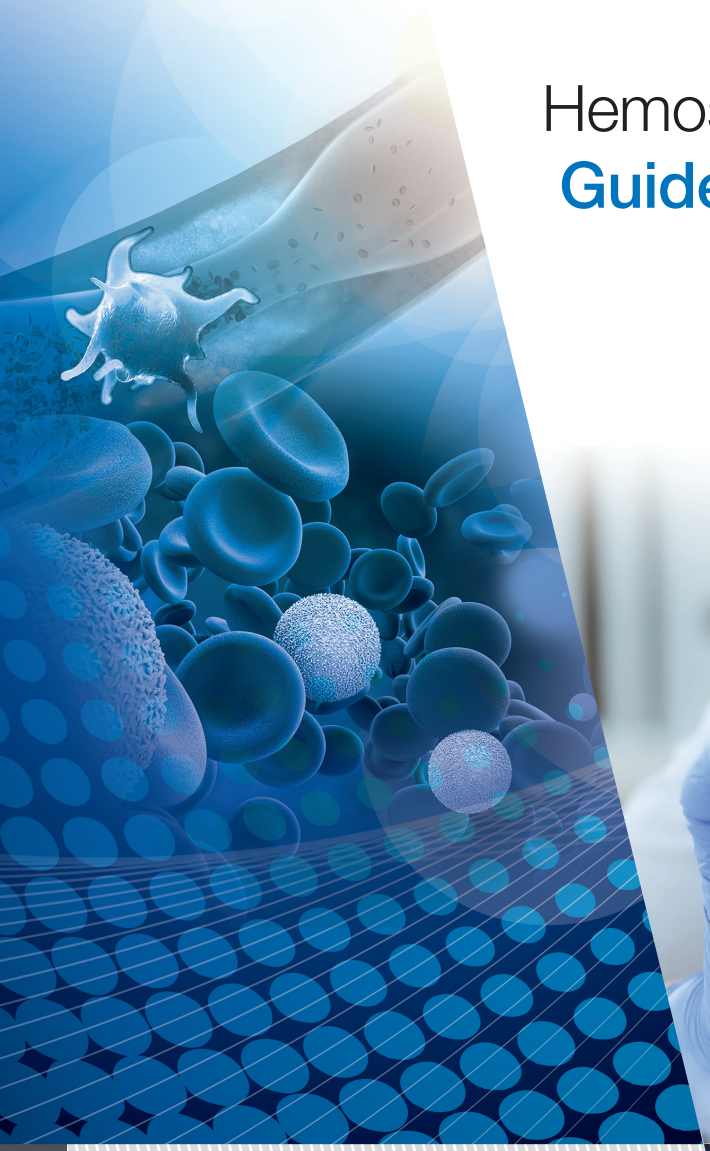
HORIBA
Medical

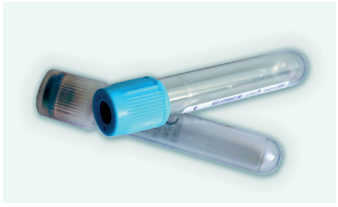
Hemostasis Preanalytical
Guidelines



Yumizen
G range

Sample tube

Recommendation



Anticoagulant
Recommended Sodium citrate 3,2 % (109 mmol/l)
Acceptable Sodium Citrate 3,8% (0,129 M)
CTAD acceptable in some circumstances

Sufficient volume.
Respect the required ratio of sodium citrate to whole blood (1:9)
Fill volume: ≥90 %
Do not transfer from 1 tube to another

Check expiry date of the tube

Potential Risk

Serum or any other anticoagulant can lead to an incorrect result

Sample dilution (excess CaCl2-Citratre binding)[9]

False results

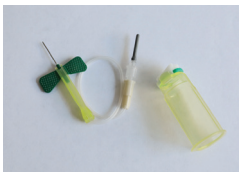
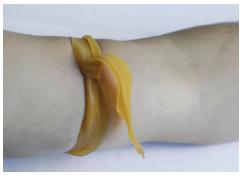
Sample collection

Tube filling order :
Before filling citrate tube, discard the first tube (neutral or citrate)
Citrate tube : before tubes with additives

Sample contamination
Sample dilution
(excess CaCl2-Citratre binding)[9]

Tube filling order during venous sampling

NEEDLE TYPE	1	2	3	4	5	6	7
Vacuum tube holder	**Without neutral tube** (If swift puncture & regular blood flow)	**Citrate tube**	**Serum tube**	**Heparin tube**	**EDTA tube**	**Fluoride tube**	**Others**
Winged collection butterfly	**Without Blood culture** neutral tube (line air purge) **With Blood culture** Aerobic vial Anaerobic vial						(ESR, Aprotinin …)

Proper Tube Identification Label / patient demographic and collection date and time	Wrong result
The diameter of the needle recommended should preferably be between 19 and 22 gauge[11] Acceptable: 23 (pediatric, compromised veins, geriatrics, oncology, …)[11]	Hemolysis[1,6]
 Vacuum tube holder : the venipuncture must be swift and the blood flow, regular[11]	Risk of contamination from tissue thromboplastin and hemolysis.
 Winged collection butterfly : before filling citrate tube, discard the first tube (neutral or citrate)[11]	Risk of under filling due to the air from sampling line.
 Release the tourniquet immediately when the first tube starts to fill (<1 mn)	Hemolysis[1,6] Fibrinolysis activation Acidosis (pH <7,3) PT prolonged
Avoid traumatic phlebotomy (draw) Avoid drip lines Avoid wet alcohol carryover	Coagulation activation[4,7] Hemolysis[1] Interferences, sample dilution
Immediately mix **gently** by 3 to 6 complete end-over-end inversions to ensure adequate mixing with anticoagulant and to prevent clotting	Factor activation, Hemolysis[1] Sample clotting[4,7] (partial) Variable anticoagulant gradient (gradient of sample with different citrate buffering)

Sample transport

Room temperature (15 – 25 °C) : **should be maintained** Keep the tube vertical during transport Prohibits transport on ice or refrigerate transport (2°C - 8°C)	False results : activation of some coagulation factors

Sample stability

Fresh sample: Room temperature (15 – 25 °C)[13] = 4 hours for most tests NOTE : this specification is true for most routine tests, for details per parameter, refer to GFHT [2]	False results : activation of some coagulation factors

Centrifugation and Storage

Centrifugation

Standard recommendation : 1500 g, 15 minutes
Centrifugal conditions must be established and validated by the laboratory.
Maximum time for centrifugation after sampling is 2 hours
Room temperature (15 – 25 °C)[13]
"Rapid centrifugation" may be used (higher speed, shorter duration) under lab validation

False results due to contamination by phospholipid from platelets.
Lupus and Heparin Assays particularly affected10.
PT, APTT, TT not affected up to Platelet count=200 000/µl [1]

Double centrifugation recommended before freezing.
Transfer the plasma to a non-activating plastic centrifuge tube using a plastic pipette, then re-centrifuging the sample for an additional 10 minutes.
When transferring to a secondary tube, take care to not include any residual platelets that may have collected at the bottom of the centrifuge tube.

False results
Lupus and Heparin Assays affected[10].

Storage (depending on the parameter)
Room temperature (15 – 25 °C)[12,13] .4 hours for most of tests
Minus 20°C = Maximum storage time : 2 weeks
Minus 70°C = 6 month to 12 month

FVII activation, platelet disruption, Loss of coagulation components, Hemolysis[1]

NOTE : *these specifications are true for most of tests, for details per parameter, refer to GFHT[2]*

Defreezing must be done at 37°C in bain-marie during 5 to 10 minutes maximum1.

False results due to the release of phospholipid

Pre-analytical Sample Integrity

Avoid clotted samples
Check samples for Hemolysis, lipid and icterus

Coagulation activation[4,6,7]
(micro clots could be not visible)
False results

Literature

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5 – Lippi et al., Clin Lab Haematol 2006; 28: 332-7
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13 – Pharmacopée Européenne

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