Basic Molecular Biology: Nucleic Acid Extraction

Gel Electrophoresis

Gel electrophoresis is a method used for separation of nucleic acid using a porous gel matrix. Depending on the size of the nucleic acid to be resolved, the percentage of the gel composition will vary. Gels may be prepared or purchased.

The gel can be made up of either agarose or polyacrylamide. Polyacrylamide gels are typically ran vertically where nucleic acid separation is based on size, shape and charge. Agarose gels are typically ran horizontally where nucleic acid separation is based on only size. Here we use an agarose gel.

Typically, samples are mixed with a sample loading dye which aids sample loading and allows visual tracking of sample migration from negative to positive through the gel.

Load the sample into a well.

Ensure the gel is oriented with the well-end on the negative electrode side before applying an electric current to the gel chamber.

Nucleic acid carries a net negative charge and as a result will migrate from the negative end of the gel to the positive end.

Smaller nucleic acid fragments move through the gel faster than larger molecules.

Thus, the bands of smaller nucleic acid are observed near the positive end of the gel while the bands of larger nucleic acid retain closer to the negative end of the gel.

This allows separation of nucleic acid of different sizes in the gel matrix.