



Electrophoresis

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- Define electrophoresis.
- Discuss how electrophoresis works.
- Explain gel electrophoresis.
- List application of electrophoresis.

Introduction

Electrophoresis is the migration of charged molecules such as proteins in an electrical field. The separation of proteins in an electrical field is based on size, shape, and charge. The charge of the protein depends on the isoelectric pH (IpH) of the protein and the pH of the surrounding buffer.

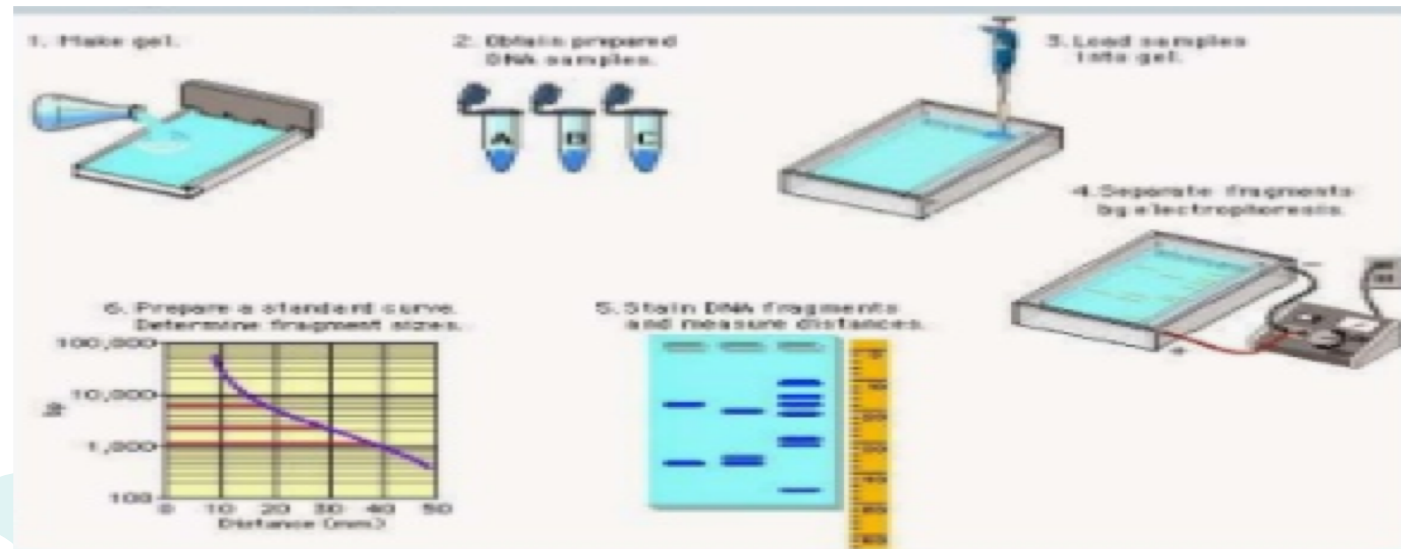
Define Gel Electrophoresis



- Gel electrophoresis is a procedure that separates molecules on the basis of their rate of movement through a gel under the influence of an electrical field.
- Can be used to separate the size of DNA, RNA, Protein.

Electrophoresis

- A sample is placed on a porous substance, such as a semisolid gel, which is then placed in a solution that conducts electricity.
- Mixtures of molecules with a similar charge-mass ratio but of different sizes will migrate at different rates through a gel based on their size.
- Once electrophoresis is complete, bands representing the variously sized molecules are identified by either autoradiography (using radioactive dye) or by the use of fluorescent dyes that bind to nucleic acids.



Types of gel electrophoresis



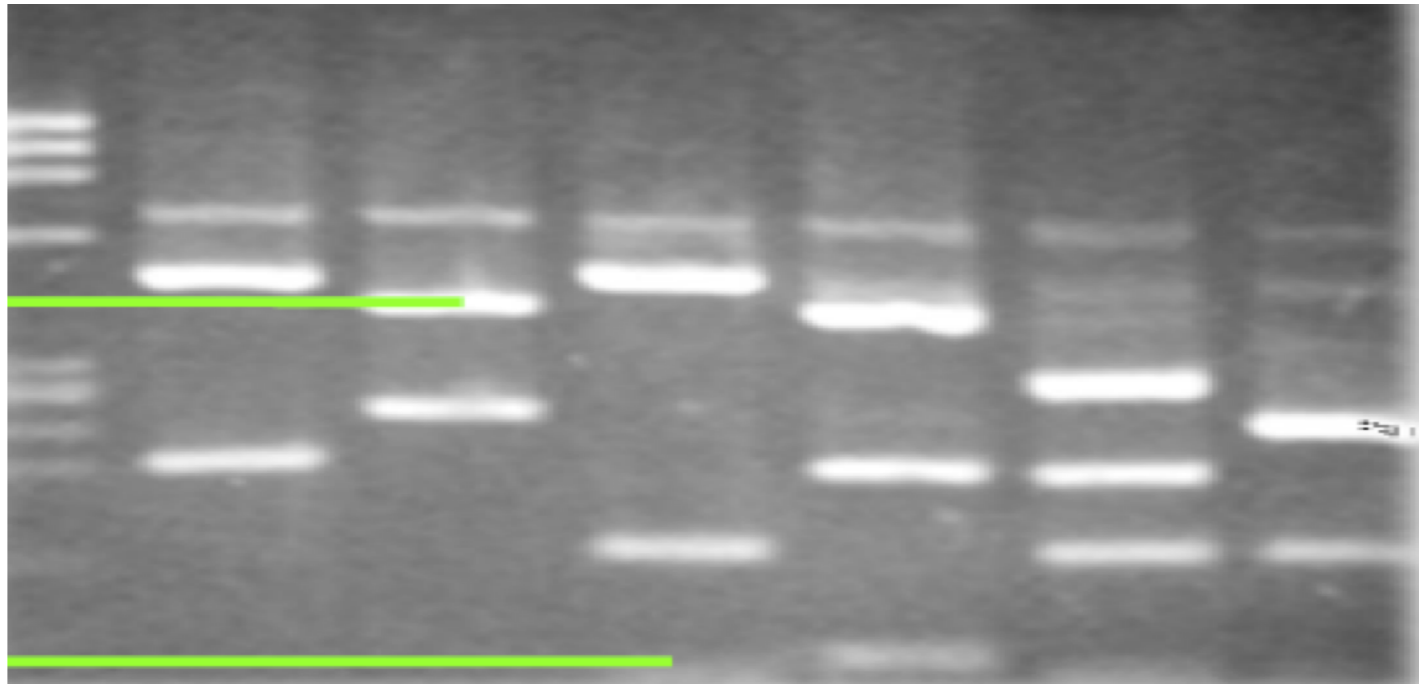
Agarose gel



**Polyacrylamide
gel**

Factors affecting DNA migration in a gel

Size of DNA fragment



Factors affecting DNA migration in a gel

Gel percent



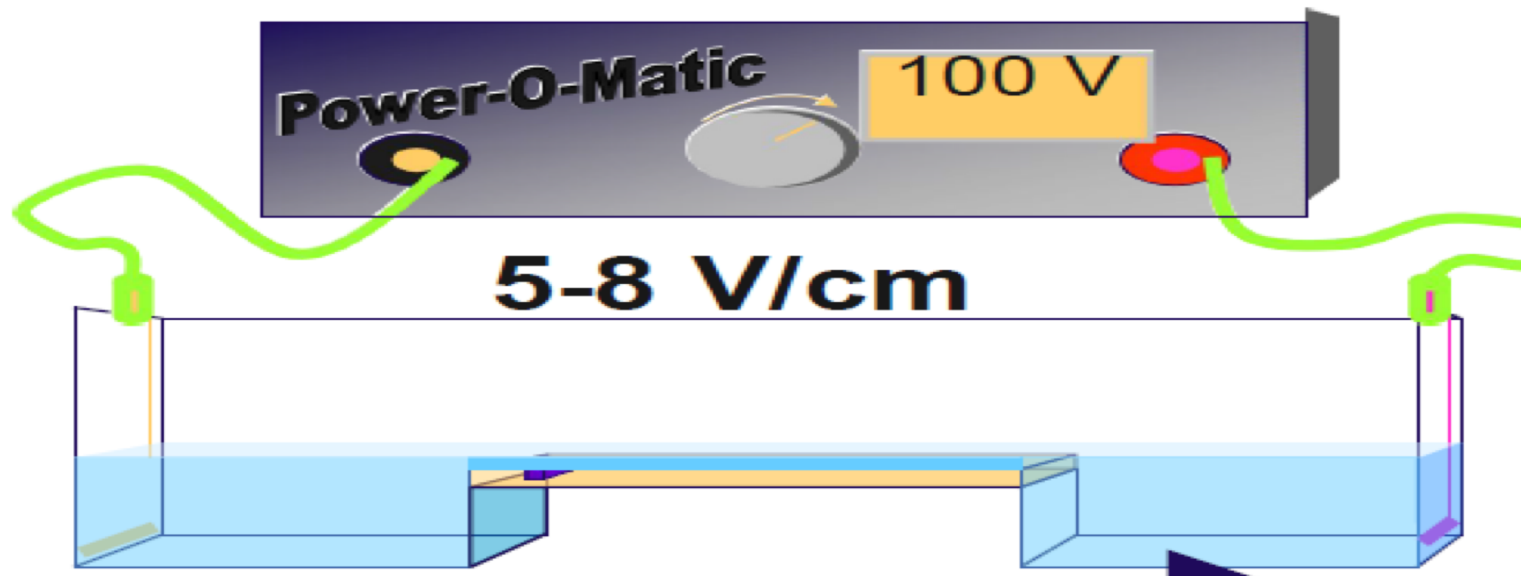
1% agarose



2% agarose

Factors affecting DNA migration in a gel

Applied voltage



Applications of electrophoresis

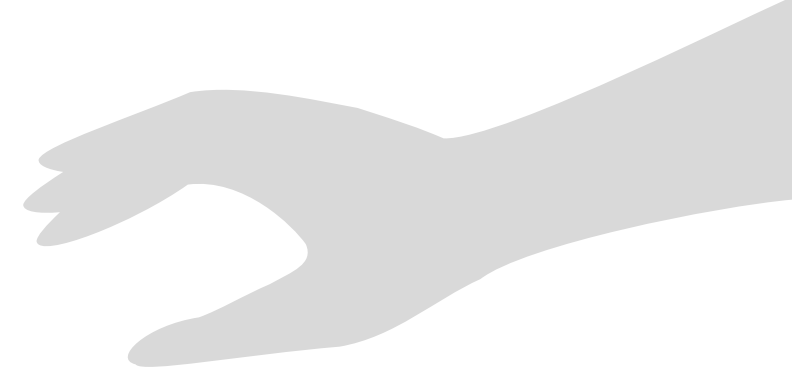
Estimation of the DNA molecule

Analysis of PCR product

Separation of restricted genomic DNA and RNA

Separation of most small fragments of DNA.

In forensic science



Agarose gel

❖ Polysaccharide extracted from seaweed

❖ Gel casted horizontally

❖ Separate large molecules

Staining can be done before or pouring the gel

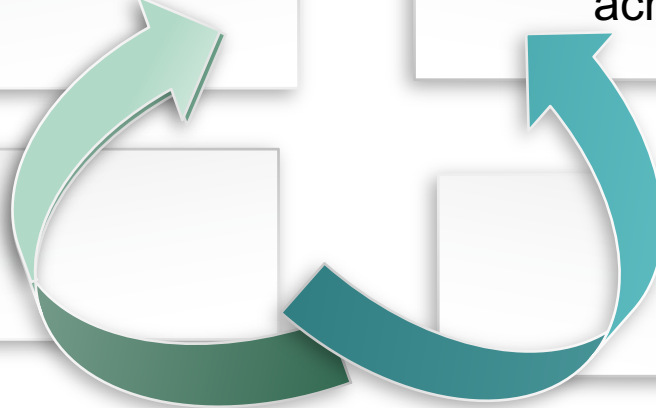
Polyacrylamide gel

❖ Cross-linked polymer of acrylamide.

❖ Gel casted vertically.

Separate small molecules.

❖ Staining can be done after Pouring the gel



Summary



Electrophoresis is the migration of charged molecules

Types of gel electrophoresis

factors affecting DNA migration in a gel

Application of electrophoresis



References

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THANK YOU

