One hundred seventeen foods and beverages were assessed. Fluoride content varied widely, ranging from non-detectable for some products to 3.0 μgF/g for some processed meats and fish, vegetables, and fruits. Low mean fluoride items included sweets (0.20 μF/g), vegetables (0.34 μF/g), and beverages (0.33 μF/g). High fluoride groups included grains (0.73 μF/g) and ‘mixture’ category (0.62 μF/g). Dairy, eggs, fats and oils, fruits and grains had some items with non-detectable fluoride levels. Current values were in general different than historical values, with significant differences for meats and grains.

AIM: The purpose of this study was to calculate current fluoride content of commonly consumed foods and beverages by two-year-olds utilizing market basket information for the US Midwest region.

BACKGROUND: Excessive intake of fluoride during the first two years of life is associated with increased risk for enamel fluorosis. Food and beverages have been identified as significant sources of fluoride. Results of studies have suggested changes over time in the fluoride content of foods and beverages.

MATERIALS AND METHODS:

Foods and beverages consumed in the Midwest region Market Basket were included in the study. Total Diet Study food Lists were cross-referenced with NHANES - What We Eat in America data to determine the foods and beverages to be included for the analysis*. These foods and beverages represent the most frequently consumed foods and beverages for our target age group in the Midwest. Foods and beverages were bought in identified grocery located in areas where residents’ demographics most closely align with those involved in NHANES research.

Fluoride was determined using a modification of the microdiffusion technique. A standard commercial-grade blender was used to homogenize the samples for approximately 2 minutes. Deionized water was added to allow for complete homogenization. Initial and final weights of the sample homogenates were recorded. Samples were frozen until the time of the analysis. Approximately 1.0 gram of each homogenate was used for fluoride analysis and was dispensed into Petri dishes a sodium hydroxide trap solution was loaded onto the Petri dish lid and after adding sulfuric acid saturated with HMDS, each dish was immediately tightly sealed. As the diffusion process occurred overnight, fluoride was released by acid hydrolysis and trapped in the NaOH trap. The fluoride-containing trap was then removed and buffered to pH 5.2 with perchloric acid. The resulting solution was adjusted to a final volume of 100 ml with Total Ionic Strength Buffer. Sets of approximately 30 samples were analyzed at one time. Fluoride levels were determined by comparing the millivolt reading of each sample to standard curves determined at the time the samples were analyzed.

Means, standard deviations, ranges, and 95% confidence intervals were calculated for the fluoride level of each food or beverage group. Confidence intervals and t-tests were used to determine if the current fluoride concentrations have changed when compared to historical values used to determine public policy by federal US agencies.

RESULTS:

- One hundred seventeen foods and beverages were assessed
- Fluoride content varied widely, ranging from non-detectable for some products to 3.0 μgF/g for some processed meats and fish, vegetables, and fruits.
- Low mean fluoride items included sweets (0.20 μF/g), vegetables (0.34 μF/g), and beverages (0.33 μF/g).
- High fluoride groups included grains (0.73 μF/g) and ‘mixture’ category (0.62 μF/g).
- Dairy, eggs, fats and oils, fruits and grains had some items with non-detectable fluoride levels.
- Current values were in general different than historical values, with significant differences for meats and grains.

CONCLUSIONS: This study showed that foods and beverages’ fluoride content varies widely and in some cases was significantly different than previously reported values, highlighting the need to obtain current and accurate values on an ongoing basis.


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