Energy Drinks

If product sales are an indication of need then there is evidently a deficit in energy. A growing craze to keep up with the hustle and bustle of modern society is to power down "liquid energy". What better solution for daily fatigue than an on the go energy boost? The $2 to $3 shot (8 ounce serving) of energy found in a can is marketed to the young hip generation. The ingredients may vary slightly, but the message is the same: quick energy to keep you moving through your busy life. These drinks can be found at the local drug stores, conveniece stores, gas stations, night clubs or even hardware stores. The demand is certainly there; the energy drink industry growth has reached over a billion dollars a year in sales.

Red Bull is the industry leader followed by over a hundred other competitors. Even the beverage powerhouses Coca-cola and Pepsi-co have hopped in to grab a share of this growing market. Coca-cola has taken a modest approach offering its Full Thottle and Vault products while Pepsi has several beverages that fall under this category including, Live Wire, MDX and AMP. Other brands (some fall under the large corporate conglomerate umbrellas) like SoBe drinks (Pepsi), Monster, Rock star, and Von Dutch represent just a few of the most common competitors. The contents of these drinks contain some type of stimulants accompanied by a variety of vitamins and minerals reported to increase energy.

Content is based on a single serving

	Red Bull		**Monster**		**Rockstar**	
	Regular	Sugar Free	Regular	Sugar free	Regular	Sugar Free
Serving size	8.3 oz	8.3 oz	8 oz	8 oz	8 oz	8 oz
Servings per container	1	1	2 per can	2 per can	2 per can	2 per can
Calories	110	10	100	10	110	10
Total Fat	0 g	0 g	0 g	0 g	0 g	0g
Caffeine	80 mg	80 mg	80 mg	80 mg	75 mg	75 mg
Total Carbs sugars	28 g 27 g	3 g	26 g 26 g	3 g	29 g 27	2 g
Proteins	0 g	0 g	0 g	0 g	0 g	0 g
Taurine	1000 mg	1000 mg	1000 mg	1000 mg	946 mg	946 mg
glucuronolactone	600 mg	600 mg	*	*	-	-
Niacin	100%	100%	20 mg	20 mg	-	-
B6 B12 B2	250% 80%	250% 80%	2 mg 6 mcg	2 mg 6 mcg	50% 50%	50% 50%
Ginseng	-	-	200 mg	200 mg	-	-
Guarana	-	-	*	*	200 mg	200 mg
Milk Thistle	-	-	-	-	20 mg	20 mg
Sodium	200 mg	200 mg	180 mg	180 mg	35 mg	35 mg

*Energy Blend 2500mg (L-carintine, Glucose, Caffeine, Guarana, Inositol, Glucuronolactone, Maltodextrin)

	Cup of Coffee	Full Throttle		Vault	Von Dutch
		Regular	Sugar Free		
Serving size	8 oz	8 oz	8 oz	8 oz	8 oz
Serving per container	1	2	2	2.5	2
Calories	-	100 g	5 g	120 g	110 g
Total Fat	-	0 g	0 g	0 g	0 g
Caffeine	100-150 mg	72 mg	72 mg	47 mg	80 g
Total Carbs Sugars	- -	28 g 29 g	0 g	32 g 32g	18% 54 g
Protein	-	0 g	0 g	0 g	< 1 g
Taurine	-	-	-	-	1000 mg
glucuronolactone	-	-	-	-	600 mg
Niacin	-	205%	205%	-	50%
B6 B12 Riboflavin B2	- - -	20% 10%	20% 10%	- - -	 150%
Ginseng	-	?	?	-	-
Guarana	-	?	?	-	-
Sodium	-	85 mg	85 mg	30 g	180 mg

Common Ingredients

Caffeine

Caffeine is a common ingredient found in coffee, tea, soda, chocolate, nutritional supplements and even performance enhancers. It is a key sympathetic nervous system stimulant used in all of the energy-beverages. Some drinks also use various compounds that serve as caffeine replacements or additives. Guaranine found in the Guarana plant is another common central nervous system stimulant found in many energy drinks. Taurine is used in the same type of products as a caffeine booster, but its efficacy has not been proven clinically to date. Moderate doses may act synergistically to speed up a person's metabolism, increasing digestion and excretion.

Caffeine is classified as a drug, whose quantities are regulated in athletes participating in IOC and NCAA sanctioned events (Juhn., 2003). Studies have shown that appropriate amounts of caffeine (minimum quantity 200 mg) can have an ergogenic effect on aerobic activities. Increased times to exhaustion in cycling and running and improved tennis performance along with decreased times in 1500 meter swimming. There were no positive affects associated with short duration activities (Buchard et al., 2002).

The level of caffeine recommended to produce an ergogenic effect is 250 to 700 mg (Juhn., 2003) a drip method cup of coffee has on average between 110 to 150 mg of caffeine. Anything above those levels could cause you to be disqualified from a NCAA event or IOC event (Juhn MS, 2003). Over consumption of caffeine may lead to symptoms such as sweating, nervousness, or overall feeling of uneasiness associated with anxiety. These side affects are due to increases in

heart rate, blood pressure, vasoconstriction, increased amounts of fatty acids in the blood and increased production of gastric acid (nausea).

Glucuronolactone
Glucuronolactone is a common ingredient found in energy drinks because it is reported to fight fatigue, aid in memory retention and give a person a sense of well being. It is a naturally occurring compound produced from the metabolism of glucose. Glucuronolactone is also a precursor to taurine another substance commonly found in energy drinks.

B Vitamins
Each B Vitamins plays an important role in the production of energy and new cells in the body. The presence of B vitamins allows for efficient energy metabolism from carbohydrates, fats, and proteins. A deficiency of B vitamins affects every cell, causing such symptoms as nausea or forgetfulness, to abnormal heart rhythms. However, consumption of excessive amounts of B vitamins over the recommended daily allowance has no benefit. Due to the fact that the B Vitamins are water soluble excess consumption beyond need results in excretion via urination. Many energy drink labels boast far more nutrients than is recommended by the DRI-RDA's. If the Vitamins are water soluble consuming more than 100% of need doesn't even make sense since anything not used is excreted. All mega-dosing the B Vitamins does is make expensive urine.

Niacin B3
Niacin is water soluble B vitamin that plays a role in energy metabolism. The protein tryptophan, is converted to niacin in the body. Consumption of protein rich foods provides appropriate amounts of niacin. Niacin is also used in the medical field to battle atherosclerosis. Some research has been shown that niacin slightly increases blood glucose levels and the positive affects of high density lipoproteins. Self medication with excessive amounts of niacin is not recommended as large doses of niacin may lead to liver injury or any number of adverse health conditions.

B6
B6 vitamin aids in the metabolism of amino acids, conversion of tryptophan to niacin, and the synthesis of hemoglobin. The consumption of B6 is directly related to the consumption of proteins, due to its role in protein synthesis. B6 also aids in the release of glycogen to aid in the regulation of blood glucose. Like other B vitamins, B6 decrease the efficiency of the immune system resulting in any number of illnesses. Excessive amounts are also associated with adverse effects.

B12
Vitamin B12 is necessary for new cell synthesis and the maintenance of nerve and red blood cells. B12 is found in natural animal sources high in protein and fortified breakfast cereals. Anemia, weakness, neurological ailments, and mental deficiencies are all symptoms associated with low levels of B12.

Riboflavin B2
Riboflavin as with other B vitamins is important nutrient for proper body homeostasis. Riboflavin aids in the breakdown of nutrients required for energy production. Some claims have been made that B2 boosts energy, however these findings are unfounded. The supplementation of Riboflavin to increase physical performance or boost energy is not necessary unless an

individual is deficient. Riboflavin is mostly consumed in milk or milk products. Whole grain breads, cereals, green leafy vegetables and some meats contain healthy amounts of riboflavin.

Ginseng

Ginseng is an adaptogen, or substance that increases the body's resistance to stress. Athletes may consume ginseng in the hopes of reducing the affects of mental and physical fatigue. It is also touted as immune system booster, mind enhancer, and energy booster. There are several species, Panax Ginseng is the most regarded based on research. Results of ginseng research are mixed, but a study conducted by the government claimed it may aid in increasing quality of life. Ginseng does not seem to have any type of affect on hormones such as testosterone, cortisol, HGH, or IGF-1 as previously suspected. Prolong ginseng consumption may lead to increases in blood pressure and is also not recommended for pregnant women or individuals with high blood pressure.

Recommended dosage of ginseng extract are between 250mg to 500mg a day.

Conclusion

These drinks contain a variety of substances claim to increasing energy, performance, and even a feeling of well being. Most often the foundation of the energy boost is due to stimulation of the central nervous system rather than consumption of quality energy sources. The excessive amounts of caffeine, caffiene alternatives (like guarana), or supposed caffeine enhancers (such as taurine) create the nuerological response. Any substance consumed in amounts greater than the dialy recommended intake does not necessarily increase its effectiveness. In most cases it simply produces greater amounts of flourescent urine due to the unabsorbed sustances.

The large amounts of simple sugars found in regular energy drinks wreak havoc on the body. It is true that carbohydrates, which are converted to glucose (sugar) are the predominate source of energy for activity. However, the best source is from the consumption of complex carbohydrates from natural sources like grains, whole wheats, and vegetables. Simple sugars dramatically increase blood sugar levels due to their speed and ease of absorption. This creates a sugar high which is combated with the release of insulin to control plasma glucose concentrations. This creates a viscious cycle of highs and lows often promoting lipogenic behavior and exposing the body cells to levels of insulin that may decrease sensitivity to the hormone.

Energy drinks may be a quick fix, but not the answer to fatigue. Proper diet, hydration and rest provide the remedy to fatigue. Consuming the appropriate amounts of nutrients from natural sources is the best choice. Plenty of rest allows the body to recover and rebuild, this will inturn increase performance. Athletes consuming large amounts of caffiene may experience and increased risk for dehydration. Dehydration decreases athletic performanc by as much as 7-10%. The side affects associated with high quantities of caffeine can cause increases in heart rate, increases in blood pressure, anxiety, upset stomach and jitters. The side affects that accompany energy drinks may actually decrease performance and/or feelings of well being that are marketed by energy drink manufacturers.

Juhn M.S., Popular sports supplements and ergogenic aids. Sports Med (2003) 33 : pp921-939.

Bouchard R, Weber AR, Geiger JD, Informed decision-making on sympathomimetic use in sport and health. Clin J Sport Med (2002)12:209-224.