Experiment 1. Determining Methodology

Bibliography:

Results

There is agreement between bottled water companies and the sports drink industry in promoting hydration; however the disagree to suffer hyponatremia (too little Na+ in the blood).

As a result of our findings we hope to determine if sports drinks differ significantly from other cheaper alternatives and if, indeed, they are worth the extra cost.

Methodology

Experiment 1. Determining the Relative Electrolyte Concentration.

To determine the electrolyte concentration in each of the drinks, the conductance must be measured. This is proportional to the electrolyte concentration.

where

Concentration of Electrolyte (C) = (Voltage / Conductance) x Volume

We measured the conductance of 16 drinks; 7 of which were specifically marketed as sports drinks.

We did this by cutting a 1 cm piece from a straw and inserting this into a beaker containing each drink. The voltage was then set to 3V using a voltmeter to confirm the accuracy. The current was then measured using the ammeter. The formula was then used to determine the concentration of electrolytes using the above equation.

A study conducted by Cardiff University and published in the British dental journal highlights that there was a lack of evidence to support the beneficial claims by the vast majority of products. “Indeed water was generally sufficient for shorter sessions, only for exercise lasting more than 60 mins was an isotonic sports drink recommended. However, there are conflicting suggestions from conducting literature reviews; that, not only are these drinks unhealthy in terms of the high sugar content, but bottled water is sold as hydrating children and adults better, during and after exercise. Indeed it’s claimed that there are no benefits of sports drinks for non-athletes and children. This investigation compares the electrolyte composition of a range of drinks marketed as sports drinks, as well as other drinks that can be used as top water. In addition, an assessment of the reducing sugar present in each drink was undertaken using colorimetry. A comparison was also made of the relative cost of each drink.

As a result of our findings we hope to determine if sports drinks differ significantly from other cheaper alternatives and if, indeed, they are worth the extra cost.

Future Research: We are aware that the potential benefits of a sports drink are very controversial, with many conflicting opinions. We would like to get more involved with working with sports drinks companies and sports physiology departments in universities to conduct studies into the differences in drink electrolyte concentrations before, during and after exercise in a range of individuals at different deviations and intensities of exercise.

Investigating Sports Drinks. Are they worth the money?

By Jamie Burnell and Rose Winter.

Introduction and Aim of the investigation

The sports drinks industry is a huge global business which shows no sign of slowing down. This project seeks to conduct the investigation from an observation that there is an increasing consumption of sports and energy drinks within our community, particularly amongst children. The message from the advertisers is clear: athletes need these electrolytes, such as sports drinks. However, there are conflicting suggestions from conducting literature reviews; that, not only are these drinks unhealthy in terms of the high sugar content, but bottled water is sold as hydrating children and adults better, during and after exercise. Indeed it’s claimed that there are no benefits of sports drinks for non-athletes and children. This investigation compares the electrolyte composition of a range of drinks marketed as sports drinks, as well as other drinks that can be used as top water. In addition, an assessment of the reducing sugar present in each drink was undertaken using colorimetry. A comparison was also made of the relative cost of each drink.

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Methodology

Experiment 1. Determining the Relative Electrolyte Concentration.

To determine the electrolyte concentration in each of the drinks, the conductance must be measured. This is proportional to the electrolyte concentration. Electrolytes are charged particles that carry an electrical charge, thus influencing the concentration of the electrolytes. The conductance was determined using the following equation:

where

Concentration of Electrolyte (C) = (Voltage / Conductance) x Volume

We measured the conductance of 16 drinks; 7 of which were specifically marketed as sports drinks.

We did this by cutting a 1 cm piece from a straw and inserting this into a beaker containing each drink. The voltage was then set to 3V using a voltmeter to confirm the accuracy. The current was then measured using the ammeter. The formula was then used to determine the concentration of electrolytes using the above equation.

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Overview

There was a huge variation in composition and price of all the drinks tested. Generally, sports drinks are twice the price of bottled water but only contain a similar electrolyte concentration. Two of the sports drinks, as well as orange juice, had an unhealthily high level. Overall the best option from all of the drinks tested was the milk; cheaper than all of the other drinks, whilst still supplying one of the highest electrolyte concentrations. The best option was the milk; cheaper than all of the other drinks, whilst still supplying one of the highest electrolyte concentrations.

Fig 1. Simple conductance set-up

Dirt, moss and sand can be used to determine the electrolyte concentration using the above equation.

Fig 2. Conductance set-up of Standard & Reduced Electrolyte Concentration

Cost per 100cm³ of Drinks

Cost per 100cm³ of Drinks

Graph showing the price, reducing sugar content and relative electrolyte concentration in a variety of drinks

Overview

Diet soft drinks and sports drinks are marketed as "sports drinks" were generally more expensive. Five out of the seven drinks tested were the milk; cheaper than all of the other drinks, whilst still supplying one of the highest electrolyte concentrations. The best option was the milk; cheaper than all of the other drinks, whilst still supplying one of the highest electrolyte concentrations. Milk contains fructose and glucose; both reducing sugars. They are therefore detected using the Benedict’s test.

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