Energy Drink in Sport
USA Swimming Task Force

Disclaimer

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Optimize strength, flexibility, and biomechanics

Swim Smarter Not Harder

Create race day and season goals

Have Fun

Make diet and fuel a priority

Practice to eliminate distractions

Increase quality of recovery and sleep

Celebrate your successes

Pre-Workout & Energy Drinks
Why do we think we need them?

**Symptoms**

- Feeling “Sluggish”
- Improper Pre-Race Fueling
- Decreased motivation
- Decreased mental focus
- FOMO (Fear of Missing Out)
Pre-Workout & Energy Drinks
What do they promise?

• Increased energy
• Improved focus
• Improved performance

• Decreased fatigue
• Improved strength gains
• Prolonged intense workouts

IS ALL OF THIS POSSIBLE IN ONE TRAINING SESSION OR RACE?

...The answer is NO.

“In sorry, Jeannie, your answer was correct, but Kevin shouted his incorrect answer over yours, so he gets the points.”
Commercial Products – Fact or Fiction

• **Sports Drink vs Energy Drink**
  - **Sport drinks** contain electrolytes and carbohydrates to rehydrate you and provide fuel after exercise.
  - **Energy drinks** may or may not contain electrolytes, but they always contain a large dose of other ingredients including stimulants.

• **Sports Drink vs Energy Drink**
  - **Sport drinks**
    - Food, primary purpose to hydrate
    - Compliance with law AND label accurate (no designer ingredients)
    - No requirement to report side-effects
  - **Energy drinks**
    - Supplement, NOT a food to hydrate
    - Company DOES NOT have to list all ingredients
    - Can include novel, UNTESTED ingredients
    - Required to report side-effects
Commercial Products – Fact or Fiction

- Food, Dietary Supplement or Drug – Green Tea

Beverage  
Supplement – Fat Burner?  
Drug - warts

Commercial Products – Drug vs Supplement

- **Drug**
  - FDA approves drugs for a particular disease when there is **evidence**, through randomized controlled trials, that the **drug is effective** in treating that disease. Companies are only allowed to advertise their drug for the specific FDA approved condition and they undergo **rigorous pre-market approval regulation**.

- **Supplement**
  - Dietary supplement manufacturers, are not allowed to advertise that their products cure, mitigate, or prevent any disease.
Commercial Products – Fact or Fiction

• **Dietary Supplement**
  • *Definition:* A dietary supplement is a product intended for ingestion that contains a "dietary ingredient" intended to add further nutritional value to (supplement) the diet. A "dietary ingredient" may be one, or any combination, of the following substances:
    • a vitamin
    • a mineral
    • an herb or other botanical
    • an amino acid
    • a dietary substance for use by people to supplement the diet by increasing the total dietary intake
    • a concentrate, metabolite, constituent, or extract

Commercial Products – Fact or Fiction

• **Dietary Supplement**
  • It is something that is taken by mouth, though it may have many forms (tablet, capsule, powder, liquid, etc.).
  • Dietary supplements are not intended to be consumed as a meal or as a meal replacement
  • The company represents the product as a dietary supplement.
Commercial Products – Fact or Fiction

• **Beware**
  - As a consumer, it’s really **hard to know** from where a supplement company bought their **raw ingredients**, and whether the raw ingredients are high quality and safe.
  - Where “studies show” a supplement works, the **research was often funded by the supplement company**.
  - **Beware of contamination**

Commercial Products – USADA

• **No organization**, including USADA, can **guarantee the safety** of any dietary supplement, and because dietary supplements are regulated in a post-market manner
  - The Food and Drug Administration (FDA) does not evaluate these products prior to them being brought to the market.
Commercial Products – USADA

• **REALIZE** there are safety issues with dietary supplements.
• **RECOGNIZE** risk when you see it.
• **REDUCE** your risk of testing positive and experiencing health problems by taking concrete steps.

USADA : Energy can graphic is a product of the Human Performance Resource Center (HPRC), from the Consortium for Health and Military Performance (CHAMP).
Caffeine: Physiologic Effects

- Complex range of physiologic effects including:
  - Antagonism of central adenosine receptors
    - inhibits the negative effects adenosine induces on neurotransmission, arousal and pain perception
  - Stimulation of adrenaline release
  - Increased cardiac muscle inotropy
  - Increased skeletal muscle contractility
  - Decreased perceived effort and fatigue
  - Sparing glycogen and mobilizing fat
    - although this effect appears to be short lived and inconsistent
  - The exact mechanisms of action remain to be elucidated
Ergogenic Benefits of Caffeine in Endurance Sports

- Moderate dosage (5-6mg/kg of body weight)
  - Stimulates endurance performance (time to exhaustion) Pasman et al 1995
  - Improved acute VO2 max Graham & Spriet 1995
  - Improved Central Nervous System function in late prolonged endurance activities Spriet 2014

Ergogenic Benefits of Caffeine in Team Sports

- Ingestion of 3mg/kg body weight of carbonated caffeine soft drink improved Tennis Skill Performance Strecker Et al 2007
- Improved putting performance and feelings of alertness in golfers Emma et al 2009
- Offset fatigue induced motor skills in soccer Gant 2010
Ergogenic Benefits of Caffeine in High Intensity Exercise

• Caffeine increased **maximal anaerobic power** and lactate concentration in cycling *Anselme et al 1992*
• Improved **100m swimming velocity** *Collomp et al 1992*
• Improved **repeat mean sprint time** in elite Freestyle swimmers *Goods et al 2017*

Effect of Stimulants

• Any **purported benefit from energy drinks** is most likely due to **caffeine**
• Guarana extracts contain **guaranine** which is chemically identical to caffeine, guarana seeds contain more caffeine than coffee beans
• Guarana extracts also contains **other stimulants such as theophylline and theobromine**
Effects of Stimulants

- All individuals do not respond the same way to caffeine and their response depends on how the body uses and breaks down caffeine.
- Habitual caffeine users may exhibit different responses compared to non-habitual caffeine users.
- Many other stimulants are banned, however therapeutic use exemptions may apply.

Energy Drinks – Side Effects

- Immediate Side Effects
  - Increased heart and blood pressure
    - 2015 Canadian Journal of Cardiology study concluded it increase risk of dangerous arrhythmias and may contribute to sudden death
  - Shortness of breath
  - Anxiety & Agitation
  - Insomnia
Energy Drinks – Side Effects

• **Psychological Implications**
  • Development of a **dependency** (“I can’t perform without it”)
  • Increased heart rate, respiration rate, perception of nervous energy, feeling “jittery”
  • **Narrowed attentional focus**
  • For athletes already nervous **before an event**, over-stimulation via energy drink consumption can lead to fears, doubts, and tension

Energy Drinks – Side Effects

• **Potential Longer Term Impacts**
  • **Heart Disease**
    • May enhance blood clotting and blood vessel damage
  • **Dependency**
    • Withdraw symptoms, depression, hypertension, and anxiety
  • **Poor Nutrition**
    • High calorie and appetite suppression
Energy Drinks - Caution

- **Recent Global Consensus Statements**
  - **Denmark, Norway, and Iceland** have all **banned** the sale of energy drinks to minors
  - **Canada** capped the **content of caffeine** in beverages and forced energy drink companies to reclassify products as “food products”
  - **American Academy of Pediatrics** stated **energy drinks** should **NEVER be consumed by youth under 18 years of age** because of potential adverse consequences
How To Check for Safety of A Product

• Athletes must be conscious of what ingredients are included in the products they consume, as products sold over the counter may contain prohibited substances.

• Athletes are responsible for ensuring that no prohibited substance enters their system.
How To Check for Safety of A Product

• USADA created a document to provide guidance in understanding the labels of energy drinks (prohibited ingredients may or may not be listed on the label!!).

• Understanding Energy Drink Labels

How To Check for Safety of A Product

• Athletes must be educated consumers and evaluate their products from a safety and doping control perspective. A few key guidelines are provided by USADA:

  • 5 Things to Know about Energy Drinks
  • Screen Your Dietary Supplements
  • 3 Resources to Help Athletes Avoid Prohibited Substances in Sport
  • Global Drug Reference Online (Global DRO)

• Any questions may be directed to USADA at 719-785-2000. Visit Supplement 411 for additional information.
5 Things to Know about Energy Drinks

1. Energy drinks are not the best choice for hydration.
   According to numerous studies, water is simply the best fluid for hydration and thirst is really the best guide as to how much someone needs to drink in order to stay properly hydrated. The high sugar and caffeine (or other stimulants) content of energy drinks is detrimental to hydration and poses additional health risks, including adverse effects from caffeine and extra calories that contribute to weight gain. In general, energy drinks should not be used for hydration before, during, or after physical activity.

2. Feeling a “rush” is a warning sign of stimulant or vitamin overdose.
   Contrary to popular marketing, the presence of high doses of vitamins, such as niacin, do NOT actually make a beverage healthy, because some energy drinks tout high concentrations of vitamins and warn users about a skin flush or other sudden rash. People may drink an energy drink with the expectation that they will “feel something” and when they do, they think the product must be working. However, consumers should be aware that foods and drinks should never cause side effects. As such, a rash or overdose resulting in skin reddening, increased heart rate, or sweating due to stimulants is actually considered an adverse event by health care providers. These effects are NOT considered good.

3. Energy Drinks can contain more caffeine than soda.
   Contrary to popular belief, there is no legal limit to the amount of caffeine that companies can put into energy drinks, and it’s been found that energy drinks can contain up to six times as much caffeine as soda drinks. You should not assume that the amount of caffeine in an energy drink is on par with cola beverages and it’s important to recognize that the effects of caffeine are dose-dependent. The higher the dose, the more likely you are to get the jitters, suffer insomnia, have irregular or racing heart beats, sweating, nervousness, or reductions. For more evidence of the risks of highly caffeinated energy drinks, take a look at the story of Olivia Saffra, a high school football player who suffered a seizure and stopped breathing after consuming just two energy drinks.

4. Don’t rely on energy drink labels to know whether they’re safe or not.
   Energy drinks can be sold as foods (beverages are considered conventional foods under the law) and labeled with a nutrition facts panel, or they can be sold as dietary supplements and labeled with a supplement facts panel. To evade food labeling and marketing laws, companies sometimes switch back and forth between the two labeling options. An energy drink sold as a food is no safer than an energy drink sold as a supplement, and vice versa. Both can contain large amounts of caffeine or other ingredients that can be harmful, and many of these products evade labeling laws, which is why it can be difficult to know exactly what is in an energy drink.

5. Energy drinks are marketed to youth and adolescents.

Screen Your Dietary Supplements

Popular Prohibited Substances Commonly Contained in Dietary Supplements

If you’re thinking about using dietary supplements, it’s important to remember that supplements are regulated in a post-market manner. This means that the Food and Drug Administration (FDA) does not analyze the safety, efficacy, or label accuracy of supplements before they are sold to consumers. No organization, including USADA, can guarantee the contents or safety of any dietary supplements. Consequently, athletes always assume some risk of testing positive for prohibited substances when they use supplements. As always, athletes have strict liability for substances they ingest, including those consumed through dietary supplements.

Athletes also need to be aware that manufacturers may misleadingly prohibit substances on labels, or they may omit prohibited substances from labels altogether. In general, athletes simply cannot depend on the accuracy of supplement labels, so the only way to assume no risk of testing positive from a supplement is to not use the supplement in the first place.
3 Resources to Help Athletes Avoid Prohibited Substances in Sport

1. Supplement High Risk List
   Compiled by USADA, the High Risk List is a list of dietary supplements and other black market products that have been known to contain prohibited substances, or claim to deliver the same performance-enhancing effects as prohibited substances. The list also includes products that USADA has previously tested to confirm the presence of a prohibited substance. Similarly, USADA adds supplements to the High Risk List when the Court of Arbitration for Sport has determined that a supplement likely caused a positive test for an athlete. When referring to the High Risk List, it’s really important to realize that the list is not exhaustive and that the absence of a product on the list doesn’t mean the supplement is safe. With more loosely regulated supplements added to the market everyday, it’s difficult to develop a truly comprehensive list of supplements that could cause an athlete to test positive for a prohibited substance. Because of the prevalence of supplement contamination, it’s often safer to satisfy nutritional needs through proper diet, sleep, and recovery programs.

2. Global DRO
   To help athletes determine if their medications contain prohibited substances or if they are safe to use, USADA also partnered with anti-doping agencies around the world to develop the Global Drug Reference Online (Global DRO). Global DRO allows athletes and support personnel to search specific medications and ingredients to see if they are prohibited in-competition, out-of-competition, or at all times based on the current World Anti-Doping Agency (WADA) Prohibited List. This online resource contains information on products sold in Australia, the United Kingdom, Canada, the United States, and Japan. Focused primarily on medications and ingredients, Global DRO does not contain information that applies to dietary supplements.

3. Drug Reference Phone Line
   After checking the High Risk List and searching Global DRO, athletes can also utilize USADA’s Drug Reference Phone Line to reach an expert at USADA with additional questions about the prohibited status of substances and the therapeutic use exemption (TUE) process. Athletes can reach a friendly expert Monday through Friday, from 8 a.m. to 4 p.m. MST, at 719-785-2000 x 2.

By utilizing these resources, athletes can more easily avoid substances that are prohibited in sport, protect their reputations, and help ensure that all athletes have access to a level playing field.

Global Drug Reference Online (Global DRO)

The WADA Prohibited List in Action!

CHOOSE YOUR SPORT NATIONALITY

Canada  United Kingdom  United States  Switzerland  Japan  Australia

The Global Drug Reference Online (Global DRO) provides athletes and support personnel with information about the prohibited status of specific medications based on the current World Anti-Doping Agency (WADA) Prohibited List.

Global DRO does not contain information on, or that applies to, any dietary supplements.

Visitors can search the Global DRO for specific information on products sold in the United Kingdom, Canada, the United States, Japan, Australia, and Switzerland.

Global DRO is brought to you through a partnership between UK Anti-Doping (UKAD), the Canadian Centre for Ethics in Sport (CSES), Anti-Doping Switzerland (ASDA), and the United States Anti-Doping Agency (USADA). The Japan Anti-Doping Agency (JADA) and the Australian Sports Anti-Doping Agency (ASADA) are official Global DRO licensors.
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Summary of Positive Effects of Stimulants

- Complex range of physiologic effects the exact mechanism of which is unknown
- Caffeine metabolism and effects varies among different individuals
- Caffeine appears to improve exercise capacity
- Scientific evidence is limited and difficult to interpret
  - Small sample sizes
  - Inherent variability in sports performances
  - Habitual use vs. non-habitual use
  - When multiple supplements used concurrently, interpretation of effects and side effects are even more complex
Unintended Impact of Energy Drink Consumption

• The contents of these drinks, in excess, produce unwanted immediate effects and potentially dangerous long term risks
• The contents of the drinks and their amounts are not regulated and could be contaminated potentially leading to doping
• No organization, including USADA, can guarantee the safety of any dietary supplement, and because dietary supplements are regulated in a post-market manner

Alternative Sources of Preparation & Energy

• Good, old-fashioned hard work leads to confidence and readiness
• Daily decisions about proper nutrition, sleep patterns, and routines lead to energy without unintended side effects
Alternative Sources of Preparation & Energy

• Use motivational music to alter energy levels, when needed

• Visualizing good performances (i.e., seeing yourself overcoming an opponent in the last 15 yards of a race)
Commercial Products – USADA

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