Molecular Biology " Buffers "

Buffers

Buffer: **is a solution containing either weak acid and its salt or weak base and its salt which resist changing in pH.**

Buffer: **also defined as (solution resist chaining in pH in dilution or in addition of acid or base. Examples (Phosphate buffer, Tris-buffer).**

Buffer capacity: **means the ability of buffer to resist changing in pH.**

Buffer agent: **is a weak acid or weak base in buffer.**

Buffers Properties

1- It has known pH.
2- It has pH value don't change even in long time or adding of strong acid or base.

Types of Buffers

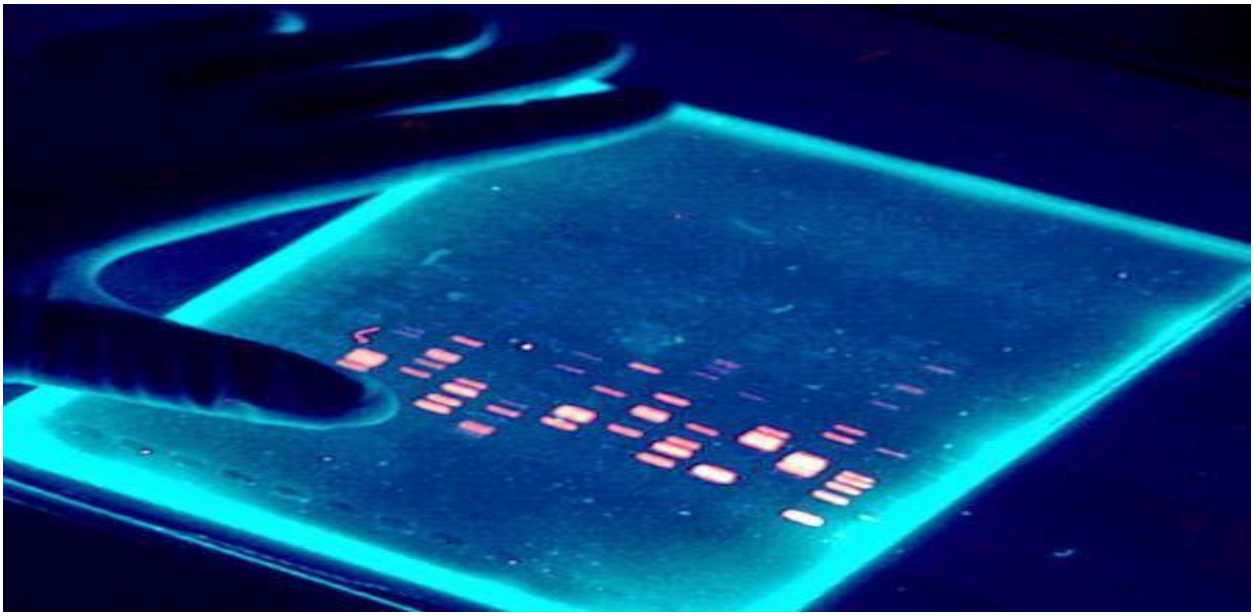
1- TBE (Tris-borate-EDTA) buffer.
2- TSE (Tris-sucrose-EDTA) buffer.
3- STET (Sucrose-Tris-EDTA-TritonX- 100) buffer.

Tris buffers are solution effective in basic conditions which keeps the DNA deprotenated and soluble in water.

EDTA is a chelator agent divalent cations, for example Mg+2 that act as co-factor for many enzymes including nuclease, therefore the role of EDTA is to protect the nucleic acid from enzymatic degradation.

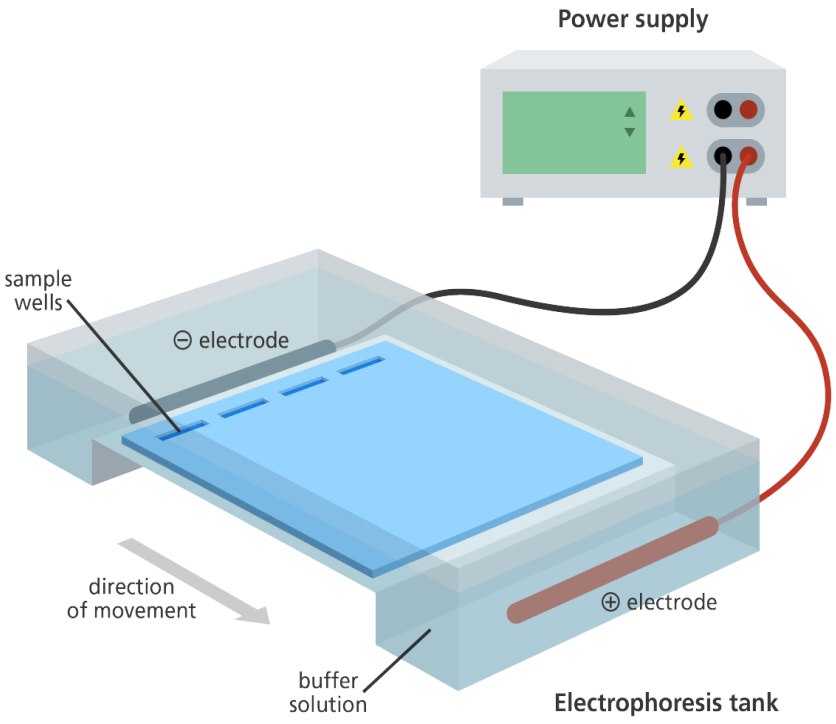
Mg+2 is also act as co-factor for many useful DNA modifying enzymes such as restriction enzymes and DNA polymerase

These buffers are used in procedures of nucleic acid such as in electrophoresis.

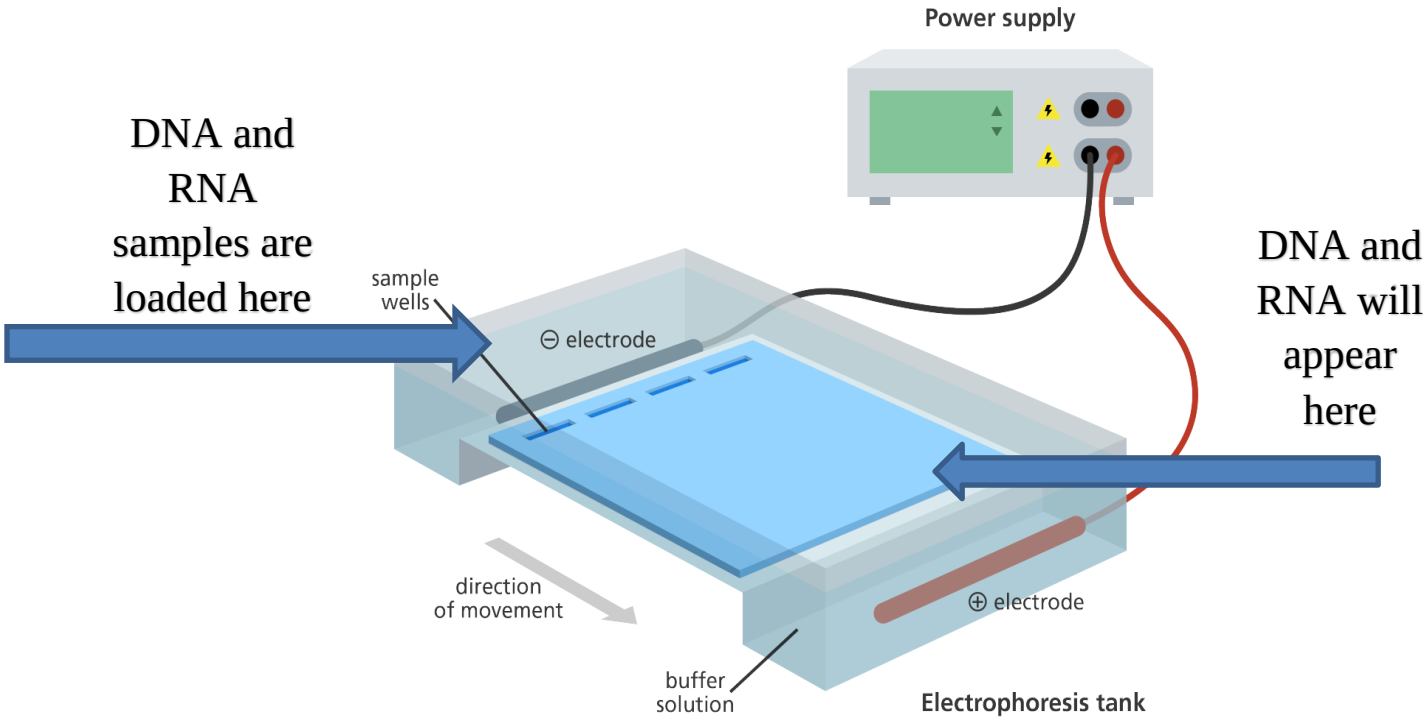


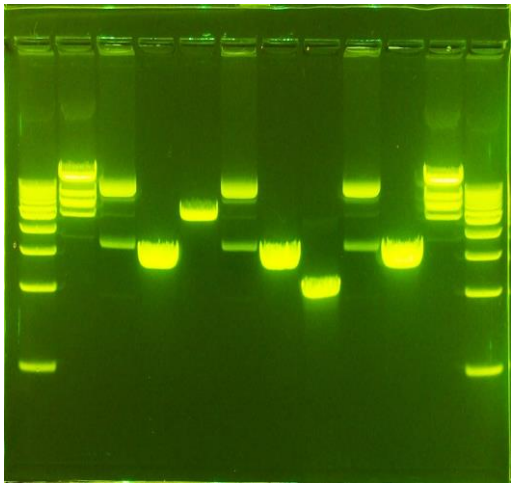
Electrophoresis

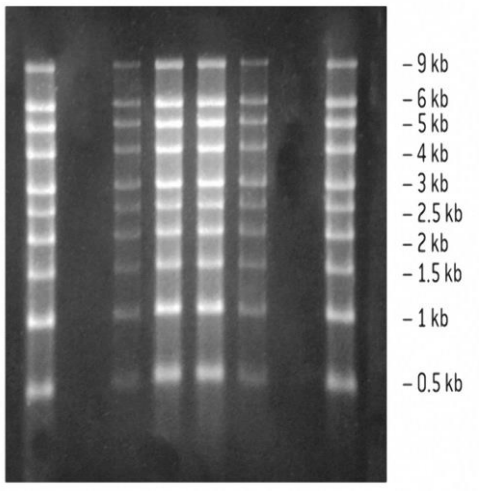
Electrophoresis is a laboratory technique used to separate DNA, RNA, or protein molecules based on their size and electrical charge. An electric current is used to move molecules to be separated through a gel.

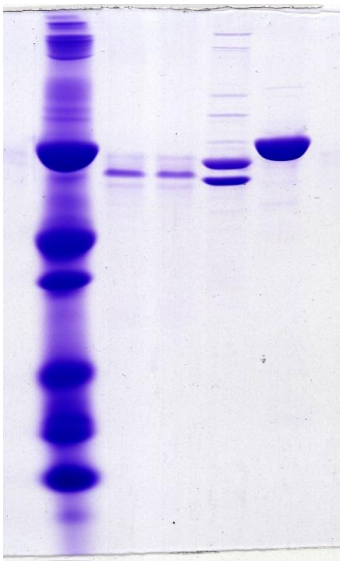


- To separate DNA using **agarose gel electrophoresis**, the DNA is loaded into pre-cast wells in the **gel** and a current applied. The phosphate backbone of the DNA (and RNA) molecule is negatively charged, therefore when placed in an electric field, DNA fragments will migrate to the positively charged anode.









Three purposes using a buffered solution in gel electrophoresis:

1- Is it provides the necessary ion to conduct electricity,

2- Helps maintain a stable ph and a stable temperature.

3- A buffer also keeps the gel from melting.