[IMAGE]

Sports Science: What's in That Drink?

Key components of a performance / recovery drink – and what many are missing.

By Robert Silverman, DC, MS, CCN, CSCS

"Performance is about fuel. Longevity is all about recovery." — Jack LaLanne

Athletes frequently ask me what the best liquid is to drink during exercise – water or a sports drink? Water provides the necessary hydration, but unfortunately, it lacks the key nutrients to aid in performance and recovery. If water is not sufficient, what, then, is the best sports drink on the market?

An extensive review of various literature shows that the "best" sports drink should contain carbohydrates, electrolytes and numerous other ingredients. Sports drinks should not only fuel activity, but also aid in recovery.[1-3] Let's review the key components of an efficient sports drink and how some of the popular brands stack up.

Carbohydrates

Carbs are a key component for athletic performance, recovery and health.[4] I recommend 30-60 grams of carbs per hour for an athletic endeavor.[5-6] This carbohydrate amount will prevent immunosuppression, which naturally occurs during intensive exercise.[7] In addition, this amount enables athletes to maintain blood glucose levels, and optimize glucose uptake and oxidation in performance. Finally, replacing fluids with a carbohydrate / electrolyte beverage prior to exercise assists in meeting fluid / carbohydrate needs. It also reduces dehydration, a critical concern for athletic performance.[8-9]

Electrolytes

sports drink - Copyright â Stock Photo / Register Mark Sports drinks should contain electrolytes such as sodium, potassium, magnesium and chloride.[10-11] Magnesium, a key electrolyte, plays a pivotal role in 300 enzymatic reactions. Bisglycinate has been shown to be the best form of magnesium because it is chelated (bonded) to an amino acid (glycine). Magnesium in the form of bisglycinate ensures increased intestinal absorption and prevents diarrhea. However, most companies do not formulate magnesium in this

bisglycinate form, increasing the risk of intestinal upset.[12-16]

Other Ingredients

- *Malic acid* is a critical addition to a sports drink formulation. It reduces muscle tenderness and assists with soft-tissue recovery.[17] Malic acid coupled with magnesium bisglycinate stimulates the aerobic and anaerobic energy pathways.[18]
- *Taurine* is an amino acid that helps regulate the level of water and mineral salts in the blood by keeping potassium and magnesium inside the cell.[19] At the same time, taurine prevents excessive sodium from entering the cell. L-taurine's properties have been validated in numerous studies.
- *L-carnosine*, also an amino acid, helps fight muscle fatigue in fast-twitch fibers and aids in athletic performance.[20]
- In addition, a full range of complex *B vitamins* for energy production should be included in the drink as well.

Maximum Carb Efficiency

Research has shown that a combination of diverse sugars maximizes carbohydrate absorption during exercise. Since glucose and fructose are absorbed at different rates, both glucose and fructose polymers should be present to optimize multiple pathways of absorption during exercise. Most commercial brands use only glucose polymers.

Literature reveals that a glucose-fructose combination, versus water or glucose alone, is the best choice for carbohydrates in a sports drink. The glucose-fructose combination results in improved power performance, running time, time to fatigue during cycling, and a perceived higher level of exertion during both strength and endurance exercises.[21-27]

What Most of the Popular Sports Drinks Are Missing

Of the more popular brands, Powerade contains high-fructose corn syrup as a source of carbohydrates; it lacks electrolytes and any recovery ingredients. Gatorade has no vitamins and contains only sodium and potassium. Both these brands rely solely on glucose as a carbohydrate source and lack fructose. Another popular brand, Vitamin Water, has no sodium or chloride, and contains only trace amounts of magnesium.

Coconut water has very high levels of potassium without any sodium content, and low levels of magnesium. Analysis of coconut water reveals that it primarily contains sucrose as a main carbohydrate source, rather than glucose and fructose in an appropriate ratio of 3:1.[28]

Thus, in my professional opinion, none of these aforementioned commercial brands contains a proper formulation to aid in athletic performance. Indeed, they hinder athletic performance.

The best sports drink should contain all four electrolytes as ingredients and have the proper 3:1 ratio of glucose to fructose. In addition, it should include magnesium in the bisglycinate form, as well as malic acid, taurine, L-carnosine and complex B vitamins to aid in athletic recovery. Remember to choose wisely and drink up.

Editor's note: Tap here for a comprehensive reference list.

Robert Silverman, DC, MS, CCN, CSCS, graduated from the University of Bridgeport, College of Chiropractic. He also has a master's of science in human nutrition. Dr. Silverman is a nationally known speaker and has published numerous articles, in addition to giving seminars on injury-related prevention, treatments and nutrition for various organizations and Fortune 500 corporations. He also serves as a chiropractor and sports injury consultant for basketball players, professional wrestling organizations, local, collegiate, and professional sports teams, professional triathletes, body-builders, martial artists and cyclists. To learn more, visit his website: www.drrobersilverman.com.