

Centrifuges



Using Medifuge Centrifuge for Coagulation Testing through preparation of Platelet-Poor Plasma (PPP)

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Introduction

Clinical laboratory testing plays an important role in the detection, diagnosis, and treatment of diseases. The use of centrifugal force for the separation of blood is a very crucial step within the process. It is important to perform this step correctly and efficiently.

Blood is typically separated to yield platelet-poor plasma (PPP), which is the preferred specimen for most coagulation testing. Ideally, PPP should have a platelet count of less than 10,000/ μL .¹

The objective of this note is to illustrate the efficiency and effectiveness of the Thermo Scientific™ Medifuge™ Clinical Centrifuge for coagulation testing through the periodic check of plasma platelet counts post centrifugation.

The Medifuge centrifuge (see Table 1) comes with the Thermo Scientific™ DualSpin™ Rotor. The 2-in-1 hybrid rotor is a lightweight 8-place rotor with interchangeable fixed angle and swinging buckets. This rotor accommodates 1.4 mL to 15 mL tubes with two spacer options at maximum g-forces of 3,144 x g (fixed angle) and 3,490 x g (swinging bucket).

Methods

Blood was obtained from 10 unknown donors by venipuncture collection at the same day of the testing. 2.7 mL of whole blood was collected into plastic citrate tubes (BD Vacutainer™ blood collection tubes, article number 363083) and stored at room temperature. The tubes were processed using the Medifuge centrifuge. The rotors and centrifugation conditions are summarized in Table 1 and Table 2 (next page).

The platelet concentrations for each PPP preparation were determined with the aid of a hematology analyzer.

Table 1. Centrifuge, rotor, buckets and adapter

Centrifuge	Rotor	Buckets	Adapter
Thermo Scientific Medifuge Centrifuge	DualSpin	Swinging buckets	Green spacer

Table 2. Centrifugation conditions

Clinical testing	Rotor	RPM	RFC (x g)	Time (min)
PPP	DualSpin	4,500	3,490	8

Results

Clinically acceptable results were derived for all centrifugation steps performed using a Medifuge centrifuge and DualSpin rotor with swinging buckets. Acceptable results for PPP were accomplished at 3,490 x g or 4,900 rpm for 8 minutes.

Table 3. Platelet count in PPP preparation from 10 unknown donors

Platelet count ^{a,b} [K/ μ L] (after spin)
2.5 \pm 2.2
a Centrifugation conditions shown in Table 2
b Mean \pm SD

Conclusion

The Medifuge centrifuge achieved a clinically acceptable PPP yield per laboratory standards with a spin of 8 minutes at 3,490 x g or 4,500 rpm using the DualSpin rotor and swinging buckets. The residual platelet counts in the final PPP sample were <10,000/ μ L¹.

Reference:

1. Editor(s): Barbara J. Bain, Imelda Bates, Michael A. Laffan, Dacie, and Lewis; Practical Haematology (12th Edition), Elsevier, 2017 p. 376, chapter centrifugation: preparation of platelet-poor plasma

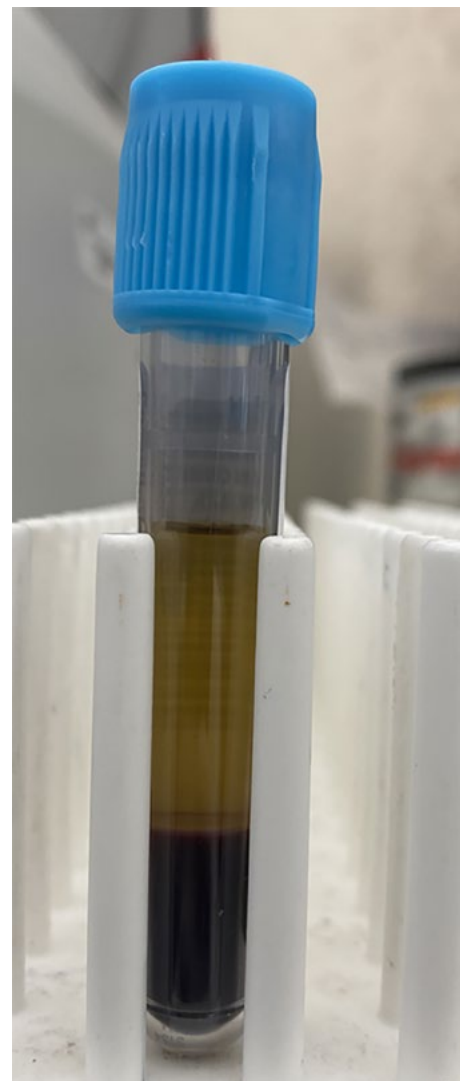


Figure 1: PPP after centrifugation with DualSpin rotor and BD Vacutainer blood collection tubes.

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