

---

## Appendix J: Color Test Reagents

---

Reagent	Composition/Preparation
Acetic acid (20% aqueous)	To 20 ml acetic acid, add enough water to make 100 ml solution
Acetic acid (67% aqueous)	To 67 ml acetic acid, add enough water to make 100 ml solution
Ammoniated acetone (1.5% solution)	To 1.5 ml concentrated ammonium hydroxide add enough acetone to make 100 ml solution
Ammoniated methanol (1.5% solution)	To 1.5 ml concentrated ammonium hydroxide add enough methanol to make 100 ml solution
Aniline sulfate	Dissolve 0.1 g aniline sulfate in 100 ml concentrated sulfuric acid
Aniline sulfate (aqueous)	Dissolve 5.0 g aniline sulfate in 100 ml deionized water
Barium chloride	Dissolve 5.0 g barium chloride in 100 ml deionized water (5% solution)
Benedict's	Dissolve 1.73 g copper sulfate in 10 ml deionized water; dissolve 17.3 g sodium citrate and 10 g anhydrous sodium carbonate in 60 ml deionized water; filter the citrate solution; add the copper sulfate solution slowly to the citrate solution; dilute the mixture to 100 ml with deionized water
Bismuth iodide (IN H <sub>2</sub> SO <sub>4</sub> )	Prepare a solution of 12.5 ml deionized water and 2.5 ml concentrated sulfuric acid; mix the following ingredients together the following until dissolved: 3.75 g potassium iodide, 1.24 g bismuth nitrate, 0.40 g sodium hypophosphite; refrigerate — over a period of time, the orange-red solution will darken as the iodide decomposes to iodine, at which point the reagent should be discarded
Brucine sulfate	Dissolve 5.0 g brucine sulfate in 100 ml concentrated sulfuric acid
<i>n</i> -Butanol/acetic acid/water	Mix two parts <i>n</i> -butanol with one part acetic acid and one part deionized water; prepare fresh before use

Reagent	Composition/Preparation
Chen's	Reagent 1: dissolve 1.0 g of copper sulfate in a solution of 1 ml acetic acid and 100 ml of deionized water; Reagent 2: 2N solution of sodium hydroxide
Cobalt thiocyanate	Method 1: dissolve 2.0 g of cobalt thiocyanate in 100 ml of deionized water; Method 2: dissolve 2.0 g of cobalt thiocyanate in a solution of 100 ml glycerine and 100 ml of deionized water
Davis	Add 15 ml ethylenediamine to 100 ml 10% aqueous silver nitrate solution
Dilli-Koppanyi	Reagent 1: dissolve 0.1 g of cobaltous acetate tetrahydrate in a solution of 100 ml of methanol and 0.2 ml of glacial acetic acid; Reagent 2: mix 5.0 ml of isopropyl amine with 95 ml methanol
<i>m</i> -Dinitrobenzene	2% solution of <i>m</i> -dinitrobenzene in reagent alcohol
Diphenylamine	Dissolve 0.68 g diphenylamine in 45 ml concentrated sulfuric acid; place in ice bath and cautiously add 22.5 ml glacial acetic acid
Dragendorff spray	Mix 2.0 g bismuth subnitrate in a solution of 25 ml acetic acid, and 100 ml deionized water; dissolve 40 g potassium iodide in 100 ml deionized water; mix 10 ml of each of solution with 20 ml acetic acid and 100 ml deionized water
Duquenois	Dissolve 5 drops acetaldehyde and 0.4 g vanillin in 20 ml of 95% ethanol
Ehrlich's	Dissolve 5.0 g of <i>p</i> -dimethylaminobenzaldehyde in a solution of 50 ml ethanol and 50 ml of concentrated hydrochloric acid
Ethanol/heptane (95:5)	Mix 95 parts absolute ethanol with 5 parts heptane
Ethanol/hexane (9:1)	Mix 9 parts absolute ethanol with 1 part hexane
Ethylenediamine (15%)	Mix 15 ml of ethylenediamine in 85 ml of deionized water
Fehling's	Dissolve 7.5 g copper sulfate in 100 ml deionized water; dissolve 35 g sodium tartrate and 25 g potassium hydroxide in 100 ml deionized water; mix equal volumes of each solution
Ferric chloride	Mix 1 g ferric chloride in 10 ml deionized water
Fiegel's (sodium nitroprusside)	Dissolve 1.0 g sodium nitroprusside (sodium nitroferricyanide) in 60 ml deionized water; add 10 ml acetaldehyde; dilute solution to 100 ml with deionized water
Froehde's	Dissolve 100 mg of sodium molybdate in 20 ml concentrated sulfuric acid
Hydrochloric acid (0.1 N)	1 ml concentrated hydrochloric acid diluted to 120 ml with deionized water
Hydrochloric acid (3.0 N)	125 ml concentrated hydrochloric acid diluted to 500 ml with deionized water
Hydrochloric acid (15%)	Mix 7.9 ml concentrated HCl into 12.1 ml deionized water
Iodoplatinate spray	10 ml of 10% aqueous solution of chloroplatinic acid; 250 ml of 4% aqueous potassium iodide; combine solutions and add 500 ml deionized water; add 0.75 ml concentrated hydrochloric acid

Reagent	Composition/Preparation
Le Rosen	Mix 75 ml of concentrated sulfuric acid in 1.5 ml 37% formaldehyde
Liebermann's	Dissolve 10 g potassium nitrite in 100 ml of concentrated sulfuric acid
Mandelins	Dissolve 1.0 g ammonium metal in 100 ml concentrated sulfuric acid
Marquis' (premixed)	Add 8 to 10 drops of 40% formaldehyde solution for each 10 ml concentrated sulfuric acid used
Mecke's	Dissolve 0.25 g selenious acid [ $\text{H}_2\text{SeO}_3$ ] in 25 ml concentrated sulfuric acid
Mercuric chloride	Dissolve 1.25 g mercuric chloride in 25 ml deionized water
Mercuric iodide	Dilute 27 ml of concentrated hydrochloric acid to 100 ml with deionized water; add enough mercuric iodide to saturate the acid water solution
Molish solution ( <i>a</i> -Naphthol)	Dissolve 1.25 g of <i>a</i> -Naphthol in reagent alcohol; refrigerate
Nessler	Dissolve 20 g potassium hydroxide in 50 ml deionized water; dissolve 10 g mercuric iodide and 5 g of potassium iodide into 50 ml deionized water; combine solutions
Nitron	Dissolve 3.75 g nitron (diphenylenedianilhydrotriazole) in 75 ml of 88% formic acid
<i>p</i> -DMBA	Dissolve 1.25 g <i>p</i> -dimethylaminobenzaldehyde in 25 ml concentrated acetic acid
Silver nitrate	Dissolve 3.75 g of silver nitrate in 75 ml of deionized water
Sodium hydroxide (0.5 N)	Dissolve 1.5 g NaOH in 75 ml deionized water
Sodium hydroxide (2.0 N)	Dissolve 6.0 g NaOH in 75 ml deionized water
Stannous chloride	Dissolve 5.0 g stannous chloride in 10 ml concentrated hydrochloric acid; dilute to 100 ml with deionized water; stannous chloride must be completely dissolved in the HCl before diluting with water
Starch	Saturated solution of hydrolyzed starch in deionized water
Sulfuric acid (75%)	Mix 56.25 ml concentrated sulfuric acid into 18.75 ml deionized water
Sulfuric acid (0.1 N)	Dissolve 1.0 ml concentrated sulfuric acid in 360 ml deionized water
Tartratic acid (2.5%)	Make 1.25 g of tartaric acid in 25 ml deionized water
Thymol	Dissolve 0.25 g thymol in 25 ml methanol
Toluene/acetic acid (9:1)	Mix 9 parts toluene with 1 part acetic acid
Triphenyl selenium chloride	Saturated solution in 60 ml deionized water
Triphenyltetrazolium chloride	Dissolve 0.38 g triphenyltetrazolium chloride in 75 ml distilled water
Van Urk's spray	Dissolve 1.0 g <i>p</i> -dimethylaminobenzaldehyde in 100 ml of ethanol; add 10 ml concentrated hydrochloric acid
Wagenaar's	Dissolve 1.25 g copper sulfate in 25 ml deionized water; add sufficient ethylenediamine to turn the solution a dark violet color
Wagner's	Dissolve 1.27 g iodine and 2.75 gm potassium iodide in 5.0 ml deionized water; dilute to 100 ml with deionized water

Reagent	Composition/Preparation
Zwikker's	Reagent 1: dissolve 0.125 g of copper sulfate in 25 ml of deionized water; Reagent 2: mix 2.5 ml of chloroform with 22.5 ml pyridine