

Try
This

Banana blues

As a banana ages, black spots appear on the ripening skin. Shine ultraviolet light on them and you will see an amazing blue, fluorescent ring around each black spot.

You will need

- a banana that is just ripe and beginning to get a few black spots on its skin
- an ultraviolet torch – I bought myself a cheap UV keyring torch



Bananas that look like this are perfect for this experiment; avoid bananas that are brown and mushy.

What you do

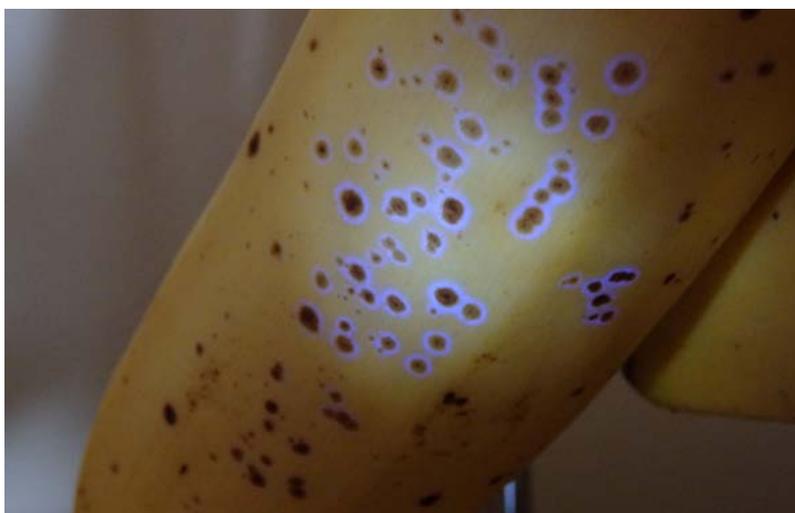
Place the banana in a darkened place (e.g. a cupboard or cardboard box). Shine your torch on the banana and observe the fluorescent ring around each spot. You may also notice that the yellow skin is giving off a less intense blue fluorescence too.

What's going on?

As a banana ripens, its skin changes colour from green to yellow. Research carried out in the last twenty years has shown that, during ripening, chlorophyll molecules in the skin of the unripe banana are broken down into smaller, colourless

molecules. With the loss of the green chlorophyll, the yellow pigments in the banana skin can be seen. In ultraviolet light, the small, colourless molecules produce the less intense blue fluorescence in the yellow banana skin.

The black spots that form on the skin of a banana as it ripens are the result of a process called apoptosis, or programmed cell death. These black spots begin to form around stomata in the banana skin and consist of dead cells. Scientists have discovered that it is the dying cells at the edge of each spot that emit the very intense blue fluorescence.



Fluorescing banana spots observed in a darkened room

Fluorescence and ultraviolet light

A UV torch emits light of wavelength between 380–420nm, at the boundary of the UV-A and visible spectrum. Light of this wavelength is not hazardous and these sorts of lights are often used to test banknotes. **Take care!** You must avoid looking directly at the UV LEDs when they are illuminated and must not shine their light directly into the eyes.

Fluorescent substances absorb light of one wavelength and re-emit the energy as light of a longer wavelength. UV is invisible to our eyes but the blue light emitted by the banana's spots has a wavelength in the visible part of the spectrum.

Gary Skinner is Biology editor of Catalyst.

Look here!

Read a scientific review of this topic, by Thomas Müller Bernhard Kräutler from the University of Innsbruck, Austria:
www.karger.com/Article/Pdf/321877