientific merit.

JUNK SCIENCE = FALSE CLAIMS = NO BENEFIT

Internet sites and popular health and fitness magazines contain multiple articles and dozens of advertisements on dietary supplements. For athletes searching for a performance edge, the allure of supplements is omnipresent, especially considering the tantalizing benefit claims...

- "helps your body use oxygen more efficiently"
- "contains powerful cell-volumizing and recovery nutrients"
- "the most effective antioxidant nutrients"
- "increases muscle protein synthesis while increasing cell hydration"
- "help sculpt a leaner, firmer body"
- "increase levels of ATP"
- "intense androgenic compound increases muscle mass"
- "prevents muscle loss during training and dieting"
- "produces a highly anabolic environment"

- “produces immediate results in energy, size, strength, pumps, performance, mental focus, and training intensity”
- “enhance verbal fluency”
- “improve strength and stamina during workouts”
- “increases lean muscle mass and promotes fat loss”
- “increase peak power output, mean body mass, and muscular performance”

Each of these product claims involves a structural or functional benefit that is testable through scientific experimentation. Although a few of these advertising claims are accompanied by relevant scientific references, the vast majority are not. This observation is similar to that of Grunewald and Bailey (*Sports Medicine* 15:90-103, 1993) who evaluated the advertising claims for 624 products targeted at body builders. The products were associated with over 800 performance-related claims, the vast majority of which were unsubstantiated by scientific research. A 2009 article in *Sports Illustrated* (Epstein D and G Dohrmann. What you don't know might kill you. May 18, 2009) highlighted the risks associated with sports nutrition supplements, especially those that promise quick increases in strength and muscle mass. And Rawdon et al. confirmed the presence of a strong placebo effect associated with sports supplements (Meta-analysis of the placebo effect in nutritional supplement studies of muscular performance. *Kinesiology Review* 1:137-148, 2012). A placebo effect can certainly be a good thing for sports performance, provided there are no related risks of supplement contamination or adverse health consequences.

FOOD FIRST

The benefits provided by even the most effective dietary supplements pale in comparison to performance benefits associated with basic sports nutrition. For that reason, it makes little sense to spend money on supplements if the athlete is failing to meet the basic goals highlighted in the questions below. Before deciding whether or not to use a dietary supplement, an athlete should answer these questions:

- Is my diet all that it could be in terms of eating a variety of healthy foods, including at least 5 servings of fruits and vegetables each day?
- Am I consuming enough calories (energy) every day? (Some athletes have a difficult time maintaining body weight and muscle mass over the course of the season. Progressive weight loss means loss of muscle mass and is a sure sign the athlete is not getting enough to eat.)
- Am I getting enough carbohydrate in my diet to help keep my muscles optimally fueled? (Carbohydrate intake should be 6 g/kg/day; that's 2.7 grams of carbohydrate per pound of body weight per day; for example, a 180-lb athlete should consume roughly 400 grams of carbohydrate from a variety of foods and beverages each day.)
- Am I eating a snack containing carbohydrate and protein after each workout to help speed recovery and stimulate muscle growth and repair?

- Am I hydrating properly throughout the day, especially during training and competition?
- Am I getting enough rest during the day and at least 8 hours of sleep each night?
- Am I focused and working hard during every practice, paying close attention to my coach's suggestions and instructions?
- Am I doing enough of the right type of strength training?
- What specifically do I want to accomplish by using a sports nutrition supplement?
- Can my coach recommend a Registered Dietitian (RD) who specializes in sports nutrition to help me optimize my diet and choose the right supplements?

SUPPLEMENT SUGGESTIONS

The simple truth is that no legal dietary supplement comes close to providing the performance benefits associated with consuming a varied, balanced diet, high in carbohydrate, and with adequate protein. Following scientifically sound nutritional practices provides maximal benefits at minimal risk. The same can not be said for some dietary supplements.

The US Food and Drug Administration oversees the dietary supplement industry but does not require manufacturers to provide evidence of product purity, safety, or efficacy. As a result, some manufacturers produce products that contain unsafe ingredients or banned substances. Many athletes have tested positive for banned substances and claimed that they did not knowingly consume the substance, that they must have ingested a supplement that contained the banned substance. This is entirely possible because some supplements do contain banned ingredients, added either purposefully by the manufacturer or accidentally in the production process (manufacturing supplements using equipment that previously came in contact with a banned substance or using ingredients that are contaminated with banned substances.)

In addition to the risks of unlabeled banned substances, some supplements contain banned ingredients that are clearly listed on the label. Of course, in many cases, ingredient listings on dietary supplements contain words that only a chemist can understand. Adding to the confusion is that some ingredients have many different aliases. For example, there are more than 100 different aliases for testosterone, a steroid that is on all banned substance lists. For all of these reasons, "buyer beware" is the unfortunate advice that athletes must follow when choosing a dietary supplement.

Some companies test dietary supplements to ensure that the contents do not contain *selected* banned substances. The word "selected" is important because it is impossible to test for all banned substances. Manufacturers that claim that their products are "free of banned substances" are intentionally misleading consumers. For example, it is possible to test for a specific list of steroids, but not for steroids that aren't on that list. Manufacturers whose products bear a certification stamp have made a good-faith effort to ensure consumers that their products have been tested and that certain banned substances such as steroids, stimulants, or diuretics have not been found. Unfortunately, it's simply not possible to test for all banned substances.

Fortunately, there are excellent resources that provide valuable information and recommendations on dietary supplements and sports nutrition:

- American College of Sports Medicine, American Dietetic Association, Dietitians of Canada joint position statement on nutrition and athletic performance (Med Sci Sports Exerc 109:709-731, 2009)
- National Athletic Trainers Association. Evaluation of dietary supplements for performance nutrition. (J Ath Training 48(1):124-136, 2013)
- Sports Nutrition: A Practice Manual for Professionals, 5th edition. Chapter 7, Ergogenic Aids, Dietary Supplements, and Exercise. Chicago: Academy of Nutrition and Dietetics, 2012.
- Aegis Shield (www.aegisshield.com)
- Australian Institute of Sport (www.ausport.gov.au/ais/nutrition/supplements)
- Banned Substance Control Group (bscg.com)
- Drug Free Sport www.drugfreesport.com/drug-resources/dietary-supplements-resources.asp
- Human Performance Research Center (hprc-online.org/dietary-supplements)
- Informed Choice (informed-choice.org)
- National Sanitation Foundation (nsf.com/services/by-industry/dietary-supplements/)
- Office of Dietary Supplements (ods.od.nih.gov)
- Sports, Cardiovascular, and Wellness Nutritionists (scandpg.org)
- US Anti-Doping Association (www.usada.org/supplement411)

The Aegis Shield mobile app and website are particularly helpful to athletes, parents, and sports health professionals interested in dietary supplements. Aegis Shield compares the ingredients listed on supplement labels to various banned substance lists to identify products that contain banned substances. In addition to the more than 100,000 products in the Aegis Shield database, there are also over 35,000 different ingredient aliases. Dietary supplement bar codes can be scanned or product names can be searched to determine if the products contain banned ingredients.

Simply put, there is no assurance that a supplement purchased from a local health food store or a national nutrition chain is free of banned substances, safe, or effective. For that reason, anyone wishing to take a dietary supplement is best advised to make an effort to ensure that the supplement is free of banned or unsafe substances.