

TESTIMONY OF DR. JAMES R. COUGHLIN

BEFORE THE U.S. SENATE COMMITTEE ON COMMERCE, SCIENCE AND  
TRANSPORTATION

“ENERGY DRINKS: EXPLORING CONCERNS ABOUT MARKETING TO YOUTH”

JULY 31, 2013

Mr. Chairman and Members of the Committee,

My name is Dr. James R. Coughlin. I am an independent consultant in food toxicology with over 35 years of experience in food, nutrition and chemical safety, toxicology and regulatory affairs. I received my M.S. in Food Science and Technology, Ph.D. in Agricultural and Environmental Chemistry and postdoctoral training in Environmental Toxicology at the University of California, Davis. I have been elected a Fellow of the Institute of Food Technologists and serve as a Food Science Communicator for this organization. In the early 1990's, I served as President of the Paris-based professional society for coffee scientists, the Association for Science and Information on Coffee, and I continue to serve on its Board. I have over 30 years' experience on health and safety issues surrounding coffee, caffeine and other caffeine-containing beverages. I am currently serving as a member of the Planning Committee for the Workshop entitled "Caffeine in Food and Dietary Supplements: Examining Safety," to be held on August 5 and 6, 2013, under the auspices of the Institute of Medicine.

Caffeine is a safe food ingredient widely consumed in a variety of foods, beverages and dietary supplements daily throughout the world. I would like to address today three conclusions concerning caffeine consumption and safety:

- (1) Health outcomes of caffeine have been thoroughly studied for many decades, and the best available clinical and scientific evidence does not support the idea that caffeine consumption (and certainly not a singular source of caffeine) is unsafe.
- (2) The caffeine content in mainstream energy drinks is equivalent to that contained in an equal amount of coffee, and less than that of coffeehouse coffees.
- (3) Coffee, tea and soft drinks are the primary sources of caffeine in U.S. diets, including the diets of children and teens. The most current exposure assessments conducted by the Food and Drug Administration (and others) indicate that caffeine consumption by children and youth is not of safety concern.

## **Health Outcomes of Caffeine Consumption**

Caffeine has been consumed for millennia and is one of the most widely consumed substances in the world. The best available clinical and scientific evidence does not support the view that consumption of energy drinks by minors causes adverse health effects. For most of the symptoms mentioned as justification for limitations on the sale of energy drinks, there is little or no evidence demonstrating causal effects. Several of the reported symptoms are based on anecdotal or confounded reports that have not stood up to more rigorous clinical investigation.

For example, while caffeine does produce a small elevation in systolic blood pressure, this effect is limited clinically to individuals who do not generally consume caffeine, and the slight increase in blood pressure only lasts a few hours; on repeated caffeine ingestion, blood pressure changes are minimal or nonexistent. This phenomenon was clearly demonstrated in the early 1980's. And many long-term studies of caffeine consumption from various products, including coffee, the largest source of caffeine, have demonstrated that there is no increased risk for hypertension in men or women.

Furthermore, caffeine has no adverse effect on electrocardiographic parameters, even in doses up to 400 mg. There is no consistent human epidemiologic evidence that caffeine causes or triggers cardiac arrhythmias, even in patients with pre-existing arrhythmias. This phenomenon was also clearly established in studies conducted in the late 1980's. Overall, moderate caffeine intake (less than 400 mg per day for healthy adults) has not been demonstrated to adversely affect cardiovascular health, even in consumers prone to hypertension or arrhythmias.

## **Caffeine-Containing Products**

Caffeine can be found in various products that may be classified as foods, dietary supplements or drugs. Caffeine can be present naturally (such as in coffee, tea, cacao, green coffee extract, tea extracts, guarana and yerba mate) or added (such as in some soft drinks, energy drinks or medications). In some products, there may be more than one ingredient that contributes caffeine, such as a coffee beverage that also contains cocoa or an energy drink that contains added caffeine as well as guarana. While caffeine can be present in solid foods (like chocolate),

more than 97% of the caffeine intake of teenagers and adults and about 95% of the intake of the children 2 to 13 come from beverage sources including coffee, tea, sodas, chocolate beverages and energy drinks [FDA, Somogyi, 2010].

In a recent evaluation commissioned by the U.S. FDA [Somogyi, 2010], daily caffeine contributions from all sources (including foods, dietary supplements and drugs) were evaluated. From this report, an eight fluid ounce cup of coffee contains between 55-180 mg caffeine, while the three market leading energy drinks contain between 77 and 120 mg of caffeine per eight fluid ounces. These caffeine concentrations are roughly the same amount, if not less than, what is found in a similar size cup of coffee. The bottom line is that the majority of mainstream energy drinks contain the same or lessor amounts of caffeine than the same size cup of coffee.

### **Dietary Sources of Caffeine**

Caffeine from energy drinks represents a very small contribution to the overall daily exposure of caffeine from all sources, while coffee, tea and soda collectively remain the primary contributors in all age groups, as reported in the Somogyi (2010) study commissioned by FDA to evaluate caffeine exposure from all sources in the U.S. population. What is interesting about this report is that despite the market entry of energy drinks, the mean daily caffeine intake of the adult population older than 22 remained steady with past estimates at 300 mg.

With regard to the younger age groups, this report demonstrated that teens and young adults (14-21 years of age) have an average daily consumption of about 100 mg caffeine, which is approximately one-third the amount of caffeine compared to adults. And importantly for this younger age group, the primary caffeine contributions are from soft drinks, tea and coffee. The author concluded that any significant change in the caffeine intake of the U.S. population would depend on modification of coffee drinking practices, given that all other caffeine sources make only a minor contribution to overall caffeine consumption.

In April of this year, a survey was presented at the American Society for Nutrition annual conference in Boston, which investigated caffeine consumption patterns in the U.S. population. In this survey, conducted in the U.S. by the International Life Sciences Institute, a nationally representative sample of 37,815 consumers of

caffeinated beverages ( $\geq 1$  year of age) completed 7-day diaries including type, amount and preparation of each beverage. The data from this study were collected from 2010-2011, and a database was developed to contain brand-specific caffeine values developed from information obtained from several resources, including company websites, commonly used nutrient databases and published literature.

Results showed that 84% of the U.S. population consumes at least one caffeinated beverage per day, and that mean daily caffeine intake from all beverages was  $165 \pm 1$  mg for all ages combined. Caffeine intake was highest in the 50-64 year age group ( $226 \pm 2$  mg/day), and intakes were lowest in consumers less than 6 years of age ( $36 \pm 3$  mg/day). The 90th percentile caffeine intake was 379 mg/day for all ages combined.

Coffee, as was also shown in the FDA-commissioned study, was the primary contributor to caffeine intakes in all age groups, but was a larger contributor in adults ( $>18$  years of age). Carbonated soft drinks and tea were also important caffeine sources, particularly in the younger age groups. Importantly, the percentage of energy drink users across all age groups was low ( $\leq 10\%$ ), and the contribution of energy drinks to total caffeine intake was 2% in the total population and 7% or less in all age groups.

## **Conclusions**

In summary, restrictions on the sale or promotion of energy drinks cannot be supported from a clinical or scientific point of view for three main reasons. First, caffeine from energy drinks represents only one of many sources of caffeine, and coffee, tea and soda collectively contribute the majority of dietary caffeine in the U.S. diet. Second, the caffeine content in mainstream energy drinks is comparable to and sometimes less than that found in various coffee products. And finally, caffeine has been established by decades of careful clinical and scientific research to be safe at the levels found in commonly consumed beverages like coffee, tea and energy drinks. The best available clinical and scientific evidence supports the conclusion that the levels of caffeine currently consumed in the U.S. are safe.

Respectfully submitted,

A handwritten signature in black ink that reads "James R. Coughlin, Ph.D." The signature is written in a cursive style with a large initial 'J'.

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