Red Kaka Beak

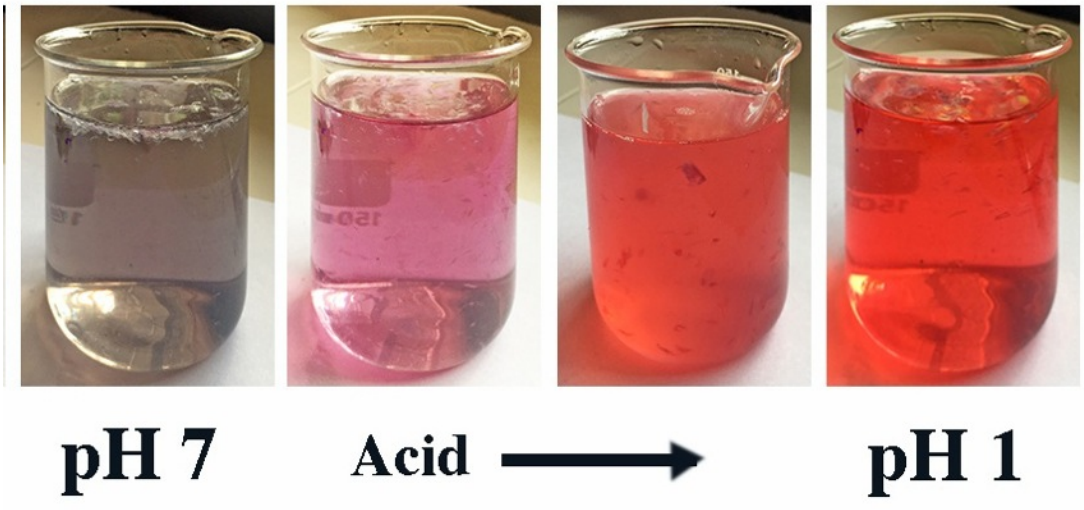
Shannon and Ian Jacobs

Clianthus puniceus is a cultivated shrub grown in gardens for its spectacular red flowers, which in Thailand are eaten as a vegetable.

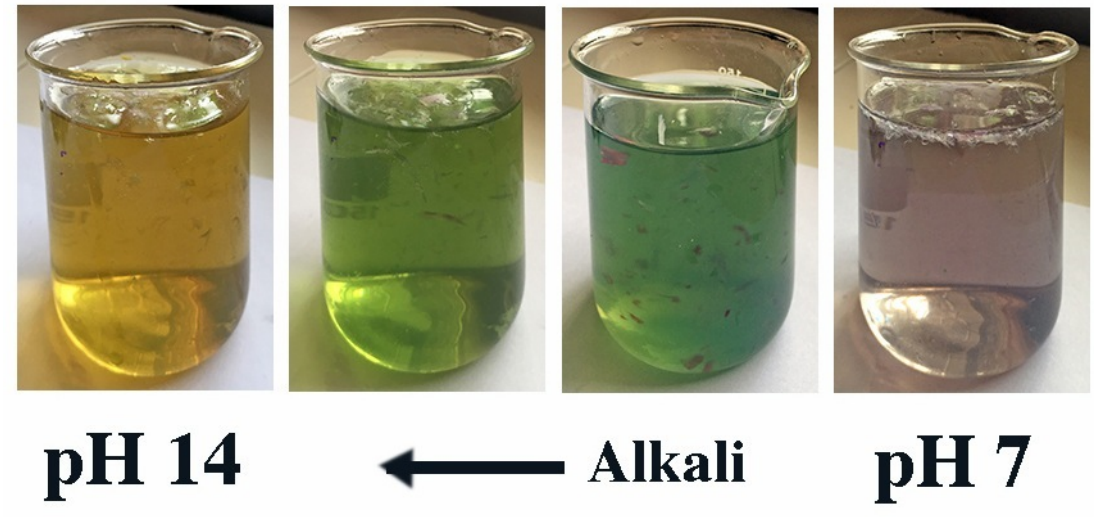
Anthocyacins can normally be extracted in hot water (we use a Chinese teapot) but in this case the boiling water remains clear as the colour disappears from the petals. The red dyes are not stable in hot water.

Dye extraction can be done by crushing the leaves in cold water, or better, in a mixture of water and isopropyl alcohol. The resulting solution appears purple when concentrated but fades to grey with dilution.

Adding a few drops of half molar hydrochloric acid from a dropper changes the colour from grey in water to mauve. As more acid is added the colour changes to a bright orange and to bright red with a pH close to 1.



Adding a strong alkali (sodium hydroxide) drop by drop to the red solution on the right neutralises the acid and returns the colour to grey.



Gradually adding more alkali gives a sequence of colours from olive green through bright green to a deep yellow at a pH close to 14.

This natural indicator is the closest thing we have found to a commercial universal indicator with three distinct colour changes in both the acid and alkali ranges. More work with a pH metre is required to make a colour chart matched to measured pH ranges and to establish the stability of the dye over time as dried petal powder, and when in alkaline solution.