Serum Index Testing for Detection of Hemolysis

Background
Medical laboratory tests can be affected by endogenous and exogenous constituents in the serum matrix. The most common interference is hemolysis. Hemolysis is due to the breakdown, or lysis (rupture), of red blood cells that cause a release of cellular products into the serum or plasma. It can appear in vivo (e.g., due to a blood transfusion reaction) as well as in vitro in all components of the pre-analytical phase of laboratory analysis (sampling, sample transport and storage). After the separation of blood cells, hemolysis can be visually detected in serum and plasma by its red color caused by hemoglobin.

Visual detection of hemolysis is subjective and therefore mostly unreliable since it may over- or under-estimate the actual amount of hemolysis in the specimen. An automated serum index detection by direct measuring hemoglobin concentration photometrically has been implemented. The benefits of this approach are consistency, reproducibility and the improvement in detection of hemolysis across the Cleveland Clinic Health System.

Clinical Indications for Testing
Serum index measurements aid in evaluating sample integrity by determining the level of hemoglobin in serum or plasma. The test-specific serum index values for hemolysis have been determined by the instrument vendor. These values represent the levels at which the hemoglobin significantly interferes with the analyte testing. Every chemistry analysis will have a serum index performed.

Interpretation
• Analytes will be evaluated according to their specific hemolysis index cutoff determined by the vendor.
• If the hemolysis index is greater than the respective analyte’s established cutoff value interference by hemolysis is considered significant.

• The result will be appended with a comment indicating hemolysis and will also indicate if the hemolysis interference falsely increases or falsely decreases the result.
• A new specimen will be requested for analysis if clinically indicated.

Analyte results that are falsely INCREASED by hemolysis are:
• Acetaminophen
• ALT
• AST
• CK
• Iron
• LD
• NH3
• Phosphorus
• Potassium
• UIBC

Analyte results that are falsely DECREASED by hemolysis are:
• Alcohol
• Alk Phos
• Direct Bilirubin
• GGT
• Haptoglobin
• PTH-I
• Troponin

Methodology
The Roche Serum Index Gen. 2 assay is based on calculations of absorbance measurements of diluted samples at different bichromatic wavelength pairs to provide a semi-quantitative representation of levels of hemolysis in serum and plasma samples. The Roche Cobas c analyzer takes an aliquot of the patient specimen and dilutes it with saline (0.9% sodium chloride) to measure the absorbances for hemolysis at 570 nm (primary wavelength) and 600 nm (secondary wavelength). From these absorbance values the instrument calculates the serum index value for hemolysis. Each analyte has its specific hemolysis index value defined.
References


