

ENERGY DRINKS (EnDs)

The drink of athletes, rock stars, college students... and your twelve year old!

Bottom Line: Energy Drinks are generally considered safe to consume in moderation in otherwise healthy adults. However, growing use causes concerns, especially in youth. Excessive caffeine can contribute to insomnia, headaches, irritability, and nervousness. There are reports of adverse cardiovascular events, seizures and even death with EnDs. EnDs are NOT recommended for children, adolescents and pregnant/breastfeeding women. Health professionals should familiarize themselves with EnDs and recognize red flags for over consumption of CAFFEINE and CALORIES!

The worldwide energy drink market is growing exponentially. In Canada, the annual per capita expenditure for EnDs in 2006 was \$8.70/person, up from \$6.90 in 2001. By 2011, the market will likely reach \$10.90/person. ¹

What are the common ingredients found in energy drinks?

The main ingredients are caffeine & sugar/carbohydrates. Natural "exotic sounding" ingredients provide **additional caffeine** include: guarana (*p. cupana*), yerba mate and/or tea. Most EnDs contain a combination of **vitamins** (primarily B complex and occasionally vitamin C), herbals (e.g. ginkgo & ginseng) & **taurine** (an amino acid-like compound). Some may have unlisted ingredients. EnDs are not to be confused with sports drinks Gatorade & Powerade which are suitable for fluid & electrolyte replacement.

Why the trend to consume these beverages?

Product website excerpts: ...sharpen your game, keep focused and alert, tackle whatever life brings, incredible energy boost, achieve extraordinary performance, stimulates metabolism, you'll be jacked up and ready to go...

- Example of a labelled recommendation for use, "for periods of increased mental and physical exertion. Helps temporarily restore mental alertness or wakefulness when experiencing fatigue or drowsiness." ²
- 2007 survey of college students; consumed EnDs for insufficient sleep, to ↑energy and to drink with alcohol. ³

Do energy drinks deliver results?

- The majority of claims remain to be substantiated, however, caffeine is caffeine, & calories are calories! Few studies have examined the behavioural/physiological effects of the separate components. As well, there are conflicting findings in determining if a synergistic relationship exists amongst the common ingredients. ^{4,5}
- Evidence is insufficient to conclude that EnDs improve cognitive function or increase energy more than traditional caffeinated beverages. ⁶ Whatever caffeine does for a person, these products will follow suit.
- The amount of guarana, taurine, & ginseng is considered to be far below that needed for a therapeutic effect. ⁶

What are the recommended limits for caffeine consumption? ⁸

Age Group	Recommended Maximum Daily Intake (mg)
Children, 4 to 6 yrs	45 mg
Children, 7 to 9 yrs	62.5 mg
Children, 10 to 12 yrs	85 mg
Healthy adults	400 mg
Pregnant, breastfeeding, planning pregnancy	300 mg
Adolescents insufficient data for definitive advice : no more than 2.5 mg/kg/day (e.g. 40-50kg:100-125mg/day)	

How are these products regulated in Canada?

To date Health Canada has approved less than 20 EnDs as natural health products. Consumers can identify those approved as having a **NPN** (natural product number) on the label. Approval status means the product has been found to be safe, effective and of high quality under its recommended conditions of use.² **Buyer Beware** - there are far more EnDs on the market, than have been Health Canada approved. **Caution Athletes** - some may include banned substances.

What variations are available on the market? How much do EnDs cost?

There are seemingly countless options available for purchase. A comparison of some familiar brands and how they compare to coffee, tea and cola is included in Table 2. To appeal to a wider consumer base and/or tie into the "health trend", alternatives on the market include: sugar-free varieties e.g. aspartame, convenient energy shots ~75mL, pre-mixed alcoholic EnDs, and those with added electrolytes. There is even energy chewing gum (80 mg caffeine/2 pieces) and on the horizon, "organic" drink varieties and caffeinated water. A typical EnD costs between **\$2.50-\$3.50**. e.g. 5 drinks/wk= \$900/yr

Caffeinated, large size amounts	Amp Energy Original	Full Throttle Fury	Monster Khaos	Red Bull	Rockstar Punched	Nos	Coffee black, Starbucks	Coffee black, Tim Hortons	Coca Cola	Tea steeped, Tim Hortons
mL size	473 (16oz)	473	473	473	473	650	473 ^{Grande} , 591 ^{Venti}	413 ^{L-g} , 591 ^{ExLg}	573	473, 591
Caffeine (mg)	142	141	150	151	160	343	320, 400	140, 200	62	88, 110
Guarana (% Caffeine)	296	0	20 (22%)	0	50 (1.25%)	0	0	0	0	0
Calories**	220	120	180 [?]	220 [?]	260 [?]	298	5	?	260	?

* Caffeine from natural ingredients not required on labelling; total caffeine provided where possible ** "sugar free" products available with much lower caloric content; caloric content not always labelled

Are energy drinks safe to consume?

- The short and long-term effects from excessive and chronic consumption of EnD additives, alone and in combination with caffeine, are not fully known.⁹ Unlisted ingredients pose an even greater unknown.
- The adverse effects of EnDs are largely attributed to caffeine. The exact amount necessary to produce an adverse effect varies from person to person depending on their sensitivity to caffeine.
- The amounts of guarana, taurine, and ginseng added to EnDs are considered to be far below the amount needed to cause an adverse effect.⁶ However this would depend on quantity consumed and is not well studied.
- The general consensus is that energy drinks are **safe to consume in moderation**, for the general healthy **adult population**. Excessive caffeine can contribute to **insomnia, headaches, irritability, and nervousness**.⁷
- Health Canada *requires* the following warnings on labels: "**contains caffeine, not recommended for **children, pregnant or breastfeeding women, or caffeine sensitive persons, not to be mixed with alcohol, and "do not consume more than ___ cans per day"** (number of cans varies depending on product.) *Proposed label warning cautions the "occurrence of irregular heart rate or rhythms with EnD consumption."***
- Evidence to support a direct link between **adverse cardiovascular outcomes** and EnD consumption is limited. Health Canada continues to monitor adverse reactions of EnDs. The most common effects reported that are suspected to be associated with the use of EnDs are: chest discomfort, heart rhythm irregularities, increased blood pressure, electrolyte disturbances, nausea & vomiting, insomnia, anxiety, increased diuresis, hyperglycemia etc... There are several reports worldwide including Canada of EnDs **suspected in contributing to seizures¹⁰ & sudden deaths of young adults.**^{6,11,12}

Youth population concerns & issues

- Children and adolescents are considered to be the fastest growing segment of caffeine users.
- Effects of caffeine use on behaviour and physiology of children are poorly understood. Some experts believe they may be more susceptible to adverse effects, as they are likely inexperienced & less tolerant to caffeine.^{4,9}
- Caffeine may disturb children's **sleep patterns** and thus impair their normal **development**. As well, due to the high sugar content of some EnDs, they may contribute to **obesity & dental cavities**.¹³
- Industry has been publicly criticized for aggressive advertising that targets youth population.
- Marketing often associates "extreme" sports with EnD consumption, which may lead youth to believe they will perform better athletically. This is concerning due to **dehydration risks** (diuretic effect of caffeine).
- There is no legal age limit for purchasing EnDs; they are readily accessible to youth, despite label warnings.
- Numerous councils across Canada are calling for provincial governments to ban sales of EnDs to students. e.g. BC Ministry & Greater Saskatoon Catholic Schools do not allow the sale of energy drinks in schools.¹⁴
- Reported concerns that EnD consumption **may be a marker or "gateway" for health compromising behaviours** such as tobacco, alcohol, illicit & prescription drug misuse, seat-belt omission, & sexual risk taking.¹⁵⁻¹⁷
- Future regulations related to the sale of EnDs may include Schedule III placement (NAPRA): for sale on pharmacy shelves only, as an attempt to safe guard over consumption particularly in youth.

Is it safe to mix EnDs with alcohol? How do you feel about "Alert & Dangerous"?

- There are clear warnings from Health Canada to **not mix** EnDs with alcohol.¹⁸ (Limited data; also FDA warning!¹⁸)
- EnDs are often combined with alcohol (e.g. Red Bull & vodka) to supposedly increase the desired effects from alcohol while counteracting the depressive effects of intoxication. Experts worry this may increase the potential for alcohol-related injuries because users may not feel the symptoms of intoxication as readily.⁹
- At this time, controversy remains over the sale of pre-mixed alcoholic EnDs in Canada. Health Canada has not approved the sale of these drinks.¹⁹ However, some products are beginning to appear in liquor stores.

Labelling concerns (Note: caffeine also sometimes labelled as 1,3,7-trimethylxanthine)

- Consumers may be completely unaware of the amount of caffeine they are ingesting because caffeine from **natural sources** (e.g. guarana) is not always included in the amount listed on the label. Note that by law, caffeine does not have to be listed on labels unless it has been added separately as a pure substance.⁷
- Difficult to appreciate the amounts of caffeine relative to various cups of coffee or cans of cola.
- Quantity of EnD consumed is more reflective of the **container size** rather than the **serving size** suggested on the label (e.g. 16 oz ^{473ml} vs. 8 oz). Consider this when calculating the amount of caffeine being consumed.
- There is discrepancy in labelling requirements for EnDs and OTC caffeine tablets related to health warnings.
- Some experts suggest to label as **"stimulant drug containing drinks"** rather than "energy drinks" to emphasize the beverage as a drug delivery system and de-emphasize marketing.

Health Canada monitors for adverse events (AE) possibly linked to consumer products. To report a possible AE, go to: <http://www.hc-sc.gc.ca/cps-spc/advisories-avis/incident/index-eng.php>.
FDA Nov/12: **18 deaths reported**.

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