Modeling of blood centrifugation and component separation

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Abstrak

Blood salvage system, using the method of centrifugal sedimentation, is a highly complex process currently designed primarily empirical and based on trial-anderror. The aim of this project is to study the flow behavior of blood and develop approaches to its modeling and numerical simulation when it is subjected to a strong centrifugal field. When the blood is centrifugated at 1500 rpm, the sedimentation occur almost instantaneously in a narrow region near the chamber inlet (26% of the chamber volume). The blood then separates into three phases, which are plasma, buffy coat, and red blood cells. Three different set of equations are developed to describe the flow of each phase through the chamber. These equations were used to develop a numerical solution of the fundamental model using the excel software tools.