# Whole blood automation: Technology for blood components preparation in Blood

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**Background and objective:** The Reveos automated blood processing system has been developed for whole blood units separation. The aim of this study was evaluate the product specifications and quality of components produced by the Reveos system. This system has been installed in Blood Transfusion Centre, Faculty of Medicine, Khon Kaen University since September 2016 for leukocyte reduction (LR) set and in 2019, Non-leukocyte reduction (NLR) set was developed for the same machine, therefore LR and NLR set were consider to routine blood collection, then the validation have to perform.

**Materials and Methods:** The Reveos NLR set-4NG456S0 can separate blood components; Leuko-poor RBCs, Plasma and platelets during the procedure by centrifugation and buffy coat removal by automation system. Whole blood (WB) volume including CPD based on WB collection volume 450+10% mL. And centrifugation by selective protocol of Reveos. WB was processed using the Reveos system and compare according to validate the use of the first installation. Reveos red cells were leukoreduced and stored in SAGM at 4°C. Reveos plasma was frozen at -30°C and factor activity was assessed after thawing. Leukoreduced platelet concentrates Reveos were prepared by pooling 4 iso-group interim platelet units or 1-2 random platelet concentrate from top-bottom method and 3-2 interim platelet units pooled by Reveos pooling set, Comparison the value of volume, hematocrit , platelet contents and white blood cell contamination of Leukocyte depleted red blood cells (LDPRC) and Leukocyte poor red blood cells (LPRC) with SPSS statistics.

**Results:** 408 whole blood was processing with Reveos system. Average of fresh frozen plasma, interim platelet and leuko-packed is 217.52, 62.40 and 10.2 mL., respectively. The platelet index more than 60 cells/u is 75.8%. The quality of LDPRC; hematocrit equal 55.8%, volume equal 313 mL. and white cell contamination equal 0.0 X 106 cells/u. Comparison the value with SPSS statistics were found that the hematocrit, volume and white blood cell contamination were not different (P>0.01, P>0.05 and P>0.05, respectively). The quality of LDPC(N=68); platelet contents equal 3.03 X 1011 cells/u, volume equal 255.8 mL. and white cell contamination equal 0.0 X 106 cells/u. All values were not differ statistically (P>0.05). The validation shown blood product specification, Reveos NLR set blood performance data were; 20 units test for volume and percent hematocrit Leuko-poor RBCs in additive solution were found 200-350 mL, and 50-70 % hematocrit and both ratio QC pass 100%. 19 units were tested residual white blood cells in Leuko-poor RBCs found 95% has residual white blood cells less than 1.2X109 cells/unit. All plasma product100% pass. 12 units tested of platelet transfusable platelet (TPU) for volume, platelet yield and residual white blood cells in TPU were found40-70 mL, all of them platelet yield more than 5.5X1010 cells/unit (100% QC pass) and residual white blood cells less than 0.2X109 cells/unit (100% QC pass). Further, platelet recovery in leukocyte depleted pooled platelet concentrates (4 units of interim platelet unit per pool) 2 pool has describe in volume, platelet yield, and residual were found; pool no.1 has 352.4 mL, 3.34 X1011 cells/units and 0.092x106 cells/unit. Pool no. 2 has 350.5 mL, 2.82x1011 cells/unit and 0.060x106 cells/unit. Time per 4 units completed approximately 25 minutes.

**Discussion and Conclusion:** Council of Europe (CoE) requirements; platelet yield must be more than 2.0 X1011 cells/unit, volume more than 40 mL per 60X109 of platelets and residual white blood cells less than 1.0x106 cells/unit. The benefits of process WB into Leuko-poor RBCs, platelet and plasma in a single centrifuge cycle. Achieve consistent and reliable blood performance criteria through automated sedimentation and separation.

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