

Caffeine content of single-serve take-out coffees

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Abstract

Caffeine, a common food component, is not banned or restricted in Japan. The ready availability of caffeine-containing products, such as coffee, often leads to excessive consumption that can be associated with caffeine intoxication, as described in numerous reports. We measured the caffeine content of coffee, a major contributor to caffeine intake, with a particular focus on single-serve take-out products sold at convenience stores, coffee shops, and fast-food chains nationwide. As the results, the caffeine content (0.72 ± 0.03 to 1.01 ± 0.04 mg/mL) was higher than the reference value (0.60 mg/mL) presented in the Standard Tables of Food Composition in Japan, and the values varied markedly among the products. Additionally, there was considerable variability in the caffeine concentration even among samples of the same product, with values ranging from 0.56 to 0.83 (mean, 0.74 ± 0.09) mg/mL ($n=8$).

Keywords : coffee, caffeine

I Introduction

Caffeine is a widely known natural food component contained in coffee beans, tea leaves including mate leaves, cacao beans as a material for chocolate, and guarana¹⁾. Caffeine is used as a food additive to add bitterness in refreshing beverages, such as cola, and is also contained in medicines such as cold and anti-drowsiness medicines. As products containing caffeine, such as coffee, are readily available, cases of caffeine intoxication due to excessive intake have been reported²⁻⁵⁾. The majority of reported cases of caffeine intoxication were related to an overdose of sleep suppressants in a suicide attempt²⁻⁴⁾. However, unlike earlier cases of suicide attempts, a fatal case of caffeine intoxication reported in December 2015 was caused by caffeine overdose resulting from the regular combination use of caffeine-containing beverages and drugs for their sleep-suppressing

effect⁵⁾. Following the report, warnings about excessive caffeine intake have been issued by government agencies, including the Ministry of Health, Labour and Welfare and Ministry of Agriculture, Forestry and Fisheries, as well as by industry groups, such as the Japan Soft Drink Association and the Japan Self-Medication Industry^{*1-4)}. In several studies, the caffeine content of food items, including commercial beverages, and the consumption of caffeine were examined from a safety standpoint⁶⁻⁹⁾.

In most cases, product information, including caffeine content, of the bottled or canned beverages evaluated in these studies are presented on the manufacturers' websites, and there should not be a large difference in caffeine content between production lots. Recently, freshly brewed single-serve coffees have been sold in three major nation-wide convenience store chains, and in the current coffee boom, such products are also available at some leading coffee shops and fast-food

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*1 Department of Environmental Health and Food Safety, Ministry of Health, Labour and Welfare, Japan. <http://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000170477.html> (accessed on March 18, 2019).

*2 Consumption and Safety Authority, Ministry of Agriculture, Forestry and Fisheries, Japan. http://www.maff.go.jp/j/syouan/seisaku/risk_analysis/priority/hazard_chem/caffeine.html (accessed on March 18, 2019).

*3 Japan Soft Drink Association, http://www.j-sda.or.jp/ippan/news_view.php?kind=2&id=202 (accessed on March 18, 2019)

*4 Japan Self-Medication Industry, http://www.jsmi.jp/news/2017/170629_caffeine.html (accessed on March 18, 2019)