

# Fluoride Concentrations of Teas Consumed by College Students during Fall 2014

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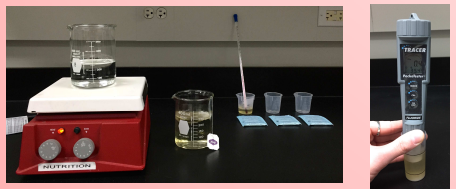


## Introduction

- Fluoride added to water sources to prevent against dental caries
- Excessive fluoride intake may contribute to dental and/or skeletal fluorosis. The incidence in fluorosis is increasing. The optimal intake of fluoride is between 0.05 and 0.07 mg per kg body weight per day <sup>1</sup>
- Tea, one of the worlds most consumed beverages, can contain high levels of fluoride but it is recommended due to its many health benefits

## Purpose

- To determine the fluoride concentration in teas and the amount of tea consumed by the college-aged population



## Methods

- An anonymous survey was distributed electronically through email after IRB approval (n=1815)
- Participants (n=128) completed a survey assessing beverage consumption after informed consent
- Five types of tea from five brands were purchased. Each tea was brewed in 240 ml of boiling water for 3 minutes in triplicate
- Teas were analyzed for fluoride concentration using a fluoride ion-selective electrode. Two-way ANOVA was used to examine the effect of tea type and flavor on fluoride concentration

## # of Tea Servings Consumed Per Week

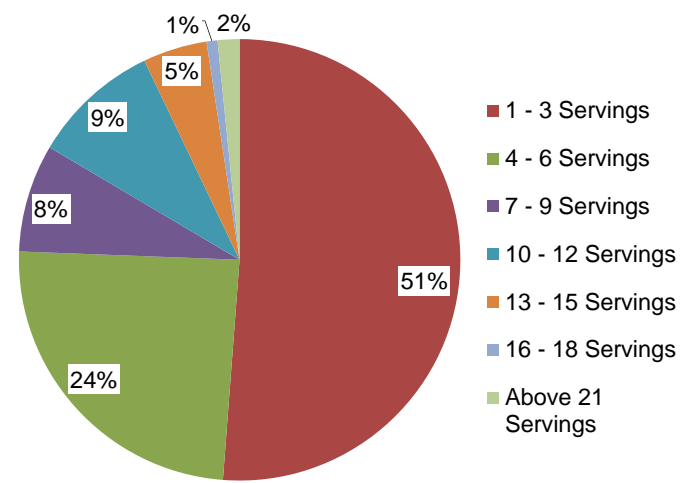


Figure 1. # of tea servings consumed per week based on survey results (n = 127). One serving constitutes one tea bag

## Average Fluoride Concentration of Tea Flavors

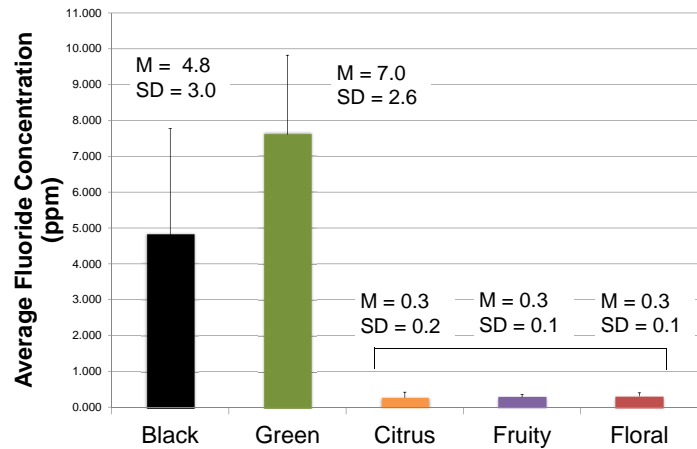


Figure 2. Average fluoride concentration of various types of tea. Error bars represent standard deviation. Ppm = mg/L

## Results

- Bigelow brand contained the highest fluoride concentration for green, citrus, fruity, and floral tea compared to Lipton, Tazo, Yogi, and Celestial brands. Lipton contained the highest fluoride concentration for black tea
- There was a statistically significant interaction between the effects of tea type and flavor on fluoride concentration ( $p = .000$ )
- The fluoride concentrations were statistically different among black tea brands ( $p = .000$ ), green tea brands ( $p = .000$ ), and citrus tea brands ( $p = .003$ ). Fluoride concentrations were very low and did not differ among fruity ( $p = .264$ ) and floral tea brands ( $p = .034$ )

## Conclusions

- 3+ green or black tea beverages per day provides 5.11-7.45 mg/L, which exceeds 0.05-0.07 mg fluoride concentration per kg per day (assuming a 68 kg college-aged student and 12-ounce beverage)
- 3 participants consume more than optimal intake of fluoride. The majority of the college-aged population is not at risk for excess fluoride intake based on tea consumption alone
- Fluoride concentration should be listed on nutritional labels so consumers can make informed decisions regarding their health

## Literature Cited

<sup>1</sup> Warren, J., Levy, S., Broffitt, B., Cavanaugh, J., Kanellis, M., & Weber-Gasparoni, K. (2009). Considerations on optimal fluoride intake using dental fluorosis and dental caries outcomes- A longitudinal study. *Journal of Public Health Dentistry*, 69(2), 111-115. doi: 10.1111/j.1752-7325.2008.00108.x.

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