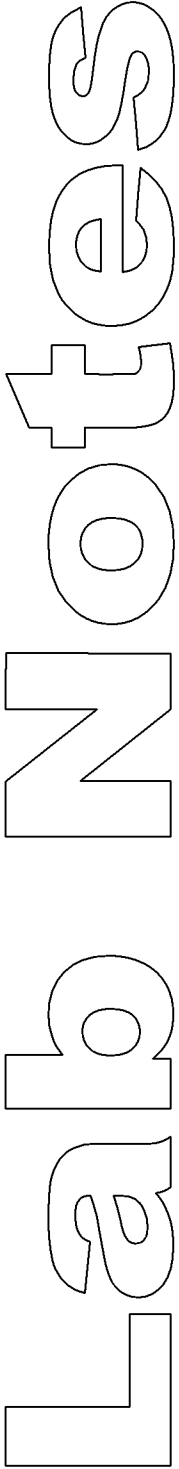


Serum versus Plasma



Serum is most commonly used by clinical reference laboratories for general chemistry although plasma can be used equally well for all common chemical analyses of clinical importance and is preferable for certain analytes. Plasma is more easily separated from the cellular constituents of blood and a greater volume of plasma can be obtained routinely than serum from the same quantity of whole blood. Since fibrinogen is not consumed in anticoagulated blood, a significant difference between plasma and serum is a higher total protein content in plasma. In a study from the Clinical Chemistry Laboratory at the Columbia-Presbyterian Medical Center, Lum and Gambino(1) demonstrated that there was no significant difference between heparinized plasma versus serum analyzed simultaneously for alanine aminotransferase, aspartate aminotransferase, amylase, total bilirubin, BUN, calcium, CO₂, creatine phosphokinase, creatinine, or glucose. Method dependent differences were found for chloride, total cholesterol, lactic dehydrogenase alkaline phosphatase, and sodium which can influence the normal reference ranges of laboratories so that values between laboratories cannot be directly compared without specific knowledge of the methodology used by each laboratory. Albumin, inorganic phosphorus, triglyceride, and uric acid had statistically significant higher values in serum although the magnitude of the differences were of no clinical significance. If serum is not immediately separated from the clot, serum phosphorus can be artificially and significantly elevated(2). This is most likely due to the degradation of the erythrocyte membrane (where this anion is found in abundance) during the clotting process(2).

Although methodological differences were observed, potassium was consistently higher in serum vs plasma in agreement with other studies(3,4). During the coagulation process, potassium is released from platelets(5) so that serum potassium levels are influenced by the platelet content of the coagulated blood sample and indicate erroneously high levels of this cation in thrombocytosis(5,6). The use of plasma eliminates this type of interference.

Lum and Gambino(1) concluded that "Heparinized plasma should be used for electrolyte determinations and may be substituted for serum for the determination of other blood constituents." Similarly, Home HealthCare Laboratories of America has validated the use of plasma and the overnight stability of anticoagulated whole blood for the analysis in plasma of those analytes more commonly quantitated using serum in the routine clinical chemistry laboratory.

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