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Facts About Energy Drinks[1]

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You can't walk into a supermarket these days without seeing a wide selection of energy drinks, many claiming that they do everything from boosting your energy to helping you focus. In fact, energy drinks are so popular that, on average, Americans drank about 15 cups per person in 2007. But what's in a typical energy drink? Do they really work? And are there any health risks from consuming them?

Common Energy Drinks

There are many energy drinks on the market, and they don't all contain the same ingredients. The following table lists four of the most popular energy drinks and their main ingredients (Higgins, Tuttle, & Higgins, 2010).

Energy drink	Caffeine content milligrams/can	Other ingredients
Red Bull® 8.3 ounces	80	Taurine, glucuronolactone, B vitamins
Monster Energy Drink® 8 ounces	80	Taurine, ginseng, carnitine, glucuronolactone, guarana, B vitamins
Rockstar™ 8 ounces	80	Taurine, guarana, ginkgo biloba, carnitine, B vitamins
Full Throttle™ 8 ounces	100	B vitamins

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Common Ingredients in Energy Drinks

Caffeine

Caffeine is the most common ingredient in energy drinks and is the chemical that provides the energy boost. Caffeine's effect on the body varies from person to person, depending on various factors such as weight, gender, and individual sensitivity to caffeine. Recent research suggests

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that caffeine's antioxidant effects may help protect people from diseases such as Alzheimer's when consumed in moderate amounts (León-Carmona & Galano, 2011). Caffeine can make you feel more alert and has been shown to help exercise endurance, but it can also have some negative side effects, such as heart palpitations and insomnia in some people who get too much (Laurent, 2000).

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Other Ingredients

Energy drink ingredient lists can often look like pages from a chemistry book. What are those other ingredients in energy drinks, what do they do, and most importantly, are they safe?

Taurine, an amino acid that is a common ingredient in energy drinks, is also found naturally in some foods. Taurine has essential functions in the body, and most healthy people can make enough to meet their needs. However, adults with serious illnesses and infants must get taurine from food (Clauson, Shields, McQueen, & Persad, 2008). Not much information is known about the long-term effects of ingesting large amounts of taurine. The amount of taurine in an 8-ounce serving of a typical energy drink is about 1,000 milligrams, which is considered safe (Zeratsky, 2010). Some energy drinks claim that taurine helps with exercise performance, but this has *not* been proven (Higgins et al., 2010).

Guarana, a rainforest vine from the Amazon, is another common ingredient in energy drinks. Guarana seeds are used by people of the Amazon for increased energy and alertness. The guarana seed has the highest caffeine content of any other plant (Higgins et al., 2010) and has the same benefits, risks, and potential side effects as caffeine (Griffin & Leopold, 2010).

B vitamins are added to most energy drinks with the claim that they boost mental and physical performance. Although a deficiency in certain B vitamins can lead to fatigue, getting more B vitamins than needed does not provide extra energy. Most people get plenty of B vitamins from their diets, especially from fortified foods. When you consume more B vitamins than you need from energy drinks or other sources, they are lost in the urine (National Institutes of Health [NIH], 2011a, 2011b). Although most of the B vitamins in energy drinks are not toxic, too much vitamin B_6 can be dangerous. The highest level of vitamin B_6 intake considered to be safe is 100 milligrams per day (NIH, 2011a). Most energy drinks contain 2–3 milligrams of vitamin B_6 per 8-ounce serving (Higgins et al., 2010).

Glucuronolactone is added to some energy drinks as part of the product's "energy blend." It is found naturally in our bodies and in foods such as fruits. There is some evidence to suggest that glucuronolactone may decrease exercise fatigue, but more research is needed to form a definite conclusion (Tamura, Tomizawa, Tsutsumi, Suguro, & Kizu, 1966). This compound has not been shown to have any negative effects on health, but the research is limited and there is also not enough evidence to set safe consumption levels (Higgins et al., 2010; Scientific Committee on Food, 2003).

Carnitine is a natural compound made in the liver and kidneys that is involved with energy metabolism. Research does not support the claim that carnitine increases exercise recovery. In amounts greater than 3 grams per day, carnitine can cause nausea, vomiting, and diarrhea (NIH, 2006). Most energy drinks don't list the amount of carnitine on the nutrition facts label, so let the buyer beware.

Ginseng and **ginkgo biloba** are herbs that are used as alternative medicines. Ginseng and ginkgo biloba may improve memory when taken together. Consumers should be aware that both ginseng and ginkgo biloba can interfere with proper drug action of certain medications such as insulin, oral hypoglycemic agents, blood thinners, and diuretics (Medline Plus, 2010; 2011). Such interactions can cause severe health problems.

Energy drinks claim that ginseng can help athletic performance, but this claim also has not been proven. The amount of ginseng in most energy drinks is less than the amount traditionally considered beneficial (Clauson et al., 2008).

Energy Drinks Provide Extra Calories

Energy drinks add extra sugar and calories to your diet unless you buy a sugar-free version. This can make losing weight or maintaining a healthy body weight difficult. The regular version of most energy drinks provides about 100 calories and 30 grams of sugar per 8-ounce serving, similar to drinking a can of regular soda (USDA, n.d.). Since many energy drinks are sold in 16- or even 24-ounce cans, you could be drinking as many calories as you would get from a small meal, without all of the nutrients.

Energy Shots

Energy shots have become very popular and have the same effects and risks as energy drinks. They have most of the same ingredients, including caffeine, taurine, carnitine, glucuronolactone, and B vitamins. Energy shots can be a more concentrated source of caffeine, with some energy shots providing 200 milligrams of caffeine per shot. They may also have up to 40 milligrams of vitamin B_6 per shot. There are currently no published studies that have evaluated the safety of energy shots. Just like energy drinks, the ingredients do not require FDA approval, and the makers are not required to state their products' caffeine content. This could result in consumers getting too much caffeine, which could lead to the side effects mentioned in the caffeine section in this publication. The same precautions taken with energy drinks need to be taken with energy shots.

Mixing Energy Drinks and Alcohol

Energy drinks mixed with alcohol are popular beverages among young adults and at social events. There are also a number of alcoholic malt beverages available that contain caffeine and are marketed as energy drinks. The dangers of mixing alcohol and energy drinks have been in the news recently and the subject of investigation by the Food and Drug Administration (FDA).

The FDA recently warned companies who make alcoholic caffeinated beverages that caffeine added to their alcoholic beverages is an "unsafe food additive," and that these beverages pose a public health concern. If the companies do not change their products by removing the caffeine, the FDA can force them to stop selling their products (Herdon, 2010).

Research has shown that when people combined energy drinks and alcohol, they did not feel the effects of alcohol intoxication as much (Ferreira, De Mello, Pompeia, & De Souza-Formigoni, 2006). This is dangerous because they may drink more alcohol than they normally do, and may be more likely to perform unsafe activities, such as driving while intoxicated or engaging in other high-risk behaviors.

Energy Drink Alternatives

How can you get a little burst of energy without drinking an energy drink? Try one of the following options:

- Do some moderate exercise, such as walking, biking, or taking a group exercise class.
- Sip unsweetened iced tea, which provides a calorie-free alternative and has less caffeine. A 10-ounce glass of tea may have 80–160 milligrams of caffeine (León-Carmona & Galano, 2011). For sweet tea, you can add sugar or a sugar substitute.
- Drink a small cup of coffee (6–8 ounces).
- Go to bed a half-hour earlier than you usually do.

Are Energy Drinks Safe?

At the present time, there is not enough research to show that energy drinks are safe. Energy drinks may cause some people to suffer from "caffeine intoxication." This can make them feel jittery, have difficulty sleeping, or have an increased or irregular heartbeat. People who consume caffeine regularly may get headaches or changes in mood if they suddenly stop drinking beverages with caffeine, including energy drinks (Laurent, 2000).

Summary

While energy drinks and energy shots may give you the energy boost that you desire, they may also produce some unwanted side effects. If you decide to consume these drinks, it is wise to drink them in moderation and avoid mixing them with alcohol or other sources of caffeine, such as coffee and tea. Check with your doctor if you are on medications or have a condition that may make it unsafe to consume energy drinks or energy shots. Energy drinks that are not sugar free contain empty calories, which can make weight control or maintenance more challenging. Keep in mind that there is little evidence to support the safety or effectiveness of most of the ingredients contained in energy drinks. Also, because they are often sold as a dietary supplement, the claims and contents of these products are not

highly regulated. "Let the buyer beware" is a good warning when it comes to these products.

References

Clauson, K. A., Shields, K. M., McQueen, C. E., & Persad, N. (2008). Safety issues associated with commercially available energy drinks. *Journal of the American Pharmacists Association*, *48*, e55–e67.

Ferreira, S. E., De Mello, M. T., Pompeia, S., & De Souza-Formigoni, M. L. O. (2006). Effect of energy drink ingestion on alcohol intoxication. *Alcoholism: Clinical and Experimental Research, 30*(4), 598–605.

Griffin, R. M., & Leopold, D. C. (2010). *Vitamins and supplements lifestyle guide: Guarana.* Retrieved from http://www.webmd.com/vitamins-and-supplements/lifestyle-guide-11/supplement-guide-guarana

Herdon, M. (2010). *FDA warning letters issued to four makers of caffeinated alcoholic beverages.* Retrieved from http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2010/ucm234109.htm

Higgins, J. P., Tuttle, T. D., & Higgins, C. L. (2010). Energy beverages: Content and safety. *Mayo Clinic Proceedings, 86*(9), 1033–1041. doi: 10.4065/mcp.2010.0381

Laurent, D., Schneider, K. E., Prusaczyk, W. K., Franklin, C., Vogel, S. M., Krssak, M.,…Shulman, G. I. (2000). Effects of caffeine on muscle glycogen utilization and the neuroendocrine axis during exercise. *Journal of Clinical Endocrinology and Metabolism*, *85*(6), 2170–2175.

León-Carmona, J. R., & Galano, A. (2011). Is caffeine a good scavenger of oxygenated free radicals? *Journal of Physical Chemistry B*, *115*(15), 4538. doi: 10.1021/jp201383y

Medline Plus. (2011). *Ginseng, panax.* Retrieved from http://www.nlm.nih.gov/medlineplus/druginfo/natural/1000.html

Medline Plus. (2010). *Ginkgo.* Retrieved from http://www.nlm.nih.gov/medlineplus/druginfo/natural/333.html

National Institutes of Health (NIH). Office of Dietary Supplements. (2006). *Dietary supplement fact sheet: Carnitine.* Retrieved from http://ods.od.nih.gov/factsheets/carnitine

National Institutes of Health (NIH). Office of Dietary Supplements. (2011a). *Dietary supplement fact sheet: Vitamin B.* Retrieved from http://ods.od.nih.gov/factsheets/vitaminb6/

National Institutes of Health (NIH). Office of Dietary Supplements. (2011b). *Dietary supplement fact sheet: Vitamin B.* Retrieved from http://ods.od.nih.gov/factsheets/VitaminB12-HealthProfessional

Scientific Committee on Food. (2003). *Opinion of the scientific committee on food on additional information on "energy" drinks.* Retrieved from http://ec.europa.eu/food/fs/sc/scf/out169_en.pdf

Tamura, S., Tomizawa, S., Tsutsumi, S., Suguro, N., & Kizu, K. (1966). Metabolism of glucuronic acid in fatigue due to physical exercise. *Japanese Journal of Pharmacology, 16*(2), 138–56.

United States Department of Agriculture (USDA). (n.d.). National nutrient database for standard reference, release 16. Retrieved from http://www.nal.usda.gov/fnic/foodcomp/Data/SR16/wtrank/sr16a269.pdf

Zeratsky, K. (2010). *Nutrition and healthy eating.* Retrieved from http://www.mayoclinic.com/health/taurine/AN01856