Paper Chromatography Experiment

Plants can convert light energy from the Sun into chemical energy through a process called **photosynthesis**. This process relies on the absorption of light energy in leaves and plants achieve this through the use of different pigments. A **pigment** is a coloured compound which absorbs certain wavelengths of light energy. One of the most common plant pigments, **chlorophyll**, absorbs red and blue light but reflects green light, which is why plant leaves tend to appear green. In order to capture as much light energy as possible, plants actually produce a variety of differently coloured pigments which absorb different spectra of light! For example, **carotenoids** are orange pigments which mostly absorb green and blue light. You can see differences in the way various plant pigments absorb light energy in Figure 1.

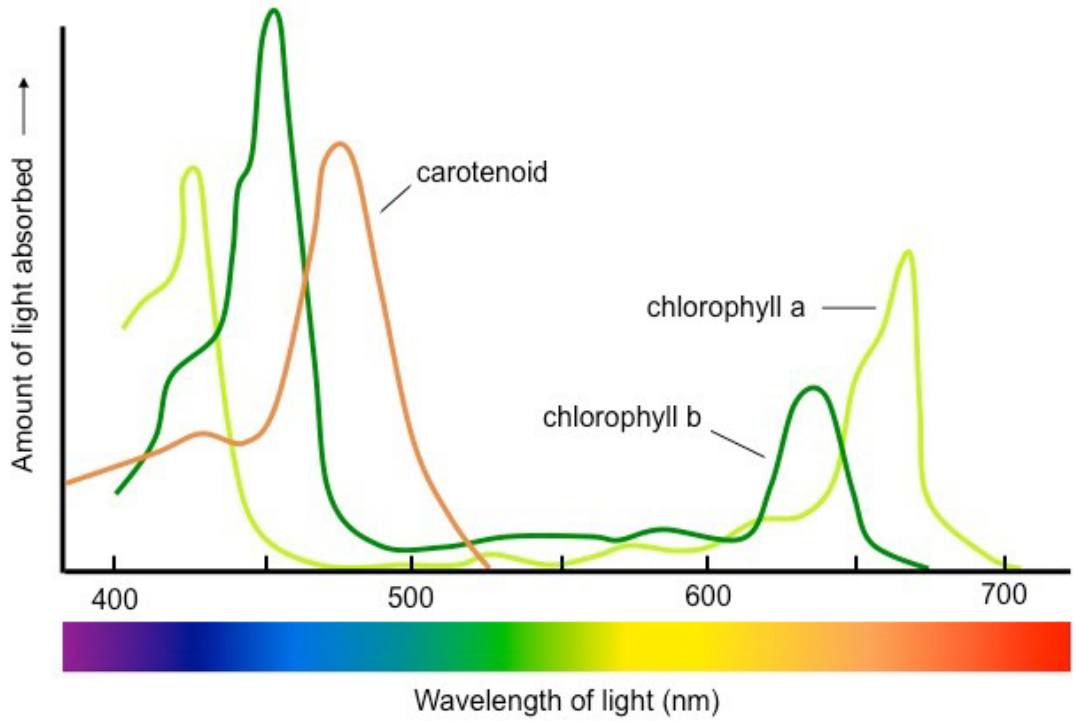

Figure 1. Absorption spectra of three key plant pigments: chlorophyll a, chlorophyll b, and carotenoids. From Cornell, 2016a.

This experiment uses a technique called **chromatography**, which allows us to reveal the different coloured pigments within a seemingly green leaf. Different pigments have different chemical properties; a plant pigment which is more chemically compatible (**soluble**) with our rubbing alcohol will travel further up the filter paper than a plant pigment which is less chemically compatible (**insoluble**).

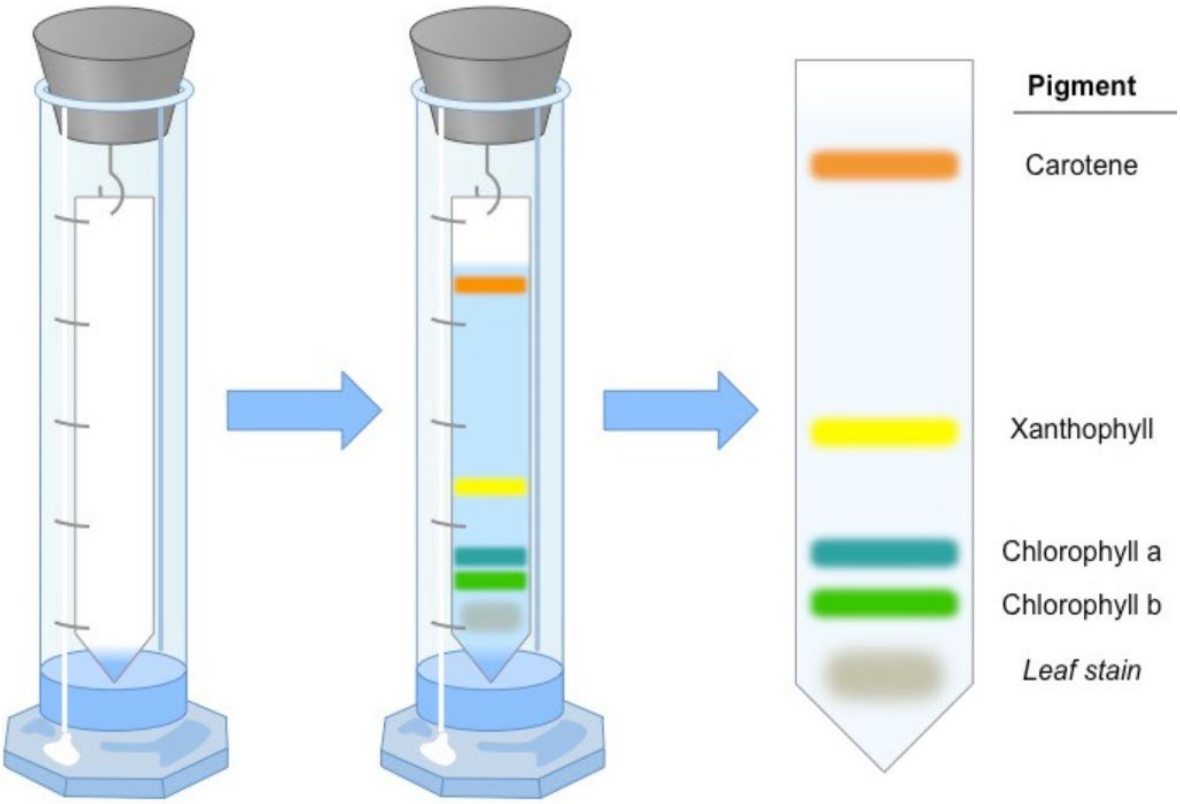

Figure 2. Chromatographic separation of various plant pigments. From Cornell, 2016b.

References

Cornell, B. 2016a. Photosynthesis – action spectrum. [ONLINE] Available at: https://ib.bioninja.com.au/standard-level/topic-2-molecular-biology/29-photosynthesis/action-spectrum.html [Accessed 06/07/2023]

Cornell, B. 2016b Photosythesis – chromatographs. [ONLINE] Available at: https://ib.bioninja.com.au/standard-level/topic-2-molecular-biology/29-photosynthesis/chromatographs.html [Accessed 06/07/2023]