

Tonic Water in UV Light

{ 5th IYNT 2017
Indonesia



8. Tonic water in UV light

Tonic water glows brightly when exposed to an ultraviolet black light bulb. It is however easy to quench the glow of tonic water by adding salt.

Investigate this effect. What other common substances glow under UV light and how can one influence their glow?



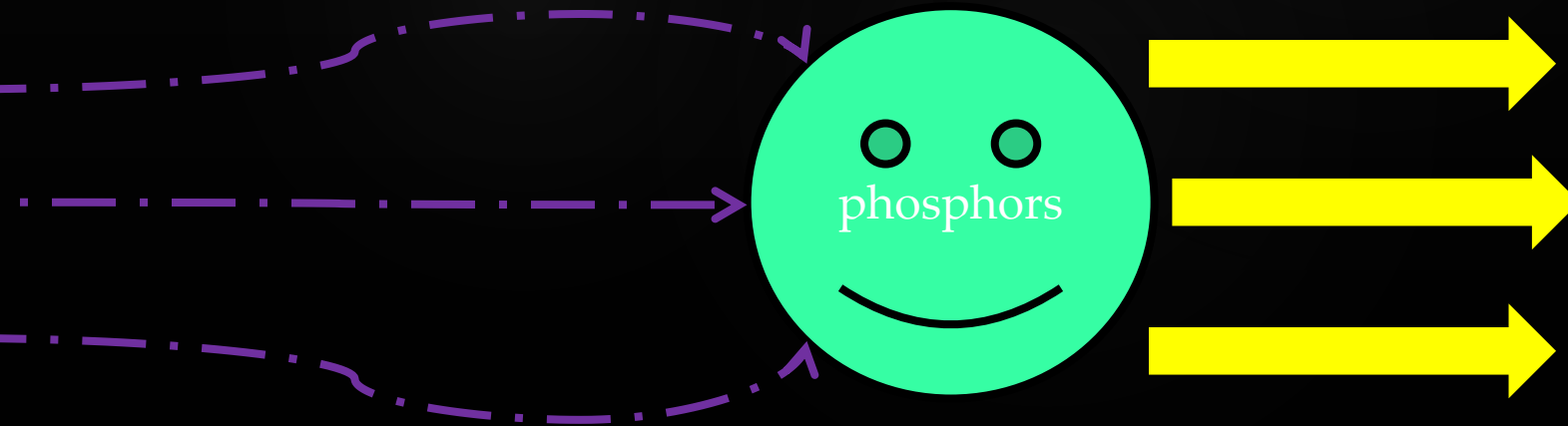
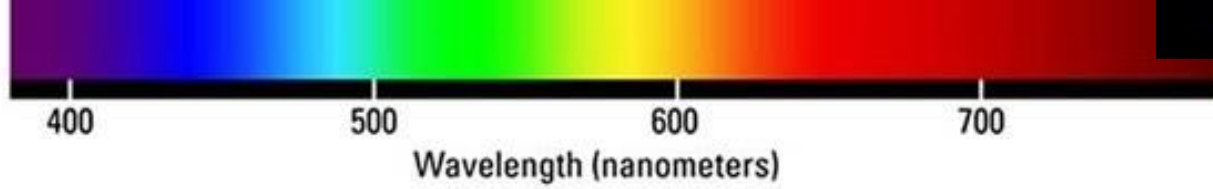
Problem



Quinine

- Makes tonic water bitter
- Glows in ultraviolet light
- Cures malaria

What is Tonic Water?



What is Ultraviolet Light?



Experiment

- Procedure: (VIDEO)

Experiment

No salt

1/2 tsp.



sp.

Results



& Hypothesis is incorrect

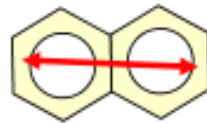
& Chloride ions quench the fluorescence of quinine very effectively

& 160 ml of tonic water, 1 ½ tsp of salt

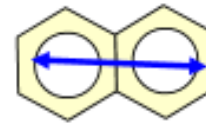
Conclusion

Collisional Quenching

Excited-state molecule returns to ground state via emission of a photon



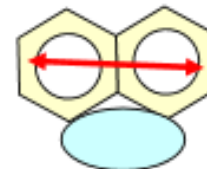
radiative.



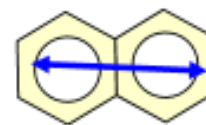
photon



Excited-state molecule collides with quencher molecule and returns to ground state non-radiatively.



non-radiative.



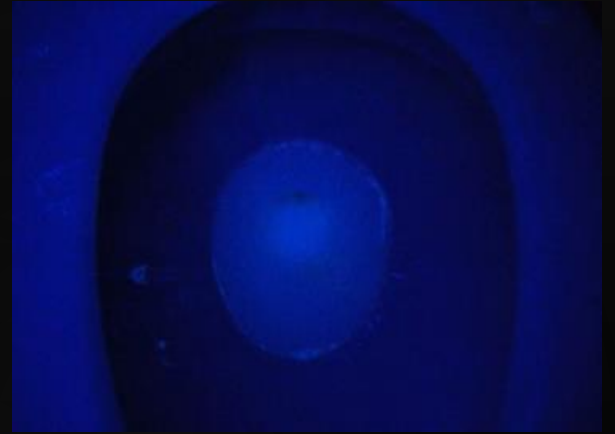
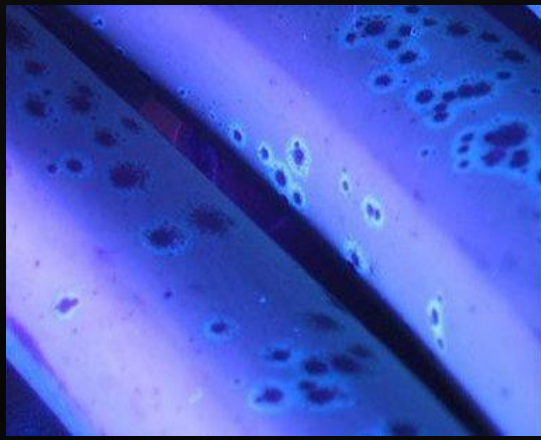
Collision with quencher



How salt effects tonic water

- **Find out:** Household objects that glow under UV light.
- **Variable tested:** Objects tested
- **Constant variables:** - Intensity of UV light
- Brightness of environment

Experiment II

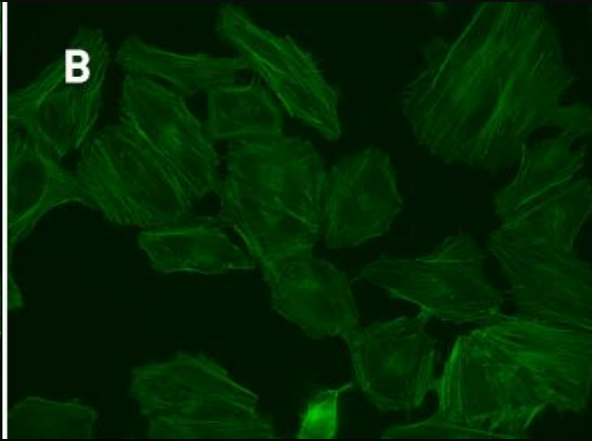
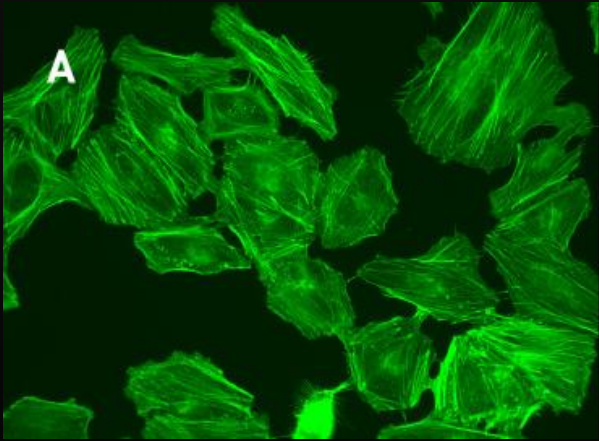


Experiment II

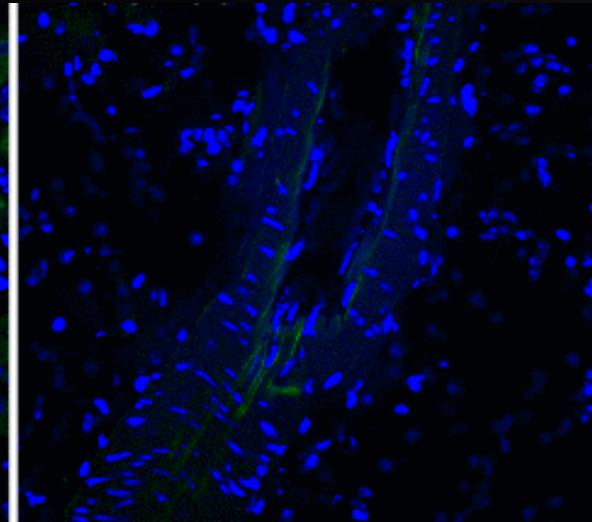
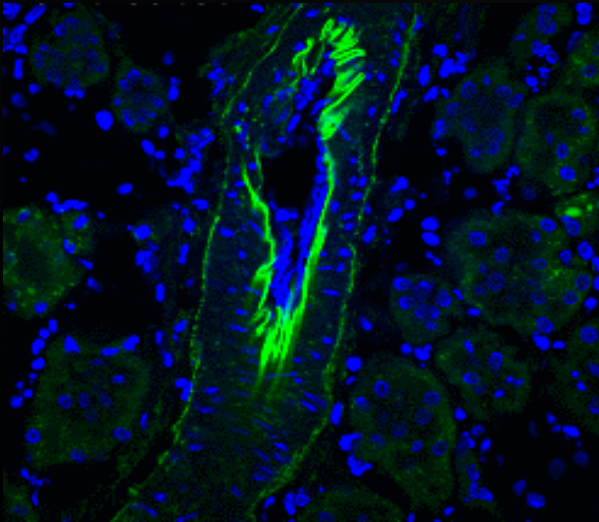
Normal ink/dye



Experiment II



Photobleaching



Reducing
Autofluorescence

- Picric Acid Fix
- Sudan Black Treatment
- Incubation

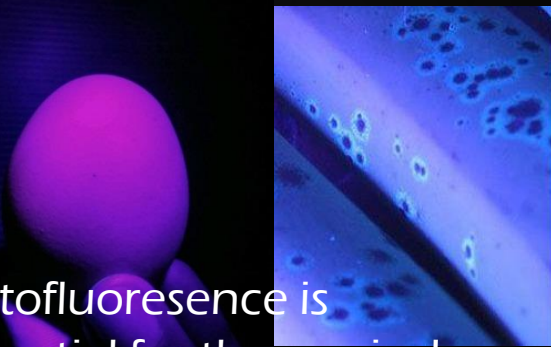
Influencing their glow



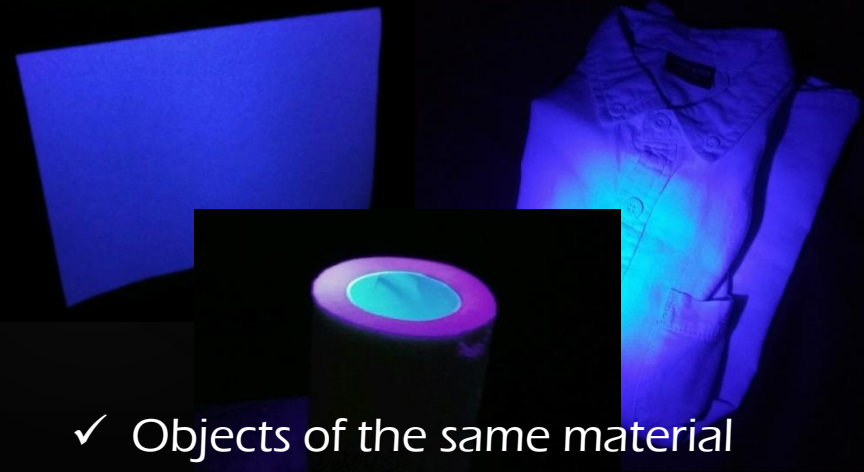
- ✓ Each object is capable of emitting light of different wavelengths under UV light



- ✓ Manmade fluorescence is able to emit the same light wavelength, in UV light or normal light



- ✓ Autofluorescence is essential for the survival of living things.



- ✓ Objects of the same material or colour does not always fluoresce because of the same reason.

Conclusion

- ⌘ “Introduction to Fluorescence” David M. Jameson
- ⌘ “Quinine Absorbance” Professor Mary J. W & Professor Thomas P. B. Jr.
- ⌘ “What is Tonic Water?” The Boston Globe, John Swain
- ⌘ “UV Radiation & Light” Gamproducts, Inc, Josef Susser
- ⌘ “The Science Behind UV: Understanding Black Light” Wildfire, Inc
- ⌘ “Autofluorescence: Causes & Cures” Wright Cell Imaging Facility

Sources

Thank You

