

# CENTRE FOR SCIENCE AND ENVIRONMENT

**MAIN OFFICE:** 41, Tughlakabad Institutional Area, New Delhi-110 062 INDIA  
**Tel:** 2995 5124, 2995 6110, 2995 6394, 2995 6399 **Fax:** 91-11-2995 5879 **Email:** cse@cseindia.org **Website:** www.cseindia.org  
**BRANCH OFFICE:** Core 6A, Fourth Floor, India Habitat Centre, Lodhi Road, New Delhi-110 003  
**Tel:** 2464 5334, 2464 5335



LEAVES  
OF  
IMPORTANT  
SURVIVAL  
TREES  
IN  
INDIA --  
MARUA,  
KHEJDI,  
ALDER,  
PALMYRA  
AND  
OAK

19 September, 2011

To  
Dr. B. Sesikeran, MD, FAMS  
Director  
National Institute of Nutrition  
ICMR, Tarnaka  
Hyderabad - 500 007

Subject: Caffeine in Energy Drinks

Dear Dr Sesikeran

This is in response to your letter regarding our article on energy drinks. We would like to bring to light the following facts:

1. Though used as a flavouring agent (which is also questionable), the standard for caffeine in soft drinks was set based on total diet study and risk analysis in the US and EU. Denmark banned energy drinks because the total diet study showed high consumption of caffeine in the diet especially from soft drinks and other caffeinated beverages. So total diet study and risk analysis have been the cornerstone of the standard setting process in caffeine because it is a "pharmacologically active substance".
2. You have quoted Nawrot et al Risk assessment of caffeine (Food Additives and Contaminants, 20:1-30,2003) that indicates that among the healthy adult population moderate daily caffeine intake of  $\leq 400$  mg (equivalent to 6.5 mg/kg bw/d for a 70-kg person) or 390 mg ( 60 kg person ) was not associated with any adverse effects. You have then stated that since the highest amount of caffeine added in the energy drinks is 320 ppm which is less than the safe dose of 390 mg per day, standard can be set at 320 ppm.
3. First of all, I would like to quote Nawrot et al in its entirety: "Based on the data reviewed, it is concluded that for the healthy adult population, moderate daily caffeine intake at a dose level up to 400 mg/day (equivalent to 6 mg/kg body weight/ day in a 65-kg person) is not associated with adverse effects such as general toxicity, cardiovascular effects, effects on bone status and calcium balance (with consumption of adequate calcium), changes in adult behaviour, increased incidence of cancer and effects on male fertility".

It is important to note that Nawort et al, is a literature survey that has tried to conclude safety of caffeine out of a score of conflicting reports. Firstly, we do not know the bias of this synthesis report. Secondly, the report has largely looked at "healthy adult population" and adult-related health effects. One can, therefore, question the validity of using Nawort et al for setting standards for "energy drinks",

**Founder Director**  
ANIL AGARWAL

**EXECUTIVE BOARD**

**Chairperson**  
M.S. SWAMINATHAN

**Director**  
SUNITA NARAIN

**Members**  
A.K. SHIVA KUMAR  
B.D. DIKSHIT  
B.G. VERGHESE  
ELA BHATT  
G.N. GUPTA  
N.C. SAXENA  
VIRENDRA KUMAR  
WILLIAM BISSELL



which are increasingly being consumed by teenagers and even children.

4. There are scores of studies that show significant acute and chronic health impacts of caffeine at much lower intake levels. I am quoting some of them:

a. Caffeine levels as low as 60 mg/kg caffeine have significantly reduced reaction time on several recognition tasks (Durlach, 1998). These studies were done on health adults weighing 70 kg.

b. Dose-related decrease in hand steadiness and increase in jitteriness from 70 to 250 mg/kg in young volunteers (Richardson et al, 1995).

c. At 100 mg/kg prolonged sleep latency and reduced sleep efficiency (Landolt et al, 1995a).

d. There is an increase in diastolic blood pressure, plasma epinephrine and free fatty acids after single dose at 140 mg/kg in a normal healthy 70 kg man (Benowitz et al, 1995).

e. At 200 mg/kg there has been reduced sleep efficiency (Landolt et al, 1995b) and rise in blood glucose at 2, 3 and 5 hours post dose in healthy young subjects (Pizziol et al, 1998).

f. At 210 mg/kg there is an increase in whole-arm tremor (Miller et al, 1998).

g. Dose related increases in rating of anxiety and blood levels of cortisol has also been observed (Nickell & Uhde, 1995-95).

h. There is increased blood pressure at 230 mg/kg of caffeine (Sung BH et al, 1994). An increase in ACTH release and cortisol production (they are released in response to stress and low level of blood sugar) in young healthy males was also observed at 230 ppm (Lovallo et al, 1996)

i. At 250 mg/kg reduction in hand steadiness and headache and increase in jitteriness in young volunteers (Richardson et al, 1995); Higher increases in systolic and diastolic BP in perimenopausal women before and during oestrogen therapy following acute dosing compared with premenopausal (Delrio et al, 1996)

j. At 280 mg/kg there is an increase in diastolic BP, plasma epinephrine and free fatty acids (Benowitz et al, 1995)

k. Consumption of 300 mg/kg of caffeine was associated with a decrease in birth weight (-1.3%) of infants born to women smokers (Cook et al, 1996)

l. Physical dependence demonstrated following 9-12 days chronic caffeine dosing (Garrett et al, 1998)

m. At 350 mg/kg there is an increase in systolic (9%) and diastolic (3%) BP in older men (Arciero et al, 1998); Increase in energy expenditure in younger and older men, increase in fatty acid concentrations in younger men (Arciero et al, 1995).

As stated above, most of the studies have been done on healthy adult population while the consumer of these so called 'energy drinks' are largely adolescents. And with these 'energy drinks' being marketed and sold in practically all shops, younger children are getting attracted to them. We do not know the health impact of high consumption of energy drinks on them. Even Nawort et al quote the following: "Scientific studies have shown a variety of effects of caffeine consumption in




children, although it is surprising that so few studies have specifically addressed effects in this population".

3. No diet study or long term study on health impacts of caffeine in India has been done. No study has been done to check the consumption pattern of energy drinks. Moreover, there are not enough studies to show the effect of caffeine with other chemicals like guarana, taurine present in the energy drinks.

4. In a scenario where not even basic data is available, we should not allow 320 ppm caffeine in energy drinks. We should follow the precautionary principle and restrict the caffeine standards in energy drinks to the level of carbonated beverages.

I request to you and to all concerned that the issue of caffeine in energy drinks must be discussed in an open and transparent manner. Today if we allow high caffeine in "energy drinks" without detailed studies then tomorrow more caffeinated products will enter the market and they too will demand same dispensations. This we should not allow.

Cordially yours

  
Chandra Bhushan  
Deputy Director General