ANDalyze
Real-Time Water Testing Powered by DNA

Analytical Data Sheet for ANDalyze Cadmium Sensor

Detection of cadmium in drinking water ***0.1-1ppm***

ANDalyze's proprietary aptamer DNA sensor for cadmium uses a DNA sensor that fluoresces in the presence of the target contaminant, cadmium. The fluorescence of the reaction is measured using the ANDalyze fluorimeter to determine the concentration of free cadmium (present as Cd^{2+}) in solution and is reported in parts per million (ppm) of cadmium.

Performance

Cadmium dilutions containing between 0 – 5 ppm of cadmium were prepared in DI water. The Cadmium sensor kits and the ANDalyze fluorimeter were used to perform the cadmium test at each dilution (five replicates were made for each test).

Materials Used

ANDalyze Fluorimeter

Cadmium Sensor Kit (Part Number: AND016)

Standard Cadmium Solutions

Linear detection Range

0.1 – 1 ppm Cd^{2+}

Precision

Standard: 0.5 ppm Cd^{2+}
95% Confidence Limits: 0.43 – 0.58 ppm Cd^{2+}

Coefficient of Variation (CV)

0.1–1 ppm Cd^{2+} ±15% or 0.1ppm, whichever is greater

Note: This data is for tests in DI water. Environmental and other matrix variations will be higher.

All specifications are subject to change without notice.

Graphs

The plot in Figure 1 depicts the average measured average measured Cd^{2+} concentration as displayed on the ANDalyze fluorimeter (y-axis) vs. the known concentration of the cadmium standards (x-axis). Error bars depict the standard deviation from at least five measurements.

Figure 1

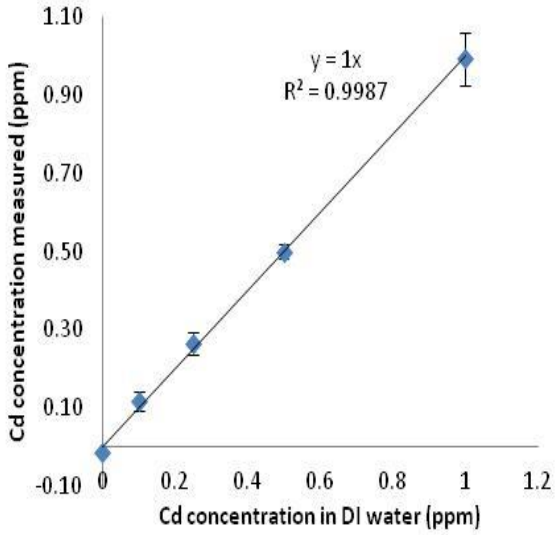
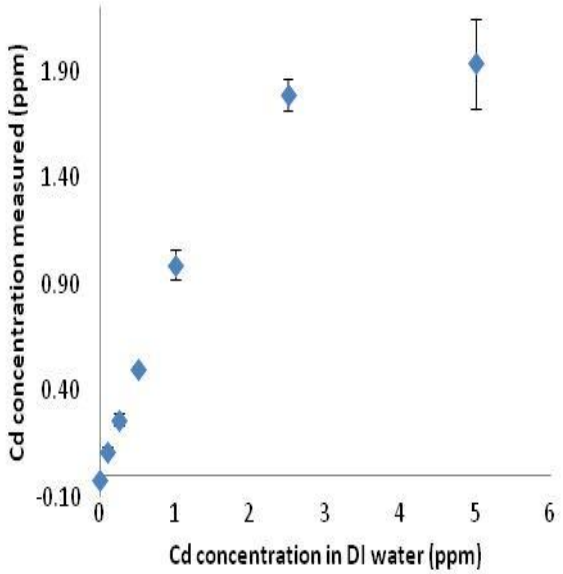


Figure 2 shows the linear range of 0.1 – 1 ppm Cd^{2+}. For higher concentrations of Cd^{2+} (tested up to 5 ppm Cd^{2+}), the accuracy decreases (Graph 2). Samples containing higher than 5 ppm Cd^{2+} can be diluted 1:1 and re-analyzed.

Figure 2



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Interference

Interference tests were done with a 0.25 ppm cadmium solution plus the potential interfering ion. The interference tolerance levels represent the concentration above which the cadmium concentration is changed to ±10%. Data represents an average of at least three replicates. For each interference test, an on-site calibration with the particular water matrix (containing the interfering ion) was performed.

Interfering ion	Interference level
Calcium, Ca^{2+}	200 ppm
Magnesium, Mg^{2+}	300 ppm
Zinc, Zn^{2+}	2 ppm
Aluminum, Al^{3+}	100 ppb
Copper, Cu^{2+}	250 ppb
Iron, Fe^{3+}	50 ppb
Mercury, Hg^{2+}	30 ppb
Manganese, Mn^{2+}	1 ppm
Lead, Pb^{2+}	500 ppb
Ammonium, NH_4^+	500 ppm
Carbonate, CO_3^{2-}	500 ppm
Phosphate, PO_4^{3-}	200 ppm
Chloride, Cl^-	1000 ppm
Nitrate, NO_3^-	3000 ppm
Sulfate, SO_4^{2-}	2000 ppm

Temperature Range

ANDalyze test kits work when the sample is in the 17 – 35 ˚C (63 – 95 ˚F) temperature range. However, the most accurate and precise results are obtained if the sample is n the range of 20 - 25 ˚C (68 – 77 ˚F). A change in temperature of several degrees will require an on-site calibration to be performed.

Storage and Shelf Life

The shelf life is 1 year (12 months) from manufacture date for the sensors if stored in cool, dry area away from direct sunlight at temperature less than 23°C (73°F); however the shelf life of the product is limited by the liquid buffer supplied with the sensor kit which is only 6 months from manufacture date. The life of the liquid buffer can be improved if refrigerated/frozen for up to one year from manufacture date.