

## **Determination of Antimony in Drinking Water Leaching from Polyethylene Terephthalate Bottles**

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### **Extended Abstract**

The purpose of the presented study is to determine trace amount of antimony leaching from polyethylene terephthalate bottles into drinking water. Solidified floating organic drop microextraction was used for preconcentration of trace amounts of antimony prior to its determination by electrothermal atomic absorption spectrometry. The antimony ions were formed anionic complex with iodide in the presence of sulfuric acid. With the help of cationic surfactant didecyl dimethyl ammonium chloride hydrophobic ion association complex was formed and then extracted using micro-organic drop of 1-dodecanol. All of the crucial parameters affecting the analytical performance were carefully studied. Under the optimum conditions, the enhancement factor was determined as 331. The quantification limit and precision were obtained as 0.04 ng/mL and 2.16 % (n = 9, 1.0 ng/mL), respectively. The accuracy of the developed method was evaluated by analyzing a certified reference material successfully. Optimized solidified floating organic drop microextraction method was applied to the determination of Sb(III) in water samples stored in polyethylene terephthalate bottles. The antimony content of several bottled water in Turkey was compared. The effects of the environmental factors affecting antimony transfer such as storage time, exposure to Ultraviolet light and temperature were investigated. It was seen that the major factor was temperature for leaching of antimony from plastics. After 72 hours at 22 °C, antimony concentration was determined as 0.035 µg/L. After heating the sample to 70 °C, the antimony concentration in the bottled water was increased to 2.57 µg/L. It was found that increasing the storage time led to higher antimony concentration. At room temperature, antimony concentration was determined as 0.31 µg/L after 1 month and 0.62 µg/L after 5 months. According to experimental results, it was seen that antimony concentration was increased with increasing the UV exposure duration. After 12 hours of exposition to UV light, antimony concentration in water samples was increased to 0.052 µg/L and after 72 hours, 0.85 µg/L of antimony concentration was determined. Finally, the effect of type of plastics on the release of antimony from plastics into the water was investigated. After 72 hours at 60 °C antimony concentrations were found to be 1.74 µg/L for water sample stored in clear PET bottle, 0.57 µg/L for water sample stored in blue PET bottle and 0.035 µg/L for water sample stored in HDPE (high density polyethylene) bottle.