Efficiency of Sports Drinks

By: Colton Nelson
Millions of people use sports drinks while exercising. I am here to tell you the truth behind sports drinks. Are they worth it? Which are more effective and efficient? Are they recommended to you and more?
What is an electrolyte?
- An electrolyte is a conductive atom that transfers electrical signals.

What do electrolytes do for your body?
- Electrolytes transfer electrical signals to your muscles and brain.

What is the purpose of drinking a sports drink? What does it supposedly do for you?
- Sports drinks replenish the electrolytes that you lose in sweat and hydrates you. This supposedly allows you to perform better.

According to nutritionists – how long does your workout have to last in order to get the benefits from drinking a sports drink?
- Your work out has to last a hour or more
There are 3 added things you get when you drink a sports drink? What are they?
• Electrolyte, water, and carbohydrates

Is coconut water a good thing to drink after exercise? Describe what happens if you drink coconut water after exercising.
• Coconut water is very good after exercise.

How many teaspoons of sugar are in a typical sports drink? Provide a graphic and site your source.

12 grams of sugar.
How many teaspoons of sugar are in Gatorade G Orange?
Provide a graphic and also cite your source.

10 grams/10 teaspoons

How many teaspoons of sugar are in Red Bull?
Provide a graphic and also cite your source.

27 grams
Similar Experiment

Sports Drinks vs. Orange Juice
Sports drinks companies spend millions of dollars advertising, but do they really give you more electrolytes. This is an experiment that is similar to mine. Orange juice ended up having more electrolytes. The one drawback of orange juice is it has a large carbohydrate content, and carbs. Take water to break down which dehydrates you and adds extra calories.
Live expert Questions
James Marker, Ph.D.

Does it enhance you body to drink Gatorade after, before, or during exercising?

• Using a Gatorade right before exercise is not very helpful at all. Gatorade is more useful if taken during an exercise more than an hour and a half.

According to nutritionist how long does your workout have to last in order to get the benefits of sports drinks?

• 90 minutes

Thanks to Cam and Griffin for sharing their expert.
Q. What will happen if I drink too much?
A. As for drinking too much, there has been a great deal of discussion, and some controversy, recently, over the issue of over-hydration during athletic events and the risk of abnormally low sodium (hyponatremia). It started when runners at a marathon presented at the finish line with what appeared to be dehydration. The medical people confused the symptoms of hyponatremia with dehydration (the symptoms are similar), and so they rehydrated the runners with intravenous fluids in the medical tent, then rushed them to the emergency room where they subsequently died, not from dehydration, but from over-hydration. Hyponatremia is an electrolyte disorder where not enough sodium (salt) is present in the body fluids outside the cells. As a result, water enters the cells in an attempt to balance the concentration of salt outside the cells, and the cells swell as a result of the excess water. Most cells can accommodate the swelling, but brain cells cannot because the skull confines them. Brain swelling accounts for most of the symptoms of hyponatremia, which include:
Q. Are sports and energy drinks safe for kids?
A. Sports drinks were developed to replace the water and electrolytes lost by training athletes. For athletes who spend long hours training in hot environments, some supplementation with these electrolytes may make sense, but for almost all ordinary child and adolescent athletes under ordinary circumstances, the only thing that needs to be replaced is water. The extra sugars and vitamins won’t do anyone any good. Coaches should concentrate on encouraging the best habits for young athletes: drinking water before, during, and after exercise. Energy drinks are different. In addition to electrolytes (especially sodium), they often contain caffeine or caffeine-like compounds, along with a witch’s brew of amino acids and herbal products like inositol, ginsing, taurine, and carnitine. Vitamins are often thrown into the mix as well. The calorie count of energy drinks is even higher than that of sports drinks, and none of these additives is likely to genuinely improve performance — in fact, it’s far more likely that children, especially, will experience toxic side effects rather than any kind of athletic “boost” from these concoctions.
Q. Should I drink bottled water?
A. Not unless you have no other source of drinking water. The plastic bottles not only end up in our landfills - 2 million tons' worth - but there's some question about the purity of bottled water versus tap water.

A 2008 Environmental Working Group report found traces of chemicals in bottled water and showed that some distributors were selling bottled water that comes out of the faucet or tap water that's been purified. If your bottle doesn't say “spring water” on it, chances are the water came from a municipal water source.

Tap water is safe and a lot cheaper than bottled water, but if you don't like the taste, refrigerate it, filter it, or boil it. You might even consider a reverse osmosis filtration system for the entire house.
Hypothesis

Milk will have the most electrolytes per $ per ounce.
Materials

- 100 ml or more graduated cylinders
- propel
- Gatorade
- Kwikade
- PowerAde
- tap water
- distilled water and squirt bottle
- conductivity sensor and labquest
- plastic container 115-200ml large
- Computer with Venir Logger Pro
1. gather the drinks you want to test.
2. Use graduated cylinders to measure out 100 ml of each drink.
3. find a container that is between 115 ml and 200 ml large.
4. turn on the labquest.
5. set the collection time to 600 seconds.
6. go the graph mode.
7. start the labquest test.
8. clean the container with tap water.
9. Rinse the container with distilled water.
10. pour the graduated cylinder with the first liquid you want to test into the container.
11. Place the sensor in the container and swirl the liquid 3 times.
12. Let the probe sit for 20 seconds.
13. after the 20 seconds remove the probe from the liquid.
14. Dump the liquid into a sink.
15. Repeat steps 8-14 until you have tested all your liquids.
16. stop the test on the labquest.
17. dump out all extra liquid.
18. Clean up all materials.
Step 2

Step 12

PHEOCS Designing experiment
<table>
<thead>
<tr>
<th>Name of drink</th>
<th>Electrolyte capacity</th>
<th>Electrolytes (names)</th>
<th>Sugar content per serving (calories)</th>
<th>Price per ounce</th>
<th>Electrolytes per dollar per ounce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skim White milk</td>
<td>6246</td>
<td>Sodium Potassium Calcium</td>
<td>12g</td>
<td>$.05</td>
<td>124920 micro Siemens per $</td>
</tr>
<tr>
<td>Distilled water</td>
<td>194</td>
<td>No electrolytes</td>
<td>0g</td>
<td>$.06</td>
<td>3233 micro Siemens per $</td>
</tr>
<tr>
<td>Tap water</td>
<td>799</td>
<td>unknown</td>
<td>0g</td>
<td>$.00</td>
<td>Infinite micro Siemens per $</td>
</tr>
<tr>
<td>Propel zero</td>
<td>1718</td>
<td>Sodium</td>
<td>0g</td>
<td>$.05</td>
<td>34360 micro Siemens per $</td>
</tr>
<tr>
<td>Kwikade</td>
<td>3512</td>
<td>Sodium Potassium</td>
<td>13g</td>
<td>$.05</td>
<td>70240 micro Siemens per $</td>
</tr>
<tr>
<td>PowerAde</td>
<td>3242</td>
<td>Sodium Potassium Calcium Magnesium</td>
<td>20g</td>
<td>$.04</td>
<td>81050 micro Siemens per $</td>
</tr>
<tr>
<td>Gatorade low calorie</td>
<td>2742</td>
<td>Sodium Potassium</td>
<td>7g</td>
<td>$.06</td>
<td>45700 micro Siemens per $</td>
</tr>
</tbody>
</table>
PHEOCS Observations

Conductivity sensor used in this experiment

Sports drinks used in this experiment

- Milk: 6245 microsemens
- Kwikade: 3512 microsemens
- Gatorade: 3242 microsemens
- Propel Zero: 1710 microsemens
- Tap water: 799 microsemens
- Distilled water: 194 microsemens

Graph showing conductivity measurements over time.
The gaps in between the columns are where we are washing out the container. Tap water didn’t move it because it had the same electrolyte content as the air. Took the micro Siemen measurement after the milk column came down and flattened out.
Milk has the most electrolytes per $ per ounce.

Even though milk has the highest content it is not recommended for use during an activity because of the high protein, carbohydrate, and Calorie content. Calories take water to digest which dehydrates you. Milk is the best recovery drink though.
Kwikade is the best for a in exercise sports drink.

Kwikade was second in electrolyte content per dollar per ounce. Kwikade will replenish the most electrolyte that are lost during exercise. Kwikade would be the most efficient and beneficial to use during exercise.
Credits

http://healthyshasta.org/rethinkyourdrink.htm

http://www.gatorade.com/default.aspx#gseries?s=g-powder

http://www.sugarstacks.com/beverages.htm

http://answers.webmd.com/search-results?ques=Are+sports+drinks+necessary+for+middle+school+athletes+in+sports+like+basketball%2C+football%2C+and+soccer%3F
Credits

http://www.sciencebuddies.org/science-fair-projects/project_ideas/Chem_p053.shtml#background