**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 $6.70/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 are these products regulated in Canada?**

Energy drinks are not to be confused with sports drinks and occasionally EnDs are not to be confused with sports drinks. However, growing use causes concerns, especially in youth. 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

**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

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**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

**What are the recommended limits for caffeine consumption?**

<table>
<thead>
<tr>
<th>Table 1: Caffeine: Recommended Maximum Daily Intake</th>
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<tbody>
<tr>
<td>Children, 4 to 6 yrs</td>
</tr>
<tr>
<td>Children, 7 to 9 yrs</td>
</tr>
<tr>
<td>Children, 10 to 12 yrs</td>
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<tr>
<td>Pregnant, breastfeeding, planning pregnancy</td>
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</tbody>
</table>

Adolescents insufficient data for definitive advice: no more than 2.5 mg/kg/day (e.g. 40-50kg:100-125mg/day)

| Table 2: Caffeine** and Caloric** Amounts: Select EnD & Other Beverage Products |
|-----------------------------------|------------------------------|-------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Caffeinated, large | Amp Energy Exl | Full Throttle | Monster Khaos | Red Bull | Rockstar Punched | Nos | Coffee Starbucks | Coffee Tim Hortons | Coca Cola | Tea steeped Tim Hortons |
| size amount | Original | Fury | | | | | | | | |
| mL size | 743 | 473 | 473 | 473 | 473 | 650 | 473 | 473 | 473 | 573 |
| Caffeine (mg) | 142 | 141 | 150 | 151 | 160 | 343 | 143 | 591 | 143 | 573 |
| Guarana (% Caffeine) | 296 | 0 | 20 (22%) | 0 | 50 (1.25%) | 0 | 0 | 0 | 0 |
| Calories | 220 | 120 | 180 (7%) | 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

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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 gingeng added to EnDs are considered to be far below the amount needed to cause an adverse effect. 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.5,11,12

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 (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!) 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.

References

4) Temple AR. Caffeine and rebound phenomena: What we have to learn and why we should worry. Neuroscience and Biobehavioral Reviews. 2009; 33: 793-806.
Additional Refs

ACKNOWLEDGEMENTS

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