



## PLANTS CAN RE-EMIT LIGHT: VISUALIZING FLUORESCENCE

### List of Materials:

Plant with big leaves, blue flash light and red glasses.  
Total cost below 15 £.

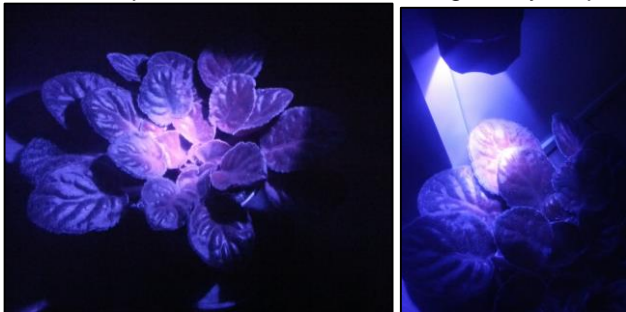


### Step 1:

Put your plant into a complete darkness for at least 20 minutes. As you know, plants can't photosynthesise in the absence of light, therefore when you'll finally shine a light on a dark adapted plant, you will get immediate response of chlorophyll.

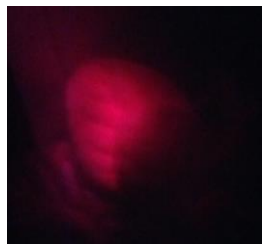
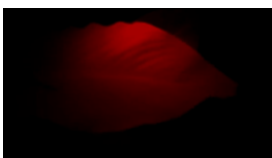
### Step 2:

Still in a complete darkness shine blue light on your plant.



### Step 3:

Put your red glasses on and observe red light re-emitted by chlorophylls.

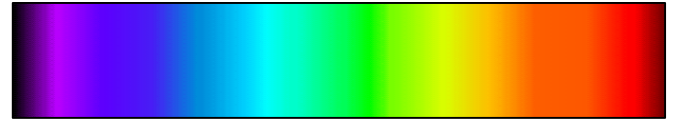


You can now put a sticker on a leaf to cover only small area and compare how plant adapt to light and darkness.

## How does it actually work?

Why we never see the fluorescence with the human eye?

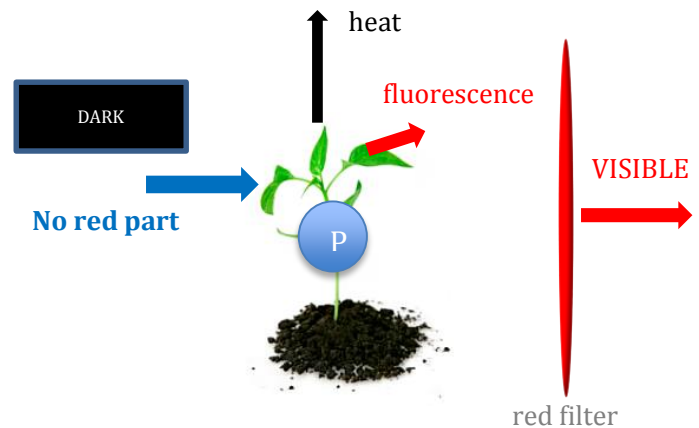
In their natural conditions plants are exposed to the sun light that consists out of all visible colours, as showed below.



Light energy is used by plant to do photosynthesis. But not all of the absorbed energy can be used for sugar production. When plant apparatus is busy in converting already absorbed light, some part of further absorbed energy has to be wasted. Plants can waist this surplus energy be either emitting heat or red light!

Unfortunately the red part of the sun light is stronger than the red signal emitted by plant. Therefore the tiny signal from plant is invisible to us under normal conditions.

That is why we use blue light instead of sun light to activate fluorescence. Blue light has no red part that would impose on the red light from plant. By putting plant into the darkness we block photosynthesis and therefore no heat or fluorescence will be emitted. With the blue light we excite plants chlorophylls and activate photosynthesis.



Red filter goggles block the activating blue light and allows ONLY the red light to pass and that's why we can see the fluorescence with human eye.

Thanks to Andreas Burkhart from the Forschungszentrum Jülich for method and inspiration