# Sports and Energy Drinks: The Complete Guide (Part 1)

November 22, 2010 by Jimson Lee

The beverage industry, and in particular, sports beverages, is a multi-billion dollar industry. These companies will do anything for you to be loyal to their brand and product. From flashy TV and magazine ads to big names sponsors associated with the branding. Remember, Gatorade dumped Tiger and that was big news, even though it had nothing to do with personal life.

I will attempt to dissect the different elements in this somewhat overpriced and confusing industry. At the end, you, the reader, will decide what is best for you. It could be simply plain water, some orange juice and a pinch of salt. Or it could be any of the products mentioned here.

Just remember, every *body* is different on how much sugar you can consume, and how you react to it in terms of metabolism. Just like some people have diabetes and others don't. So as the cliché goes, your mileage may vary.

## Before, During and Post Recovery

The FIRST thing you need to know is if you are consuming the drink **before, during** and **post recovery**. All 3 are different and it also depends on your sport. The ambient temperature (heat & humidity) will also have an effect on the amount you sweat.

Different examples of different needs are a simple 20 minute circuit training session, a long sprint workout, a 2 hour endurance workout, and finally two-12 hour days in a Decathlon competition in the hot sun.

The SECOND thing you need to know the difference between:

1. plain water
2. glorified water, smartwater, vitaminized water
3. electrolyte & fluid replacement drinks (for sprinters and distance runners)
4. sports drink for endurance athletes
5. post recovery drinks
6. energy drinks
7. … and lastly (heaven forbid) soft drinks or pop.

## What's in Your Drink?

There are 7 ingredients I can think of, so it all boils down to *what's in YOUR drink* (no pun intended).

1. water (of course!)
2. electrolytes (sodium, potassium, magnesium)
3. sugars, starches and (heaven forbid) HFCS!
4. protein, BCAA, glutamine, whey protein isolates (WPI)
5. caffeine
6. tyrosine, taurine, and other nootropics
7. others, such as creatine

I'll repeat myself here again. What you need depends on your sport, the ambient weather conditions, and whether you drink it **before, during and post recovery** of a workout or competition. Walking down the beverage aisle at Safeway or grocery store is the same as trying to choose a box of cold cereal! Just way too many choices.

The BIG 4 with the largest market share right now are (in alphabetical order) Accelerade, Cytomax, Endurox and Gatorade. (I have a sweet spot for Cytomax because these guys make my favorite RTD Muscle Milk drink!)

# Sports and Energy Drinks: The Complete Guide (Part 2)

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## Water

It's pretty obvious your body needs water, before, during and after. Just don't over do it and get hyponatremia!

I won't get into the whole plastic bottle debate either, and the need for metal (or glass) bottles. I'll save that rant on another post.

Drinking tap is fine for most cities. If you are travelling to countries like Cuba or India, you may want to get bottled water of ANY kind.

Now glorified water, "smartwater", and vitaminzed water are another story in which, unless it's given to me FREE at a conference or competition, I feel they are overpriced. Pay me to wear their T-shirt and that's another story.

## Electrolytes

Sodium and Potassium (and to some extent other minerals like Magnesium) are the principle electrolytes you need to replenish on hot humid days with profused sweating, and for long workouts in duration (i.e. over 1 hour)

People try to find a magic drink during and after the workout, but like cramming for an exam, it may be too late. So the smart thing to do is to hydrate yourself before. And not just one hour before, but all day long.

One of lesser known disgusting tasting cures for dehydration is Pedialyte with the right amounts of electrolytes as well as optimal absorption. It is important to choose an isotonic solution, neither hypotonic nor hypertonic, to stay hydrated.

What you want is a drink low in sugar, and near equal generous amounts of sodium and potassium (about a 4:3 ratio of **Na:K**). Gatorade, soft drinks or even fruit juice contains too much sugar and not enough sodium and even lower amounts of potassium.

In fact, Pedialyte has become a hydration alternative to sports drinks for professional sports teams in the USA. Unfortunately Pedialyte is several times more expensive than the electrolyte sports drinks.

You can make your own sports drink. For potassium, use “Morton Salt Substitute” or “NuSalt” which are salt substitutes that contain potassium chloride instead of sodium chloride as in table salt.

You really don’t need much, only 1/4 teaspoon per Quart or Liter!

But in terms of minerals, you really have to watch out as too much of one will affect the absorption of the other.

For example, the dangers of too much calcium will decrease your zinc absorption (along with other trace elements such as copper) as much as 50%.

For sodium, the absorption is increased by amino acids.

However, for sodium and potassium, absorption decreases with increasing amounts of calcium and magnesium.

So electrolyte balance is a fine line.

# Sports and Energy Drinks: The Complete Guide (Part 3)

November 24, 2010 by Jimson Lee

# Sugar and “Starches”

This is the big area of controversy, and of course, research.

Sugars (and “starches”) can be divided into 3 groups:

1. monosaccharides like glucose, fructose, and galactose.
2. disaccharides like sucrose (glucose-fructose) or HFCS (glucose-fructose) or lactose (glucose-galactose)
3. Polysaccharides or “starches” like maltodextrin

You would think monosaccharides are the fastest for absorption, being a single molecule, but that is not the case. galactose is absorbed slower than a complex molecule like maltodextrin.

A 2:10 marathoner can burn up to 1200 kCal/hr (using a simple formula of 100 kCal per mile). There is no way you can ingest that many calories whether in solid form or liquid form to be metabolized as quick. You cannot metabolize calories and carbs into the blood, muscles and liver as fast as you burn them.

But your body is smart enough to replenish the glucose into energy as needed, and that path comes from different biochemical pathways, ranging from free glucose, muscular glycogen, liver glycogen and fatty acid oxidation (I should add gluconeogenesis as well for those who are doing long term fasting with glycogen reserves totally empty, but that’s being picky)

During intense exercise the only thing that will cause your blood glucose level to decrease is depleting your liver glycogen reserves.

So back to sugars in sports drinks.

Drinks with “sugar” will contain one or more from the following 3 groups above: monosaccharides, disaccharides , and Polysaccharides. I know when I make my custom protein drink (back in the days of The Protein Factory), I try to combine it with 3 types of protein based on digestibility, i.e. fast acting versus slow acting.

With different biochemical and metabolic pathways, if 1 is good, 2 is better, then 3 must be best?

Now to really confuse you: what combination is best? Glucose, fructose or a combination in the form of a disaccharide sucrose? HFCS? galactose? Polysaccharides like maltodextrin?

There are literally hundreds of journals and research papers out there. Here are 3 samples:

Comparison of fructose and glucose ingestion before and during endurance cycling to exhaustion (This study demonstrated that fructose and glucose are of equal value in prolonging ETE in endurance cycling Ingesting fructose before and during exercise apparently provided a more constant supply of glucose to be available to the working muscles)

Superior endurance performance with ingestion of multiple transportable carbohydrates (Ingestion of fructose+glucose led to an 8% improvement in cycling time-trial performance compared with ingestion of glucose)

The effect of galactose supplementation on endurance cycling performance (Ingestion of an 8% galactose-only solution (12.5 ml per kg body wt per h) is detrimental to endurance performance compared with equivalent volumes of iso-osmotic solutions containing 50% galactose/50% glucose or 80% glucose/20% fructose. This may reflect the inability of the liver to convert galactose into glucose at a rate required to support strenuous exercise intensity.)

So it all comes down in choosing the right combination of a multiple-sugar sports drink to enhance the performance in an endurance event.

Again, you want to focus on the different rates of absorption, so you might as well arm yourself with 3 different types of carbs.

Galactose had a bad rap based on a single study as the only source of energy, but I think it has a place in drinks using a combination for immediate and sustained energy. Galactose is mostly hydrolyzed from the disaccharide lactose, which is found in milk. (another reason why it's a popular post recovery drink in the form of chocolate milk)

One brand that comes to mind, and that's HYPR as it has the 3 different "sugars". We don't know the exact ratio, but we do know they exist in decreasing order based on their label, and that is a combination of maltodextrin, galactose, and fructose.

There's isn't one magic pill out there, but a combination of different ingredients makes sense, as long as you don't have an allergy to these ingredients.

And finally, there is HFCS. Sucrose is 50:50 glucose:fructose, and HFCS comes in 3 different grades of fructose concentrations. As the mainstream media is putting a nail in the coffin for HFCS, expect to see it eliminated in sports drinks, or at least change the name to give it a new identity. Same Stuff, Different Day.

# Sports and Energy Drinks: The Complete Guide (Part 4)

November 25, 2010 by Jimson Lee

# Protein

Most of the protein you see in post-recovery drinks are for the optimum ratio of carb:protein. This is not to be confused with Protein only drinks for bodybuilders and weight gainers. I discussed this in several past articles, and that ratio can be anywhere from 0:1, 1:1, 2:1 and 4:1.

The logic behind the high carbohydrates, usually in the form of fast acting sugars, is to trigger the insulin response, and therefore aid in the protein and amino acid absorption. The extra protein also helps in increased protein synthesis and prevent proteolysis (muscle breakdown). One of the biggest worries of well muscled men (bodybuilders) and women is going into a negative protein state. Your body can only absorb so much protein, as we urinate the excess amounts. If you want to learn everything about protein, I recommend Lyle McDonald's The Protein Book.

As a sprinter, I don't want too many carbs, and feel a 1:1 was ideal for me, which is why I liked Proglycosyn. (more on that below in the all-in-one post-recovery sports drink). It also tastes good. A 4:1 ratio may be excessive, so the ideal ratio is probably somewhere in-between.

# Caffeine

Caffeine is usually in a pre-race drink as a stimulant and a cognitive enhancer, but some like it DURING an endurance event in a concentrated form (along with sugar) like Goo or Red Bull.

Like protein, I discussed this in past articles in 17 Reasons to love Coffee, Espresso and Caffeine and Caffeine Limits in the NCAA.

However, too much caffeine can result in a positive test in the NCAA. 12 **grams**, or 12,000 mg of caffeine can actually kill you. And that would be bad.

# Smart drinks: Tyrosine, Taurine and others

Smart drinks, or what I call pre-competition "mental alertness neurotransmitter" drinks, are definitely a pre-race drink. These drinks fall into the category of nootropics (which would take an entire article to discuss) but you can get an idea of the market share in this article.

Red Bull is probably the most famous drink and largest in terms of market share and contains the amino acid Taurine.

I preferred Power Drive (Biotest) and Vitalyze (SNAC). Both contains Tyrosine, which blocks the release of Tryptophan, an amino acid that gives you the sleep feeling,

especially halfway in the 400m! The new formulation of Vitalyze now contains caffeine. As an experiment, 5 hour energy shots were pretty good, too.

I write about nootropics in a future article.

## Creatine

You'll see creatine appear in post recovery drinks.

Creatine is probably one of the safest supplements with the exception of cramping. The benefits were covered in several articles. Most athletes take it before, but I feel before **and** after beneficial. The dosage should be based on your lean body mass and not overall weight.

You can start with a 5 part series here on creatine, and work backwards.

## The All in One

As you can see from the list above, supplements in sports drinks is getting complicated. You can always buy simple drinks (or make your own) and add the extra supplements as needed.

The "All in One" drinks are usually the post recovery drinks.

With the exception of caffeine and nootropics, which you can take with Vitalyze, I find SNAC's Proglycosyn to be a good "all-in-one" post workout drink. The mixability was easy and it taste good with semi-cool or cold water. Trying to find ice cold water after a meet can be challenging.

I'll probably get a lot of email because SNAC is associated with BALCO and Victor Conte, but I have been using Proglycosyn years before 2003 and the BALCO raid. Unlike other supplement companies, none of his products are on the IAAF list of banned substances in case there is a contamination issue. And we are seeing more and more cases of supplement contamination. Methylhexaneamine is the latest culprit in the news.

## Conclusion

If you have read this far, I hope this helps in choosing the differences in sports and energy drinks. It's a confusing market, but it doesn't have to be if you read the labels. And save a few bucks along the way.