

STAT Platelet Poor Plasma Preparation with Drucker DASH Apex Centrifuges

Abstract:

As activated platelets can cause interference in coagulation assays, CAP noted that coagulation samples must have a platelet count below 10,000/ μ L, often called platelet poor plasma (PPP)¹. PPP is achieved via centrifugation; however, the current standard spin time is between 10-15 minutes², increasing turnaround time (TAT) for STAT samples. The purpose of this study is to determine if PPP can be achieved with STAT settings. Utilizing data collected from Mount Nittany Medical Center and ACMH Hospital, it was found that the DASH Apex centrifuge settings (Figure 1) can achieve PPP in just 5-6 minutes, reducing TAT and getting results in record time.

Preparation:

BD Vacutainer® Sodium Citrate tube types were spun in a Drucker DASH Apex centrifuge, utilizing the settings noted in Figure 1. Samples were collected from volunteer donors. Specimens processed using the DASH Apex 6 and 12 centrifuge settings (Figure 1) were transported to Mount Nittany Medical Center in State College, PA for analysis. Specimens processed in the DASH Apex 24 centrifuge were drawn and analyzed at ACMH Hospital in Kittanning, PA. Specimens collected at ACMH hospital were also compared to their current centrifugation settings (10 minutes, 1300 xg).

Specimens were measured for plasma platelet counts and analyzed within two hours after sample collection. 20 samples were analyzed using the DASH Apex 6 and 12 settings, and 30 samples were analyzed using the Apex 24 settings (Figure 1).

Results:

After centrifugation in a Drucker DASH Apex unit, it can be seen that the average platelet count is under 10,000/ μ L (See Figure 2). Depicted on Figure 3, comparative results of the DASH Apex 24 settings and Hettich Rotina 380 centrifuge show no significant results in platelet count when reducing spin time to 6 minutes.

Detailed results may be viewed under Addendum A.

Conclusion:

Drucker DASH Apex centrifuges reliably delivered the platelet counts needed to produce PPP with BD Vacutainer® Sodium Citrate tubes. When tested against longer spin PPP alternatives, DASH Apex delivered equivalent separation in half the time. Using STAT settings (5 minutes, 4000 xg or 6 minutes, 3000 xg) samples achieved PPP 4-5 minutes faster than the Hettich Rotina 380 (10 minutes, 1300 xg) and 10 minutes faster than the current standard spin time (10-15 minutes).

Location:

Mount Nittany Medical Center
1800 East Park Ave, State College, PA 16803

ACMH Hospital
One Nolte Drive, Kittanning, PA 16201

Drucker DASH Apex Cycle Settings

MODEL	TIME	G-FORCE
DASH Apex 6	5 minutes	4000 xg
DASH Apex 12	5 minutes	4000 xg
DASH Apex 24	6 minutes	3000 xg

Figure 1: DASH Apex Centrifuge settings used in this test

Drucker DASH Apex Average Platelet Counts

MODEL	AVG PLATELET	STD DEV	CV%
DASH Apex 6	8.03	1.87	63%
DASH Apex 12	8.03	1.87	63%
DASH Apex 24	3	5.89	73%

Figure 2: Average platelet count, standard deviation, and CV% for all DASH Apex centrifuge settings

Comparative Platelet Results

MODEL	AVG PLATELET	STD DEV	CV%
DASH Apex 24	3	5.89	73%
Hettich Rotina 380	7.20	6.94	96%

Figure 3: Comparative platelet results between Drucker DASH Apex 24 and Hettich Rotina 380 results in record time

Test Dates:

September 2017

Equipment:

Model: DASH Apex 6, DASH Apex 12, DASH Apex 24
Comparison Model: Hettich Rotina 380
Test Tubes: 13 x 75 BD Vacutainer® Sodium Citrate Tube

Data collection and supervision provided by Josh T. Cowher and Daria M. Kaminskyj

References:

1: Savage, Adam. CAP Today, 4/2005 http://www.captodayonline.com/Archives/q_and_a/qa_04_05.html

2: BD Product Catalog, Instructions for use, page 11. <https://www.bd.com/resource.aspx?IDX=10155>

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Addendum A: Measuring Plasma Platelet Counts

PLATELET COMPARISON BD SODIUM CITRATE TUBE		
Sample ID	Drucker	Hettich
SU-1	3	23
SU-2	2	5
SU-3	5	7
SU-4	6	2
SU-5	6	3
SU-6	2	3
SU-7	1	6
SU-8	3	4
SU-9	3	23
SU-10	2	5
SU-11	5	7
SU-12	6	2
SU-13	3	23
SU-14	2	5
SU-15	5	7
SU-16	6	2
SU-17	1	3
SU-18	0	3
SU-19	3	1
SU-20	4	19
SU-21	0	21
SU-22	3	7
SU-23	1	4
SU-24	1	3
SU-25	1	4
SU-26	2	4
SU-27	1	6
SU-28	4	1
SU-29	5	9
SU-30	4	4
Average	3	7.20
Std Dev	1.87	6.94
CV%	63%	96%

Table 1: Data collected comparing the DASH Apex 24 (6 minutes, 3000 xg) and the Hettich Rotina 380 (10 minutes, 1300 xg)

PLATELET COUNT (APEX 6)	
Sample #	Platelet (x10 ⁹)
1	3
2	4
3	2
4	4
5	3
6	4
7	8
8	9
9	18
10	26
11	1
12	9
13	4
14	5
15	19
16	15
17	4
18	5
19	4
20	5
21	4
22	8
23	8
24	7
25	5
26	5
27	13
28	10
29	13
30	16
Average	8.03
Std Dev	5.89
CV%	73%

Table 2: Data collected using the DASH Apex 6 settings (5 minutes, 4000 xg)

PLATELET COUNT (APEX 12)	
Sample #	Platelet (x10 ⁹)
1	3
2	4
3	2
4	4
5	3
6	4
7	8
8	9
9	18
10	26
11	1
12	9
13	4
14	5
15	19
16	15
17	4
18	5
19	4
20	5
21	4
22	8
23	8
24	7
25	5
26	5
27	13
28	10
29	13
30	16
Average	8.03
Std Dev	5.89
CV%	73%

Table 3: Data collected using the DASH Apex 12 settings (5 minutes, 4000 xg)