Electrophoresis: Time & Voltage

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Hints, Help & Troubleshooting

EDVOTEK electrophoresis experiments feature a coordinated system of equipment and reagents to maximize success. For each specific experiment, refer to the Time and Voltage table in the accompanying instructions for guidelines regarding how long the DNA fragments should be separated by electrophoresis.

Many variables influence how long an agarose gel electrophoresis experiment is run. Factors that influence electrophoresis include the following:

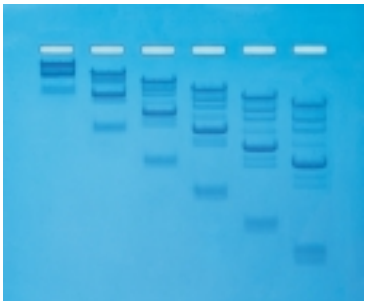

Figure 1: Separation of Standard DNA Markers at 15-minute intervals at 70 volts.

Lane 1: 15 minutes
Lane 2: 30 minutes
Lane 3: 45 minute
Lane 4: 60 minutes
Lane 5: 1 hour 15 minutes
Lane 6: 1 hour 30 minutes

- Longer electrophoretic runs will increase the separation between fragments (see Figure 1). Adequate separation is important for analysis of DNA fragments, especially those that are close in size. However, if the electrophoresis is conducted for too long, DNA bands may migrate off the end of the gel.
- The higher the voltage, the faster the DNA will travel through the gel. However, voltages that are too high can possibly melt the gel or cause smearing or distortion of DNA bands.

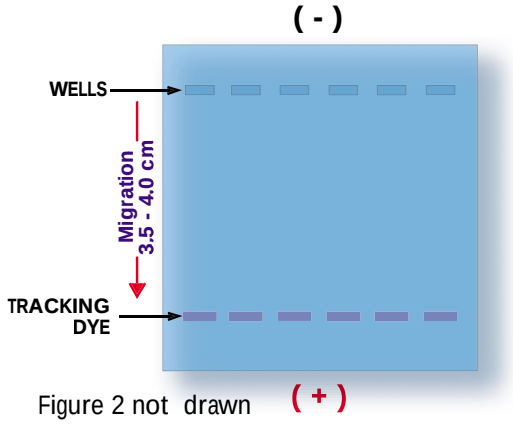

Figure 2 not drawn to scale.

- The gel concentration and volume (thickness) affect electrophoretic separation. For example, DNA samples will migrate faster in a 0.8% gel compared to a 1% gel. Likewise, samples will migrate faster in a 20 ml gel (6 mm thick) versus a 30 ml gel (8 mm thick) with the same 7 x 7 centimeter dimensions.
- A convenient visual cue is to stop the electrophoresis when the tracking dye in the DNA sample migrates approximately 3.5 to 4 cm down the gel (7 x 7 cm gel). This is a particularly useful guideline because individual power source voltages can vary (see Figure 2).