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PERFORMANCE CHARACTERISTICS OF CadmiumCheck™ SWABS

I. The Reaction

A CadmiumCheck™ Swab contains two glass ampoules each containing the reagents required for the colorimetric detection of cadmium(II). One ampoule contains a dye reactive with cadmium which under the proper conditions of pH and solvent conditions turns orange. The second ampoule contains the buffers and solvents required to optimize the reaction of cadmium with the dye. CadmiumCheck™ provides careful control of the ratio of solvent to dye which provides a reproducible and reliable test. The reaction leads to an orange result on the tip of the swab (depending on the concentration of cadmium present). The color development is linear with concentration.

II. Sensitivity

To determine the sensitivity of CadmiumCheck™ Swabs, a standard curve was prepared with a solution of cadmium nitrate, an AA standard at a concentration of 1000 ppm. Dilutions of the standard were used to determine the standard curve. For one standard curve, samples of each dilution were allowed to dry on plastic weigh boats. The dried standards were tested with CadmiumCheck™ Swabs.

The following table illustrates the reaction of CadmiumCheck™ Swabs to each concentration.

Cadmium Concentration	Color Result	Rating (%)
0 ng (no cadmium)	Yellow or Clear	0
500 ng	Purple goes to pink/peach	14
1 µg	Purple goes to pink/peach	28
2 µg	Purple goes to pink/peach	57
3 µg	Purple goes to pink/peach	71
4 µg	Purple goes to pink/peach	85
5 µg	Purple goes to pink/peach	97
6 µg	Purple goes to pink/peach	100

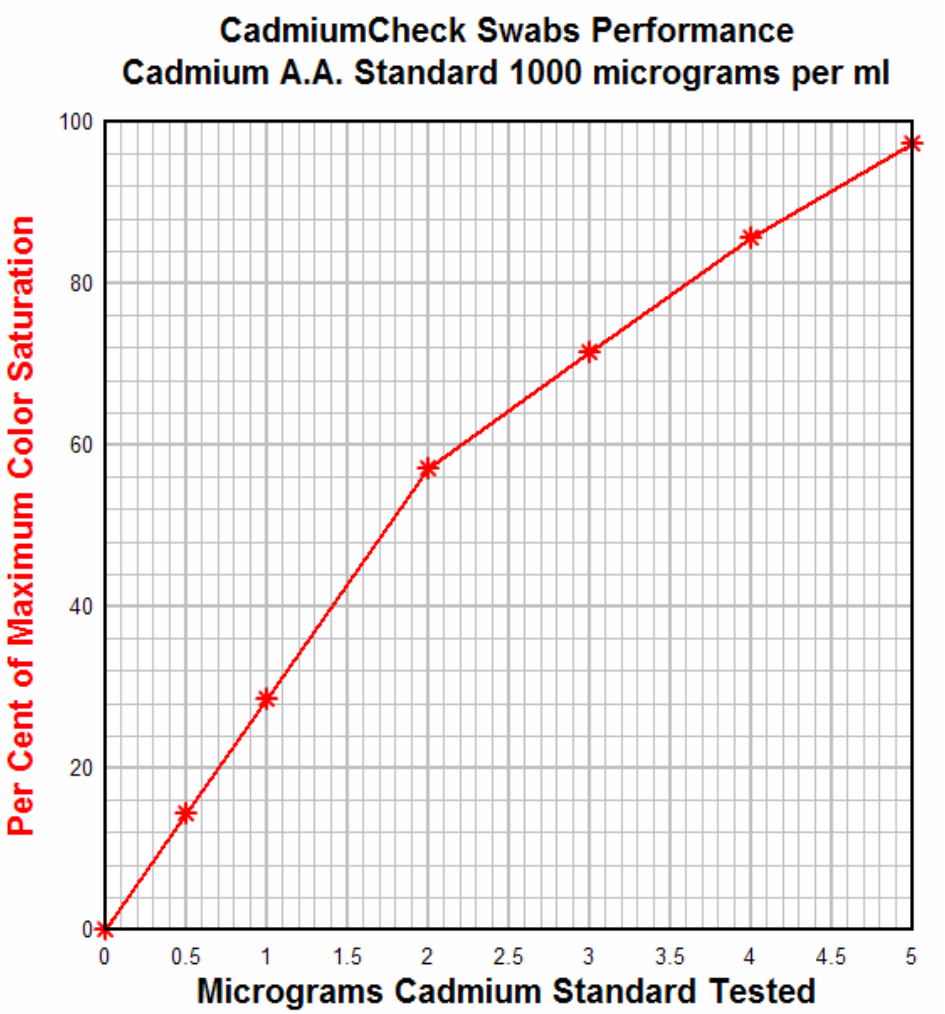
These reactions were repeated three times with the same results. Another standard curve was constructed using liquid aliquots of each dilution. The same results were obtained. A clear gradation of color was observed and a rating was assigned to each concentration relative to the maximum percent color saturation. The sensitivity of the swabs was 250 to 500 ng under laboratory conditions.

III. Specificity

CadmiumCheck™ Swabs are quite specific for cadmium. High levels of nickel chloride (10X concentration) interfere with color development, however lower levels (less than 9X) do not interfere. Mercury (II), silver and chromium III at levels of 1X interfere with color development.

IV. Reaction with Cadmium in Pigments on Dishes

CadmiumCheck™ Swabs detect cadmium on dishes. Four dishes with known concentrations of cadmium were tested. A level of 0.17-0.48 ppm (determined by the AOAC 973.32 method) tested positive with CadmiumCheck™ Swabs.



Legend

Standard curves were developed using several lots of CadmiumCheck™ Swabs. An A.A. standard solution (1000 micrograms per ml) of cadmium was diluted to the concentrations used in each series of experiments. The results of several curves were averaged and have been summarized in the above graph. A progression of color was observed consistent with increasing concentration of cadmium. The intensity of the orange color developed at each of the concentrations was scored with 100% considered the most intense color. It is possible to determine low, medium and high concentration ranges.