Are Energy Drinks Safe?

Training for peak athletic performance includes the standards of strength and speed training and sport specific drills. But today, energy drinks are fast becoming a standard in the athlete's arsenal for attaining optimal performance. Do drinks that tout "increased energy" and "reduced fatigue" keep their promises? They may also contain caffeine and herbal supplements. Examples of these drinks are: 180, Arizona Energy X, Energy, Sobee Adrenaline, and Red Bull.

Carbohydrates

The main ingredient in all "energy drinks" is carbohydrates or sugar. Sugar is the energy source all of our cells use to function...so the more we ingest, the better we will perform. Right? Not exactly.

A well balanced sport drink will have between 19 and 25 grams of sugar per 8 oz of drink. Research has shown that a concentration higher than 25g/oz slows gastric emptying. That means that the water which dilutes the sugar will not enter the blood stream, enhancing dehydration. Also, if consumed too soon prior to competition, a high sugar drink may cause gastric distress (nausea or vomiting). A drink too high in fructose (a simple sugar) may lead to diarrhea. Both of these side-effects can exacerbate dehydration. Energy drinks should also not be used as a rehydration source after exercise for the reasons previously mentioned.

Ingesting high levels of sugar can also lead to a sugar high and crash. That is, the sugar enters the blood stream and provides a "blast" of energy, the athlete feels good and performs well. Once that sugar is burned up, usually in about 30 to 45 minutes, there is a sugar crash. The athlete's reflexes slow, they may feel dizzy, muscle power decreases and performance falls off.

Caffeine

Caffeine is a central nervous system stimulant that when consumed, may make the athlete feel "energized." This effect is temporary and when done, the athlete will feel down and slow. Studies have shown that the effect from caffeine ingestion can last from 0 to 120 minutes. The dose needed to positively affect performance is 6 mg/kg of body weight. This would be comparable to a 180 pound athlete drinking eight 12 oz caffeinated sodas.

The problem with ingesting this large amount of caffeine is its side affects. Caffeine is a diuretic; it causes more urine output and therefore enhances dehydration. Caffeine also has a laxative effect which also enhances dehydration. Caffeine is also addictive, therefore the athlete may require higher and higher doses to achieve the same “caffeine high.”

Herbs

Many energy drinks contain caffeine containing herbs such as guarana seeds, kola nuts, and Yerba mate leaves. Many people feel that these “natural” caffeine-containing supplements are better than synthetic caffeine. The natural substances do not have consistent amounts of caffeine so manufacturers will often add synthetic caffeine to boost the effect of the natural source.

Other herbs included may include the alleged immune system enhancers: Astragalus, Schizandrae and Echinacea. Supposed memory boosters such as Ginkgo biloba and ginseng are also commonly added herbs. Additional common herbal additions are: Ciwjuia, hydroxycitrate, and ephedra (each boasts “fat-burning” claims).

Each of these herbal additions has little scientific proof as to their efficacy. Some of these herbs may interact with prescription medications to impede or enhance their chemical properties, a dangerous combination. Many people are also allergic to these herbal compounds. Allergic reactions range from mild (hives) to severe (death).

Other Ingredients

Pyruvate (a salt of pyruvic acid) is often added to energy drinks as a “performance booster.” Studies have shown that when given in a dose high enough to positively affect performance, the athlete became ill. The doses present in energy drinks have been shown to have no affect on performance.

Proteins and amino acids are often added to assist with muscle recovery and supply energy. Proteins are used in extremely small quantities as an energy source during exercise, so their addition as an energy source should have little affect. Adding them to energy drinks will affect water absorption from the gut and give the drink an unpalatable taste.

Addition of individual amino acid chains is a common trend in energy drinks. Amino acids such as glutamine, arginine and taurine have been added. Larger, branch-chained, amino acids such as leucine, isoleucine, and valine have also been added.

Glutamine has been thought to boost the immune system to decrease over-training and enhance muscle energy availability in endurance athletes. Studies have not shown this link. Adding glutamine to energy drinks did not positively affect the manufacture of muscle glycogen.

Arginine was also thought to positively affect muscle glycogen availability. This has not been supported in scientific research.

Taurine allegedly improves the contractility of cardiac muscle and may serve as an antioxidant. At this point, there is no independently reproducible scientific data to back up these claims.

Branch-chain amino acids have been shown to reduce the synthesis of serotonin in the brain. Serotonin, a neurotransmitter, production has been associated with early fatigue. Therefore, the theory is that ingesting these amino acids will delay fatigue by slowing the production of serotonin. Some studies have shown that adding these amino acids to energy drinks does not affect fatigue any more than the same drink without the amino acids.

The bottom line is that we need to be leery of claims made on the labels of energy drinks. Keep in mind that these products are NOT regulated by the Federal Drug Administration. The federal government has yet to classify these compounds as drugs, as such they can not regulate their inclusion into food items.

Information for this article was gathered from the Gatorade Sport Science Exchange.