

Nutrition and Health Info Sheet: Energy Drinks

For Health Professionals

Produced by:
Lyndsey Ruiz, BS
Melanie Gerdes, BS
Ashley Theide, BS
Taylor Berggren, MS
Anna Jones, PhD
Rachel E. Scherr, PhD
Sheri Zidenberg-Cherr, PhD
Center for Nutrition in Schools
Department of Nutrition
University of California, Davis
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What are energy drinks?

The term “energy drinks” refers to non-alcoholic beverages that claim to improve athletic performance, concentration, reaction time, and increase basal metabolism through the addition of ingredients such as caffeine, taurine, glucuronolactone, B vitamins, and herbal supplements such as ginseng and guarana.¹ Energy drinks may be categorized into beverages or liquid dietary supplements, depending on the manufacturer’s choice.



Is there evidence that energy drinks increase energy?

Caffeine consumption has been shown to enhance alertness and mood, act as an ergogenic aid, or counteract symptoms of sleep loss.² However the body of scientific literature is limited and it is not known whether ergogenic improvements from consuming energy drinks are due only to the caffeine, or are also due to other herbal ingredients, or as a result of the combination of the ingredients found in a beverages.¹ Some evidence shows that energy drinks may improve mental alertness, reaction times and concentration.³

How does the caffeine content of energy drinks compare to other beverages that contain caffeine?

The caffeine content of a single serving of energy drink can range from 50 to 200 mg; however, many cans contain multiple servings, thus significantly raising the caffeine intake if consumed as one portion.⁴ Furthermore, only manufacturers that belong to the American Beverage Association are required to report caffeine content.⁵

In comparison, the caffeine content, per serving, of regular drip or percolated coffee, tea, and cola beverages ranges between 95 - 165 mg, 5-48 mg, and 24-46 mg, respectively.⁶ The nutrition facts label may be missing key information about the concentration of caffeine in the beverage.

Can consumption of energy drinks have adverse effects?

Consumption of up to 400 mg caffeine daily by healthy adults is not associated with adverse

effects.⁷ Adverse effects associated with caffeine consumption in amounts of 400 mg or more include nervousness, irritability, sleeplessness, increased urination, abnormal heart rhythms (arrhythmia), decreased bone levels, and stomach upset.⁸ Caution is warranted for healthy adults who choose to consume energy beverages. Consumption of a single energy beverage may not lead to excessive caffeine intake, however, consumption of multiple beverages in a single day could, depending on the caffeine content. Other stimulants such as guarana and ginseng are often added to energy beverages and can enhance the effects of caffeine. Guarana, for example, contains caffeine (1g of guarana is equal to ~40 mg caffeine)⁹ and may substantially increase the effect of an energy drink. Furthermore, it should be noted that energy drinks often contain added sugar. According to the *2015-2020 Dietary Guidelines for Americans*, added sugar should be limited in the normal daily diet.⁷

There are groups that are at higher risk for negative health implications of caffeine consumption. This group includes women of reproductive age, pregnant and lactating women, and children. Pregnant women are recommended to consume less than 200mg per day of caffeine.¹⁰ Women who are nursing should avoid caffeine, as it can be found in breastmilk at approximately 50% of the amount found in maternal serum, and thus should be avoided.¹¹ The position of the American Academy of Pediatrics is for children to avoid stimulants, including caffeine-containing beverages.⁵

What is the caffeine and sugar content of energy beverages?

Drink	Serving (fl. oz.) ¹²	Servings per container ¹²	Kcal per serving ¹²	Sugar per serving (g) [*]	Caffeine per serving (mg) ¹²
Rock Star™	8	2	130	30	80
Monster Energy™	8	1	101	27	86
Red Bull Sugar Free™	8.4	1	5	0	80
Monster Zero Ultra™	16	2	0	0	70
NOS™	8	2	110	26	80
Java Monster™	8	2	50	5	100
Monster Rehab™	8	2	10	2	83
Monster Energy Lo-Carb™	8	2	10	3	70
Red Bull Energy Drink™	8.4	1	110	27	80
5 Hour Energy™	1.93	1	4	0	200
Redline Xtreme™	4	2	0	0	158

*Sugar content collected from Nutrition Facts Labels in store.

Note: This table does not include amounts of other stimulants found in energy drinks that can enhance the effects of caffeine. Many products are available in multiple sizes and may contain more servings than listed in this table.

There are many unusual ingredients in energy drinks. What do they claim to do?

Ingredient	Found In	Unsubstantiated Claims
Carnitine	Monster Energy™, Rock Star™, Monster Energy Zero™, Java Monster™, Monster Energy Lo-Carb™, Monster Rehab™	Improves endurance; ¹³ increases fat metabolism; ¹⁴ protects against cardiovascular disease ¹⁵
Glucuronolactone	5 Hour Energy™, Monster Energy™, Monster Energy Zero™, Java Monster™, Monster Energy Lo-Carb™, Monster Rehab™	Promotes excretion of toxins and protects against cancer ⁵

Guarana	Nos™, Monster Energy™, Rock Star™, Monster Energy Zero™, Java Monster™, Monster Energy Lo-Carb™, Monster Rehab™	Increases energy, enhances physical performance, and promotes weight loss ¹⁶
Inositol	Monster Energy™, Rock Star™, Monster Energy Zero™, Java Monster™, Monster Energy Lo-Carb™, Monster Rehab™	Decreases triglyceride and cholesterol levels, lowering risk of cardiovascular disease ¹⁷
Panax Ginseng	Monster Energy™, Rock Star™, Monster Energy Zero™, Java Monster™, Monster Energy Lo-Carb™, Monster Rehab™	Speeds illness recovery; improves mental, physical, and sexual performance; controls blood glucose, and lowers blood pressure ¹⁸
Taurine	Red Bull™, Red Bull Total Zero™, Red Bull Sugar Free™, Nos™, 5 Hour Energy™, Monster Energy™, Rock Star™, Monster Energy Zero™, Java Monster™, Monster Energy Lo-Carb™, Monster Rehab™	Lowers risk of diabetes, ¹⁹ epilepsy, ¹⁹ and high blood pressure ²⁰

Is there scientific evidence to support these claims?

Ingredient	Scientific Evidence
Carnitine	There is no clinical evidence that carnitine use is effective for increased endurance ¹³ or weight loss ¹⁴ , and the relationship with heart disease risk is controversial ²¹
Glucuronolactone	Scientific evidence does not exist to support claims regarding the efficacy of glucuronolactone ²²
Guarana	A major component of guarana is caffeine. ¹⁶ Caffeine consumption has been associated with increased energy, enhancement of physical performance, and suppressed appetite.
Inositol	Scientific evidence does not exist to support claims regarding the efficacy of inositol. ¹⁷
Panax Ginseng	Scientific evidence does not exist to support claims regarding the efficacy of panax ginseng. ¹⁸
Taurine	Clinical evidence is insufficient to show that taurine is effective in treating diabetes or epilepsy. ²⁰

Is consumption of these ingredients safe?

Ingredient	Safety
Carnitine	Insufficient data exists to establish the safety of carnitine use. ¹⁴
Glucuronolactone	Insufficient data exists to establish the safety of glucuronolactone use at the concentrations found in energy drinks. ²²
Guarana	This substance is generally regarded as safe (GRAS) for addition to cola beverages by the Food and Drug Administration Center for Food Safety and Applied Nutrition (FDA CFSAN). ²³
Inositol	Inositol is generally regarded as safe (GRAS) for addition to food by the Food and Drug Administration. ²³
Panax Ginseng	Insufficient data exists to establish the safety of panax ginseng use. ¹⁸
Taurine	Taurine is GRAS for use in enhanced water beverages at 45 ppm. ²³



Should energy drinks be consumed before or during exercise?

While caffeine is widely accepted as an effective and safe ergogenic aid, the safety of consuming caffeine in combination with other herbal supplements found in energy beverages prior to or during exercise has yet to be established.²⁴ Until the safety of this practice can be established, consumption of energy beverages prior to exercise by individuals of any age is not recommended.

Is it safe to mix energy beverages with alcohol?

A study investigating the effects of energy beverage consumption in combination with alcohol reported that, despite not feeling intoxicated, participants performed just as poorly on objective measures of motor coordination and reaction time as they did after consumption of alcohol alone.²⁵ In short, an individual may unknowingly overlook the debilitating effects of intoxication because of the sensation of alertness produced by the energy drink. For these reasons, it is not recommended to consume energy drinks in combination with alcohol.

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