

# Clinical Chemistry Sample Handling Guidelines

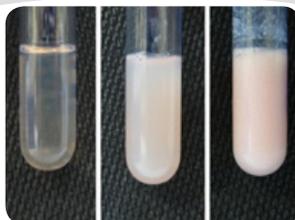
Chemistry panels are run for a variety of reasons from a general wellness screening to evaluating the status of a previously diagnosed condition, or as part of an emergency medical evaluation. The chemistries (parameters) being evaluated are associated with functions of specific organs.

i.e.  
ALT (Alanine Aminotransferase)-liver  
ALKP/ALP (Alkaline Phosphatase)-liver/muscle enzyme  
BUN (Blood Urea Nitrogen)-kidney

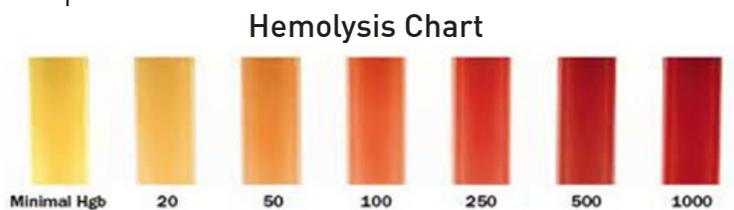


Heparin is the standard anticoagulant used for biochemistry analysis. EDTA is not suitable for biochemistry as the EDTA removes certain biochemistry analytes from the sample during the anticoagulation process.

Lipemia is the milky appearance of the serum or plasma sample; Lipemic samples will cause most clinical chemistries to have erroneous results.



Hemolysis is the breakage of the red blood cell's membrane, causing the release of the hemoglobin and other internal components into the sample fluid.



When drawing a sample it is imperative that the sample be a “clean stick”, the more injury to the vein the more hemolysis (disruption/destruction of RBCs) may be seen. Hemolysis will not be noticed until the sample has been “spun down” (centrifuged). Mild to moderate hemolysis has a minimal effect on most routine chemistries. Bilirubin and ALT are often increased. All blood samples should be gently inverted several times after collection to distribute any anticoagulant that may be in the tube. The blood to anticoagulant ratio can affect results if too little sample is drawn.

Ideally blood samples should be collected with a calibrated syringe and a needle of appropriate size. Once the blood is drawn, in order to transfer the sample into the designated tube, the needle should be removed. Forcing blood through the needle into the tube can cause hemolysis. The preferred needle size is 22G; other sizes are also usable but are too dependent on animal size. The wrong size needle can cause hemolysis of the cells.

## **Whole Blood** (Lithium Heparin)

Whole blood is composed of cellular elements (RBCs, WBCs, and PLTs) and a fluid called plasma.

## **Plasma** (Lithium Heparin)

To obtain a plasma sample, whole blood is spun down before clotting factors are activated so it contains fibrinogen. (Excessive amounts of fibrin in a plasma sample may affect the results)

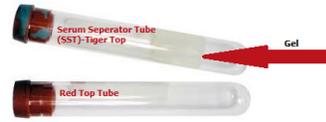
## **Serum** (Serum Separator Tube-SST-Tiger Top or Red Top Tube)

Serum is plasma after the proteins (fibrinogen) needed for clotting have been activated and allowed to clot for 15-20 minutes prior to being spun down.

## Lithium Heparin Tubes



- Used for whole blood and plasma samples
- Plasma must be separated from cells once spun down, may cause erroneous results otherwise
- Inhibits coagulation and clotting in samples for 8-12 hours



- Used for serum samples
- Serum must be removed from tube once spun down
- Cell breakdown can cause erroneous results
- Parameters that may be affected
  - GLU, TB, ALT, PHOS, AST

## SPOTCHEM EZ Centrifuge Cups

-Centrifuge Cups have 1 line marked on them 250ul=0.25ml-needed sample size

**-Insufficient sample may cause incorrect measurements and an unbalanced spin.**

**-Excessive sample will cause a mess on the inside of the unit, on the cover and also within the centrifuge itself. This will also cause an unbalanced spin.**

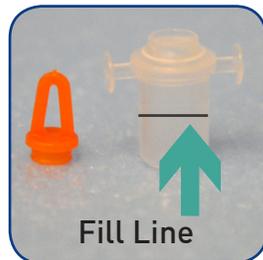
-Air bubbles or film on the surface of the sample can cause incorrect results as well as errors on the unit.

-Samples with a high hematocrit may yield incorrect results when using centrifuge cups; not enough serum for testing.

-Samples with heavy clotting or fibrin may cause errors on unit and cannot be measured.

\*Be sure that the samples are properly prepared to avoid any issues.\*

\*User error is the most common cause of errors on patient sample readings.\*



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