

Pigments in a purple leaf

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Wandering jew (*Tradescantia pallida*) and purple oxalis (*Oxalis triangularis*) are grown in our garden for their purple leaves.



The purple leaves of wandering jew.

Wondering whether these leaves contain normal chloroplasts (with chlorophyll) for photosynthesis or whether purple dyes are involved, we decided to examine the leaf pigments by extracting them with isopropyl alcohol.

The anthocyanins that give the leaves their purple colour are soluble in water and ethyl alcohol. Other pigments, including any green chlorophylls, dissolve in isopropyl alcohol but not in water or ethanol.

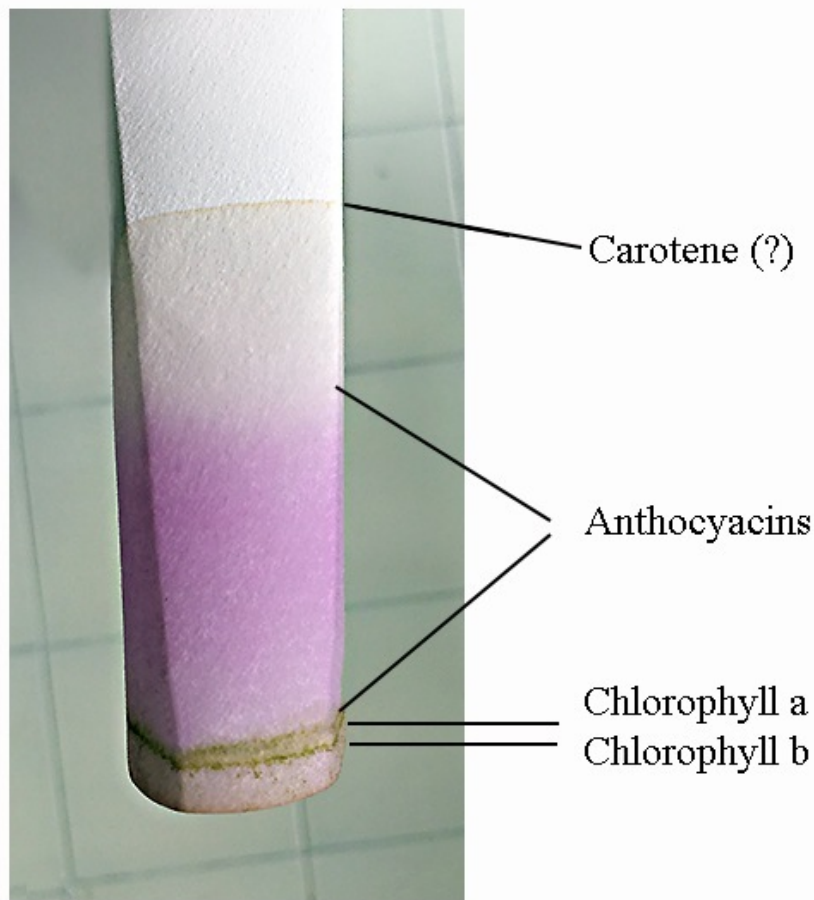


Alcohols are alkanes with one OH group. Ethanol has two carbon atoms and propanol has three. An image of a model we made of the isopropyl alcohol molecule, with the single OH group on the middle carbon, is superimposed on the half litre can we bought from LAZADA.

Method

Crushing a handful of the purple leaves with a wooden pestle in 5 mm of isopropyl alcohol in a beaker gave a muddy dark purple solution. A folded filter paper submerged a mm into this solution of alcohol and water produced the chromatogram shown below over 30 minutes.

The chromatogram showing the separation of pigments in the purple leaves of the wandering jew.



The orange line close to the solvent front is probably a carotene.

The chromatogram is dominated by a wide purple region indicating the presence of a range of anthocyanins.

The two green lines close to the bottom of the chromatogram are identified (by comparison with similar items on the web) as being due to large slower moving molecules of chlorophyll a and b.

The findings confirm observations found in many sites on the web that purple and red leaves contain chlorophylls that are responsible for photosynthesis. The normal green leaf colour is masked by the other pigments. There is apparently no evidence that anthocyanins and other leaf pigments are involved in photosynthesis (the production of sugars using the red and blue components of sunlight absorbed by chlorophylls).