



## GENERAL ANTICOAGULANTS USED IN HAEMATOLOGY

### 1. Introduction

Anticoagulant is an agent that is used to prevent the formation of blood clots. Anticoagulants have various uses. Anticoagulant selected for use in hematological examination must have the following qualities.

- it must not alter the size of the cell
- it must not cause hemolysis
- it must minimize platelet aggregation
- it must minimize disruption of staining and morphology of leukocytes
- it must be readily soluble in water
- it should be soluble in blood
- it must be keeping the blood in fluid condition

### 2. Top 5 Anticoagulants Used in Hematology Laboratory

#### a. Anticoagulant 1. Double Oxalate:

- used for hemoglobin %, ESR estimation, RBCs count and leucocytes count
- potassium oxalate and ammonium oxalate are used together in a ration 2:3, this is done to counter the swelling effect of ammonium oxalate and shrinkage effect of potassium oxalate on RBC.



#### b. Anticoagulant 2. Ethylene Di-Amine Tetra Acetic Acid

- commonly used for the CBC
- EDTA can be found in three salt forms:
  1. Tri-Potassium EDTA
  2. Di-Sodium EDTA
  3. Di-Lithium EDTA

EDTA acts by chelating/removing ionized calcium (calcium is required for blood to clot, so when it is removed blood will not clot). Generally, tri-Potassium EDTA is better than di-Sodium EDTA and di-Lithium EDTA.





## c. Anticoagulant 3. Heparin:

- used for osmotic fragility test, HCT and is also used for L.E. cell preparation (L.E. = Lupus Erythromatosus).
- acid mucopolysaccharide, it acts by complexing with antithrombin to prevent blood clotting (antithrombin is one of the natural/physiological inhibitors of blood coagulation), heparin may cause leukocyte and platelet clumping, therefore heparin is not suitable for routine hematology tests.



## d. Anticoagulant 4. Sodium Citrate:

- most used anticoagulant for coagulation and platelet function tests, also is used for ESR
- it came in a liquid form, as 3.8% tri-sodium citrate.
- for coagulation testing, the ratio of 9 volumes of blood to one volume of anticoagulant (9:1) is very critical, as variation from this ratio may cause errors.
- for ESR, the ratio of 4 volumes of blood to one volume of anticoagulant (4:1) is used.



## e. Anticoagulant 5. Sodium Fluoride:

- used for preparing blood specimens for the determination of glucose and urea in plasma by non-enzymatic methods.
- inhibits the glycolytic enzymes responsible for the breakdown of glucose in the blood, (at Room Temp, about 10% glucose is lost per hour from an untreated sample).
- as fluoride is not a strong anticoagulant, it is mixed with oxalate





### References

- <https://paramedicsworld.com/hematology-notes/anticoagulants-used-for-routine-tests-principle-preparation-uses-advantages-disadvantages/medical-paramedical-studynotes>
- <https://www.slideshare.net/peddanasunilkumar/anticoagulants-used-in-haematology>