

Evaluation of the New VACUETTE® Evacuated Plastic Tubes for Immunohematological Testing



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BACKGROUND

- VACUETTE® tubes are evacuated serum plastic tubes intended to collect, transport and process blood for testing in the clinical laboratory.
- VACUETTE® blood bank tubes are available containing No Additive or containing Clot Activator and are used in immunohematology testing that requires red cells and serum, such as ABO grouping, Rh typing and antibody screening / identification.

OBJECTIVE

- To evaluate if there is a difference between the Greiner VACUETTE® Clot Activator tubes (**Test A**), the Greiner VACUETTE® No Additive tubes (**Test B**) as compared to the Beckton Dickinson Vacutainer™ No Additive Non-Siliconized Glass Serum tube (**Control**).

STUDY DESIGN

PART 1: Blood from 54 normal blood donors was drawn and their serum and RBCs were tested for ABO and Rh type, antibody screen, direct antiglobulin test (DAT), and in 11 donors, RBCs were phenotyped for the most common antigens of the Rh (C, E, c, e, K, S, s, Fy^a, Fy^b, Jk^a and Jk^b).

PART 2: Blood from 15 individuals known to have serum alloantibodies was tested for antibody identification.

- Each donor donated 6 mL blood in each of the Test A & B tubes, and 7 mL of blood in the Control tube.

- The order of draw in the different tubes was randomized.

METHODS

- All testing was performed within 24 hours of collection at the Hoxworth Blood Center's Compatibility Laboratory.

ABO & Rh type testing:

ABO (forward and reverse) and Rh typing: was performed in standard tube technique. Anti-A, Anti-B and anti-D antibodies were monoclonal antibodies. A1 and B cells were used for the reverse ABO typing. All reagents were from Immucor-Gamma.

Antibody Screen and Identification:

Was done by two methods: a) standard gel test (gel cards and 0.8% cells from Ortho-Clinical Diagnostics) and b) standard tube test at immediate spin and at 37°C (3% cells and autocontrol cells from Immucor-Gamma). For Part 2, it always included a panel of at least 11 cells and patient cells.

DAT Test:

Was performed according to the tube technique SOPs with polyvalent anti-human gammaglobulin (Immucor-Gamma) at immediate spin, and after an incubation of 5 minutes at room temperature.

Antigen Phenotyping:

Anti-C, -E, -c, -e, -K, -S, -s, -Fy^a, -Fy^b, -Jk^a and -Jk^b antibodies (Immucor-Gamma) were used according to manufacturer's instructions and Hoxworth Blood Center SOPs. All of them were IgG monoclonal antibodies except anti-K which was IgM.

RESULTS

Table 1. (PART 1)
Antigen Phenotyping

Antibody (N=11)	Test A	Test B	Control
C	7	7	7
E	1	1	1
c	9	9	9
e	11	11	11
K	0	0	0
Fy ^a	8	8	8
Fy ^b	7	7	7
Jk ^a	9	9	9
Jk ^b	7	7	7
S	5	5	5
s	11	11	11

Part 1

- We found no changes in the red blood cell ABO/Rh/10-antigen panel phenotyping or antigen panel reactivity intensity among the RBCs obtained from the 3 different collection tubes (quantitative analysis in scale 0, wk, +1, +2, +3, +4; Spearman's r test for ABO and Rh typing = 1) on every donor.

- All DAT and antibody screening tests performed were negative.

- The ABO reverse typing and antibody detection ability using sera from the three different tubes was equivalent.

Table 2. (PART 2)
Antibody Identification
(Number of cases)

Antibody (N=15)	Test A		Test B		Control	
	Gel Method	Tube Method	Gel Method	Tube Method	Gel Method	Tube Method
D	7	7	7	7	7	7
E	5	5	5	5	5	5
C	1	1	1	1	1	1
K	1	1	1	1	1	1

Part 2

- We found no significant differences in the agglutination strength (scale 0, wk, +1, +2, +3, +4) against sera from individuals with alloantibodies collected in the 3 different tubes (weak reactivity was considered 0.5; Spearman's r test for ABO and Rh typing = 1).

- Two individuals that had shown alloantibodies in the past did not show detectable antibody levels for this study.

CONCLUSIONS

- RBC and sera obtained from blood collected in either the VACUETTE® Clot Activator or VACUETTE® No Additive tube showed concordant results, for both RBC and serum obtained from blood collected in a FDA-cleared glass collection tube for immunohematological analysis.

- Reactivity intensity for ABO/Rh typing and for alloantibody detection was similar among RBCs and sera obtained from blood collected in any of the three different tubes tested.