

## Preparation of Chemical Reagents

### 1 Scope

This procedure provides instructions for the preparation and storage of all reagents used in the various standard operating procedures of the Chemistry Unit's Toxicology Subunit. This document does not provide information for materials used directly as obtained from the manufacturer. Neither does it provide instructions for the preparation of calibrators, controls, or analytical standards. Prepared reagents are listed, in alphabetical order, in section 6, "Procedure" and materials needed for preparation of these reagents are listed in section 2, "Equipment/Materials/Reagents." Refer to the *Chemistry Unit Procedure for Verification of Reagents, Kits, Solvents and Standards* (CUQA 9) for guidance in labeling and testing the reliability of reagents.

### 2 Equipment/Materials/Reagents

- a. Electronic balance
- b. pH paper in various ranges
- c. Ultrasonicator
- d. Vacuum filtration apparatus (1 liter size) with 0.5  $\mu\text{m}$  PTFE filter membranes
- e. Miscellaneous routine laboratory glassware and supplies
- f. Acetic acid, glacial (17 M) (ACS grade)
- g. Acetonitrile (HPLC grade)
- h. Ammonium acetate (reagent grade)
- i. Ammonium hydroxide, concentrated (15 M) (ACS grade)
- j. Calcium chloride (reagent grade)
- k. Chloramine T (reagent grade)
- l. Chloroform (GC<sup>2</sup> grade and HPLC grade)
- m. o-Cresol (reagent grade)

- n. Cupric sulfate pentahydrate (reagent grade,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ )
- o. Curcumin (reagent grade)
- p. Diethyl ether (high purity grade)
- q. Dimethylsulfoxide (ACS grade)
- r. Diphenylamine (reagent grade)
- s. Ethyl acetate (HPLC grade)
- t. Ethyl alcohol (200 proof and pharmaceutical grade)
- u. Ferric chloride hexahydrate (reagent grade,  $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ )
- v. Ferric nitrate nonahydrate (reagent grade,  $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ )
- w. Gold(III) chloride hydrochloride trihydrate (reagent grade,  $\text{HAuCl}_4 \cdot 3\text{H}_2\text{O}$ )
- x. Heptafluorobutyric acid (aka HFBA) (reagent grade)
- y. Hexamethonium hydroxide solution, 0.1 M (obtained from Fluka Chemical Company)
- z. Hexane (UV grade)
- aa. Hydrochloric acid, concentrated (12 M) (ACS grade)
- bb. Indigo Carmine (reagent grade)
- cc. Iodine (reagent grade)
- dd. Isopropanol (2-propanol) (HPLC grade)
- ee. Magnesium nitrate (high purity grade I)
- ff. Mercuric chloride (reagent grade,  $\text{HgCl}_2$ )
- gg. Methanol ( $\text{GC}^2$  grade and HPLC grade)
- hh. Methylene Chloride (dichloromethane) (HPLC grade)
- ii. Nitric acid, concentrated (16 M) (ACS grade and Optima grade)

- jj. Palladium matrix modifier solution (0.1% obtained from High-Purity Standards, Inc.)
- kk. PIC reagent (methanesulfonic acid) (reagent grade)
- ll. PICB-8 reagent (octanesulfonic acid) (low UV grade obtained from Waters Corp.)
- mm. Potassium cyanide (reagent grade)
- nn. Potassium ferricyanide (reagent grade)
- oo. Potassium hydroxide (reagent grade)
- pp. Potassium iodide (reagent grade)
- qq. Potassium phosphate, monobasic (ACS grade,  $\text{KH}_2\text{PO}_4$ )
- rr. Pyromellitic acid (reagent grade)
- ss. Saponin (reagent grade)
- tt. Silver nitrate (reagent grade)
- uu. Sodium acetate trihydrate (reagent grade)
- vv. Sodium bicarbonate (reagent grade)
- ww. Sodium borate (sodium tetraborate decahydrate) (ACS grade,  $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ )
- xx. Sodium chloride (reagent grade)
- yy. Sodium dithionite (reagent grade)
- zz. Sodium hydroxide (ACS grade)
- aaa. Sodium phosphate, dibasic heptahydrate (ACS grade,  $\text{Na}_2\text{HPO}_4 \cdot 7\text{H}_2\text{O}$ )
- bbb. Sodium phosphate, monobasic monohydrate (ACS grade,  $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ )
- ccc. Sulfuric acid, concentrated (18 M) (ACS grade)
- ddd. Tetramethylammonium hydroxide (ACS grade)

- eee. Toluene (HPLC grade)
- fff. Triethanolamine (reagent grade)
- ggg. Trifluoroacetic acid (98+% purity)
- hhh. Water, Deionized (18+MΩ grade)

### **3 Standards and Controls**

Not applicable.

### **4 Calibration**

Not applicable.

### **5 Sampling**

Not applicable.

### **6 Procedure**

Unless specifically noted otherwise, all reagents can be prepared in larger or smaller total volumes, as needed, by appropriate scaling of component volumes and masses. Listed grades or qualities of chemicals are the minimum acceptable levels. Unless specifically noted otherwise, a higher quality of the same chemical may be substituted.

- a. 50 mM Acetic Acid:  
To a 100-mL graduated cylinder, add 80 mL deionized water and 0.25 mL glacial acetic acid. Mix well and bring to 85 mL with deionized water. Store in glass at room temperature. Stable 3 months.
- b. 0.1 M Acetic Acid:  
To a 100-mL graduated cylinder, add 80 mL deionized water and 0.5 mL glacial acetic acid. Mix well and bring to 85 mL with deionized water. Store in glass at room temperature. Stable 6 months.

- c. Dilute (~ 1.5 M) Acetic Acid:  
Mix 2 mL glacial acetic acid with 20 mL deionized water and shake to combine. Store in glass at room temperature. Stable 3 months.
- d. 1:1 Acetonitrile:Water:  
Combine 100-mL HPLC grade acetonitrile with 100 mL deionized water and mix well. Store in glass at room temperature. Stable 6 months.
- e. 0.1 M Ammonium Acetate:  
Add 3.85 g ammonium acetate to a 500-mL volumetric flask containing 300 mL deionized water. Mix well to dissolve, and bring to volume with deionized water. Store in refrigerated in glass. Stable 2 months.
- f. 0.24 M Ammonium Hydroxide:  
Add 1.6 mL concentrated ammonium hydroxide to 50 mL deionized water in a 100-mL graduated cylinder. Fill to the 100-mL mark with deionized water and mix well. Store in glass at room temperature. Stable 1 month.
- g. 2 M Ammonium Hydroxide:  
Add 10 mL concentrated ammonium hydroxide to 50 mL deionized water in a 100-mL graduated cylinder. Fill to the 75-mL mark with deionized water and mix well. Store in glass at room temperature. Stable 1 month.
- h. 5% (w/v) Calcium Chloride Solution:  
Dissolve 1 g calcium chloride in 20 mL deionized water. Store in glass at room temperature. Stable 1 year.
- i. CE (Capillary Electrophoresis) Run Buffer – Anions:  
To a 1000-mL volumetric flask, add 500 mL deionized water, 612 mg pyromellitic acid, 280 mg sodium hydroxide, 238 mg triethanolamine, and 7.5 mL 0.1M hexamethonium hydroxide solution. Mix well to dissolve, and bring to volume with deionized water. Store refrigerated in plastic. Stable 1 week.
- j. 0.5% (w/v) Chloramine T:  
To a 100-mL volumetric flask, add 80 mL deionized water and 0.5 g chloramine T. Mix well to dissolve and bring to volume with deionized water. Store refrigerated in glass. Stable 6 months.
- k. 4:1 Chloroform:Methanol:  
Combine 40 mL GC<sup>2</sup> grade chloroform with 10 mL GC<sup>2</sup> methanol. Mix well. Store in brown glass at room temperature. Stable 1 month.

- l. 1% (by volume) o-Cresol:  
Place 1 mL o-cresol in a 100-mL volumetric flask and fill to the mark with deionized water. Mix well and allow to stand for at least 24 hours before use. Store refrigerated in brown glass. Stable 6 months.
- m. 5% (w:v) Cupric Sulfate Solution:  
Dissolve 1.56 g cupric sulfate pentahydrate in 20 mL deionized water. Store in glass at room temperature. Stable 1 year.
- n. Curcumin Solution (saturated in ethanol):  
Add curcumin to 10 mL 200 proof ethanol in a test tube with mixing until no more will dissolve. Centrifuge at low speed for 5 min and transfer the supernatant. Store in glass at room temperature. Stable 1 year.
- o. Cyanmethemoglobin Reagent (Drabkin's Solution):  
To a 1000-mL volumetric flask containing 500 mL deionized water, add 200 mg potassium ferricyanide, 50 mg potassium cyanide, and 1 g sodium bicarbonate. Mix well to dissolve and bring to volume with deionized water. Store refrigerated in brown glass. Stable 4 months.
- p. Diphenylamine Reagent (0.5% w:v in sulfuric acid):  
Dissolve 0.5 g diphenylamine in 100 mL concentrated sulfuric acid. Store in glass with a PTFE-lined cap at room temperature. Stable 1 year.
- q. 80% (by volume) Ethanol:  
Measure 80 mL pharmaceutical grade ethanol into a 100-mL volumetric flask. Bring to volume with deionized water and mix well. Store in glass at room temperature. Stable for 6 months.
- r. 1:1 Ether:Toluene:  
Combine 50 mL HPLC grade toluene with 50 mL diethyl ether. Mix well. Store in glass at room temperature. Stable 1 month.
- s. 5% (w/v) Ferric Chloride Solution:  
Dissolve 1.67 g ferric chloride hexahydrate in 20 mL deionized water. Store in glass at room temperature. Stable 1 year.
- t. 0.5% (w/v) Gold Chloride Solution:  
Dissolve 130 mg gold(III) chloride hydrochloride trihydrate in 20 mL deionized water. Store in brown glass at room temperature. Stable 1 year.

- u. 0.1% (w/v) Heptafluorobutyric Acid:  
Add 0.5 g HFBA to 400 mL deionized water in a 500-mL volumetric flask and mix well. Bring to volume with deionized water. Store in glass at room temperature. Stable 3 months.
- v. 2 mM Hydrochloric Acid:  
In a 100-mL volumetric flask, combine 80 mL deionized water with 16  $\mu$ L concentrated hydrochloric acid and mix well. Bring to volume with deionized water. Store in glass at room temperature. Stable 6 months.
- w. 0.1 M Hydrochloric Acid:  
To a 100-mL graduated cylinder, add 80 mL deionized water and 0.8 mL concentrated hydrochloric acid. Bring to 96 mL with deionized water and mix well. Store in glass at room temperature. Stable 6 months.
- x. 0.96 M Hydrochloric Acid:  
To a 100-mL volumetric flask, add 80 mL deionized water. Add 8 mL concentrated hydrochloric acid and mix well. Bring to volume with deionized water. Store in glass at room temperature. Stable 6 months.
- y. 1 M Hydrochloric Acid:  
To a 100-mL graduated cylinder, add 80 mL deionized water. Add 8 mL concentrated hydrochloric acid and mix well. Bring to 96 mL with deionized water. Store in glass at room temperature. Stable 6 months.
- z. 6 M Hydrochloric Acid (~ 50% v:v):  
To a 25-mL graduated cylinder containing 10 mL deionized water, add 12 mL concentrated hydrochloric acid and mix well. Bring to 24 mL with deionized water. Store in glass at room temperature. Stable 6 months.
- aa. 0.01% (w/v) Indigo Carmine Reagent:  
Dissolve 10 mg indigo carmine in 100 mL deionized water. Store in glass at room temperature. Stable 1 year.
- bb. Iodine Test Solution:  
Dissolve 0.4 g iodine and 0.6 g potassium iodide in 20 mL deionized water. Store in glass at room temperature. Stable 6 months.
- cc. LC (Liquid Chromatography) Mobile Phase – Alkaline#1 / Cocaine (95:5:0.03 methanol:water:ammonia):  
Combine 950 mL HPLC grade methanol and 50 mL deionized water. Mix well and vacuum filter through a 0.5  $\mu$ m PTFE membrane. Add 0.3 mL concentrated ammonium

- hydroxide and mix gently. Verify pH>8. Store in glass at room temperature. Stable 1 month.
- dd. LC Mobile Phase – Alkaline#2 (5:95:0.03 methanol:water:ammonia):  
Combine 25 mL HPLC grade methanol and 475 mL deionized water. Mix well and vacuum filter through a 0.5 µm PTFE membrane. Add 0.15 mL concentrated ammonium hydroxide and mix gently. Verify pH>8. Store in glass at room temperature. Stable 1 month.
- ee. LC Mobile Phase – Benzodiazepines (60:40:0.03 methanol:water:ammonia):  
Combine 300 mL HPLC grade methanol and 200 mL deionized water. Mix well and vacuum filter through a 0.5 µm PTFE membrane. Add 0.15 mL concentrated ammonium hydroxide and mix gently. Verify pH>8. Store in glass at room temperature. Stable 1 month.
- ff. LC Mobile Phase – Rodenticide #1 (0.1% acetic acid in water):  
Vacuum filter 500 mL deionized water through a 0.5 µm PTFE membrane. Add 0.5 mL ACS grade glacial acetic acid. Store in glass at room temperature. Stable 1 month.
- gg. LC Mobile Phase – Rodenticide #2 (0.1% acetic acid in methanol):  
Vacuum filter 500 mL Optima grade methanol. Add 0.5 mL ACS grade glacial acetic acid. Vacuum filter through a 0.5 µm PTFE membrane. Store in glass at room temperature. Stable 1 month.
- hh. LC Mobile Phase – Mivacurium #1 (acetonitrile):  
Measure out 1000 mL HPLC grade acetonitrile and vacuum filter through a 0.5 µm PTFE membrane. Store in glass at room temperature. Stable indefinitely.
- ii. LC Mobile Phase – Mivacurium #2 (5 mM octanesulfonic acid):  
Quantitatively transfer the contents of one vial of PICB-8 reagent into a 1000-mL volumetric flask and bring to the mark with deionized water. Vacuum filter through a 0.5 µm PTFE membrane. Store in glass at room temperature. Stable 1 month.
- jj. LC Mobile Phase – Mivacurium MSMS (40:60:0.015 acetonitrile:water:methanesulfonic acid):  
Combine 200 mL HPLC grade acetonitrile, 300 mL deionized water, and 75 µl PIC reagent. Vacuum filter through a 0.5 µm PTFE membrane, and verify 2<pH<3.5. Store at room temperature in brown glass. Stable 1 month.
- kk. LC Mobile Phase – Succinylmonocholine #1 (92:8:0.1 water:methanol:PIC reagent):  
Combine 460 mL deionized water, 40 mL HPLC methanol, and 0.5 mL PIC reagent. Mix well and vacuum filter through a 0.5 µm PTFE membrane. Store at room temperature in brown glass. Stable for 1 month.



- ll. LC Mobile Phase – Succinylmonocholine #2 (80:15:4.75:0.25 0.1% HFBA:0.1 M ammonium acetate:acetonitrile:isopropanol):  
Combine 400 mL 0.1% heptafluorobutyric acid, 75 mL 0.1 M ammonium acetate, 23.75 mL HPLC grade acetonitrile, and 1.25 mL HPLC grade isopropanol. Mix well and vacuum filter through a 0.5 µm PTFE membrane. Store in glass at room temperature. Stable 1 month.
- mm. 1:1 Methanol:Dilute Hydrochloric Acid:  
Combine 2 mL GC<sup>2</sup> grade methanol with 2 mL 1 M hydrochloric acid, and mix well. Store in glass at room temperature. To be prepared fresh.
- nn. 95:5 Methanol:Water:  
Combine 95 mL HPLC grade methanol with 5 mL deionized water and mix well. Store in glass at room temperature. Stable 12 months.
- oo. 1:1 Methanol:Water:  
Combine 50 mL HPLC methanol with 50 mL deionized water and mix well. Store in glass at room temperature. Stable 12 months.
- pp. Nitric Acid, Dilute (33% by volume):  
Mix 5 mL concentrated nitric acid with 10 mL deionized water and shake to combine. Store in glass at room temperature. Stable 1 year.
- qq. 0.2% (by volume) Nitric Acid:  
To a 1000-mL Nalgene volumetric flask containing 600 mL deionized water, add 2 mL Optima grade concentrated nitric acid. Bring to volume with deionized water and mix well. Store in plastic at room temperature. Stable 1 year.
- rr. Opiates Extraction Solvent (90:10 chloroform:isopropanol):  
Combine 50 mL HPLC grade isopropanol and 450 mL HPLC grade chloroform and mix well. Store at room temperature in brown glass. Stable 1 month.
- ss. Palladium / Magnesium Nitrate Matrix Modifier for AAS (Atomic Absorption Spectroscopy):  
To a 100-mL Nalgene volumetric flask containing 50 mL deionized water, add 15 mg magnesium nitrate and 25 mL palladium matrix modifier solution. Bring to volume with deionized water and mix well. Store at room temperature in Nalgene container. Stable 5 years.

- tt. 11.8 M Potassium Hydroxide:  
To a 100-mL Nalgene volumetric flask add 66 g potassium hydroxide and 50 mL deionized water. Mix well to dissolve and bring to volume with deionized water. Store at room temperature in Nalgene container. Stable 1 year.
- uu. 5% (w/v) Potassium Phosphate Buffer (pH 4.5):  
To a 100-mL volumetric flask, add 80 mL deionized water. Add 5 g monobasic potassium phosphate and mix well to dissolve. Bring to volume with deionized water, and verify  $4.0 < \text{pH} < 5.0$ . Store refrigerated in glass. Stable 1 month.
- vv. 10% (w/v) Silver Nitrate Solution:  
Dissolve 2 g silver nitrate in 20 mL deionized water. Store at room temperature in an opaque container. Stable 1 year.
- ww. 0.1 M Sodium Acetate Buffer (pH 7):  
To a 250-mL volumetric flask, add 3.4 g sodium acetate trihydrate and 200 mL deionized water. Mix well and adjust to  $6.5 < \text{pH} < 7.5$  by slow addition of 1 N hydrochloric acid. Bring to volume with deionized water. Store refrigerated in glass. Stable 3 months.
- xx. Sodium Acetate Buffer with 5% Methanol:  
Add 5 mL HPLC grade methanol to a 100-mL volumetric flask and bring to volume with 0.1 M sodium acetate buffer (pH 7). Store refrigerated in glass. Stable 2 months.
- yy. 1.1 M Sodium Acetate Buffer (pH 5.5):  
To a 100-mL volumetric flask, add 14.95 g sodium acetate trihydrate, 60 mL deionized water, and 2.2 mL glacial acetic acid. Mix well to dissolve, and bring to volume with deionized water. Verify  $5 < \text{pH} < 6$ . Store refrigerated in glass. Stable 2 months.
- zz. 0.1 M Sodium Borate Buffer (pH 9):  
To a 100-mL volumetric flask add 3.8 g sodium borate and bring to volume with deionized water. Sonicate for 15 minutes to assist dissolution, and verify  $8.5 < \text{pH} < 9.5$ . Store refrigerated in glass. Stable 3 months.
- aaa. Saturated Sodium Chloride Solution (~ 35% w/v):  
To a 500-mL volumetric flask, add 450 mL deionized water and 175 g sodium chloride. Gently heat with continuous stirring for at least one hour. Remove the stirbar, fill to volume with deionized water, and mix by inversion. A small amount of undissolved solid should remain in the bottom of the flask. Store in glass at room temperature. Stable for one year.

- bbb. 0.287 M Sodium Dithionite Reducing Agent:  
To a 50-mL volumetric flask, add 40 mL deionized water and 2.96 g sodium dithionite. Mix well to dissolve and bring to volume with deionized water. Store in glass at room temperature. Stable 1 month.
- ccc. 0.1 M Sodium Hydroxide:  
To a 100-mL Nalgene volumetric flask, add 60 mL water and 0.4 g sodium hydroxide. Mix well to dissolve and bring to volume with deionized water. Store in Nalgene containers at room temperature. Stable 1 year.
- ddd. 5 M (20% w/v) Sodium Hydroxide:  
To a 100-mL Nalgene volumetric flask, add 60 mL water and 20 g sodium hydroxide. Mix well to dissolve and bring to volume with deionized water. Store in Nalgene containers at room temperature. Stable 1 year.
- eee. 0.1 M Sodium Phosphate Buffer (pH 6.0):  
To a 500-mL volumetric flask, add 400 mL deionized water, 6.1 g sodium phosphate monobasic monohydrate, and 1.6 g sodium phosphate dibasic heptahydrate. Mix well to dissolve. Verify  $5.8 < \text{pH} < 6.1$ , adjusting pH by addition of 0.1 M dibasic sodium phosphate (increases pH) or 0.1 M monobasic sodium phosphate (decreases pH) as necessary. Bring to volume with deionized water. Store refrigerated in glass. Stable 2 months.
- fff. 0.1 M Sodium Phosphate, Dibasic:  
To a 100-mL volumetric flask, add 2.7 g sodium phosphate dibasic heptahydrate and 80 mL deionized water. Mix well to dissolve and bring to volume with deionized water. Store refrigerated in glass. Stable 1 month.
- ggg. 0.1 M Sodium Phosphate, Monobasic:  
To a 100-mL volumetric flask, add 1.4 g sodium phosphate monobasic monohydrate and 80 mL deionized water. Mix well to dissolve and bring to volume with deionized water. Store refrigerated in glass. Stable 1 month.
- hhh. SPE (Solid Phase Extraction) Alkaline / Cocaine Elution Solvent (78:20:2 methylene chloride:isopropanol:ammonia):  
Combine 20 mL HPLC grade isopropanol with 2 mL concentrated ammonium hydroxide and mix well. Add 78 mL HPLC grade methylene chloride and mix well. Store in glass at room temperature. To be prepared fresh.
- iii. SPE Benzodiazepines Elution Solvent (49:1 ethyl acetate:ammonia):  
Combine 49 mL ethyl acetate with 1 mL concentrated ammonium hydroxide and mix well. Store in glass at room temperature. To be prepared fresh.

- jjj. SPE Benzodiazepines Wash Solvent (20% acetonitrile in 0.1 M phosphate buffer):  
Combine 80 mL 0.1 M phosphate buffer (pH 6) with 20 mL HPLC grade acetonitrile and mix well. Store in glass at room temperature. Stable 1 month.
- kkk. SPE THC Elution Solvent aka Rodenticide Wash Solvent (95:5 hexane:ethyl acetate):  
Combine 95 mL hexane with 5 mL ethyl acetate and mix well. Store in glass at room temperature. Stable 3 months.
- lll. SPE THC-COOH Elution Solvent aka Rodenticide Elution Solvent (75:25:1 hexane:ethyl acetate:acetic acid):  
Combine 75 mL hexane with 25 mL ethyl acetate and 1 mL glacial acetic acid. Mix well. Store in glass at room temperature. Stable 1 month.
- mmm. 5 N Sulfuric Acid:  
To a 100-mL graduated cylinder containing 70 mL deionized water, slowly add 12.5 mL concentrated sulfuric acid. Mix well and bring to 90 mL with deionized water. Store in glass at room temperature. Stable 1 year.
- nnn. 5% (by volume) Sulfuric Acid:  
To a 100-mL volumetric flask containing 80 mL deionized water, slowly add 5 mL concentrated sulfuric acid. Mix well and bring to volume with deionized water. Store in glass at room temperature. Stable 1 year.
- ooo. 1 M Sulfuric Acid with 1.5% (w/v) Saponin:  
Add 80 mL deionized water and 1.35 g saponin to a 100-mL graduated cylinder and mix well to dissolve. Slowly add 5 mL concentrated sulfuric acid. Bring to the 90-mL mark with deionized water and mix well. Store in glass at room temperature. Stable 1 year.
- ppp. THC-COOH Extraction Solvent (7:1 hexane:ethyl acetate):  
Combine 70 mL hexane with 10 mL ethyl acetate and mix well. Store in glass at room temperature. Stable 3 months.
- qqq. TMAH Reagent:  
Dissolve 0.25 g tetramethylammoniumhydroxide in 1 mL deionized water. Add 20 mL dimethylsulfoxide and mix well. Store refrigerated in brown glass. Stable 1 year.
- rrr. 0.04% (by volume) Trifluoroacetic Acid (TFA):  
To a 100-mL volumetric flask, add 90 mL deionized water and 40 µl trifluoroacetic acid. Mix well and bring to volume with deionized water. Store in glass at room temperature. Stable 3 months.

- sss. Trinder's Reagent:  
Add 400 mg mercuric chloride, 400 mg ferric nitrate nonahydrate, and 0.1 mL concentrated hydrochloric acid to 5 mL deionized water in a 10-mL volumetric flask. Mix well to dissolve and bring to volume with deionized water. Store refrigerated in glass. Stable 6 months.

## **7 Instrumental Conditions**

Not applicable.

## **8 Decision Criteria**

Not applicable.

## **9 Calculations**

Not applicable.

## **10 Uncertainty of Measurement**

Not applicable.

## **11 Limitations**

Not applicable.

## **12 Safety**

Follow standard precautions for the handling of chemicals and biological materials. Refer to the *FBI Laboratory Safety Manual* for guidance.

### **13 References**

Shugar, G. J.; Ballinger, J.T. *Chemical Technicians' Ready Reference Handbook, 3<sup>rd</sup> Ed.*; McGraw-Hill: New York, NY, 1990.

*FBI Laboratory Safety Manual.*

*Toxicology Subunit SOP Manual.*

*Chemistry Unit Procedure for Verification of Reagents, Kits, Solvents and Standards (CUQA 9);*  
FBI Laboratory Chemistry Unit Quality Assurance Manual.

Rev. #	Issue Date	History
0	1/30/06	New document.
1	6/21/06	Added new reagent (saturated sodium chloride), and removed several (insulin ELISA reagents).
2	10/27/06	Added new reagents (mobile phases for rodenticides).
3	10/21/09	Updated expiration dates of 0.1 M acetic acid, LC Mobile Phase – Mivacurium #1, 95:5 Methanol:Water, 1:1 Methanol:Water, 0.1 M Sodium Acetate Buffer and 0.1 M Sodium Phosphate Buffer.

**Approval**

Redacted - Signatures on File