METHOD #: 110.2	Approved for NPDES (Issued 1971)
TITLE:	Color (Colorimetric-Platinum-Cobalt)
ANALYTE:	Color
INSTRUMENTATION:	Spectrophotometer
STORET No.	TRUE COLOR 00080 APPARENT COLOR 00081

1.0 Scope and Application

1.1 The Platinum-Cobalt method is useful for measuring color of water derived from naturally occurring materials, i.e., vegetable residues such as leaves, barks, roots, humus and peat materials. The method is not applicable to color measurement on waters containing highly colored industrial wastes. See **ADMI** color method in this manual.
NOTE 1: The Spectrophotometric and Tristimulus methods are useful for detecting specific color problems. The use of these methods, however, is laborious and unless determination of the hue, purity, and luminance is desired, they are of limited value.

2.0 Summary of Method

2.1 Color is measured by visual comparison of the sample with platinum-cobalt standards. One unit of color is that produced by 1 mg/L platinum in the form of the chloroplatinate ion.

3.0 Interferences

3.1 Since very slight amounts of turbidity interfere with the determination, samples showing visible turbidity should be clarified by centrifugation.
3.2 Method is pH dependent.

4.0 Sample Handling and Preservation

4.1 Representative samples shall be taken in scrupulously clean glassware.
4.2 Since biological activity may change the color characteristics of a sample, the determination should be made as soon as possible. Refrigeration at 4°C is recommended.

5.0 Apparatus

5.1 Nessler tubes: Matched, tall form, 50 mL capacity.

6.0 Reagents

6.1 Standard chloroplatinate solution: Dissolve 1.246 g potassium chloroplatinate, K_2PtCl_6, (equivalent to 0.500 g metallic Pt) and 1 g crystalline cobaltous chloride, $CoCl_2 \cdot H_2O$, in distilled water containing 100 mL of conc. HCl. Dilute to 1000 mL with distilled water. This standard solution is equivalent to 500 color units.

7.0 Preparation of Standards

7.1 Prepare standards in increments from 5 to 70 units. The following series is suggested:

mL of Standard Solution Diluted to 50.0 mL with Distilled Water	Color in Chloroplatinate Units
0.0	0
0.5	5
1.0	10
1.5	15
2.0	20
2.5	25
3.0	30
3.5	35
4.0	40
4.5	45
5.0	50
6.0	60
7.0	70

7.2 Protect these standards against evaporation and contamination by use of clean, inert stoppers.
NOTE 2: The standards also must be protected against the absorption of ammonia since an increase in color will result.

8.0 Procedure

8.1 Apparent color: Observe the color of the sample by filling a matched Nessler tube to the 50 mL mark with the water and compare with standards. This comparison is made by looking vertically downward through the tubes toward a white or specular surface placed at such an angle that light is reflected upward through the columns of liquid.If turbidity has not been removed by the procedure given in (8.2), report the color as "apparent color". If the color exceeds 70 units, dilute the sample with distilled water in known proportions until the color is within the range of the standards.

8.2 True color: Remove turbidity by centrifuging the sample until the supernatant is clear. The time required will depend upon the nature of the sample, the speed of the motor, and the radius of the centrifuge, but rarely will more than one hour be necessary. Compare the centrifuged sample with distilled water to insure that turbidity has been removed.If the sample is clear, then compare with standard as given in (8.1).

9.0 Calculation

9.1 Calculate the color units by means of the following equation:

$$\text{Color units} = \frac{A \times 50}{V}$$

where:
A = estimated color of diluted sample
V = mL sample taken for dilution

9.2 Report the results in whole numbers as follows:

Color Units	Record to Nearest
1-50	1
51-100	5
101-250	10
251-500	20

10.0 Precision and Accuracy

10.1 Precision and accuracy data are not available at this time.

Bibliography

1 Standard Methods for the Examination of Water and Wastewater, 14th Edition, p 64, Method 204A (1975).