Is Your Water Safe to Drink? Development of a Novel Home Test Method to Quantitatively Determine the Concentration of Lead in Water, Phase Two

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The purpose of this research is to develop a quick, accurate, affordable, and quantitative test for lead in water. Lead contamination in drinking water is a public health concern. The EPA's safe standard for lead in water is 15 parts per billion. There is currently no inexpensive way to quantitatively test water for lead. Sodium rhodizonate is a chemical compound which creates a red color reaction with lead. Colorimetric analysis can be used to determine the unknown concentration of a chemical element or compound in a solution with the aid of a color reagent. The hypothesis of this research is that colorimetric analysis of water, using sodium rhodizonate as the reagent, will be a quick, accurate, affordable, and quantitative method to test for lead in water. A concentration-absorbance calibration curve was created by colorimetrically analyzing five solutions with increasing concentrations of lead from 15-95 ppb. These solutions were analyzed using a free mobile color analyzer application. A value representative of green light being transmitted was obtained (G value). This value was used to calculate the absorbance of red light using "Absorbance = -log(GUnknown / G0)". Samples of water from the Cincinnati EPA with unknown concentrations of lead were tested. These samples were colorimetrically analyzed and using the calibration curve, the concentration of lead in each sample was calculated. The range in differences between calculated and actual concentration was 1-13 ppb. All samples that had a level of lead >15 ppb were also calculated to have this concentration. The hypothesis was proven.

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