

## DIY FLUORESCENCE PART 3: DIY ULTRAVIOLET LIGHT EPI-FLUORESCENCE MICROSCOPE.

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### Introduction:

Fluorescence is a concept that most of the time attracts our attention because of its beauty regarding a fluorescent subject that emits light against a darker background when light of the appropriate wavelength is shone on it.

I have presented two previous articles about this amazing topic. In the [first one](#) I took advantage of the capability of a camera with its software to produce digital negatives and the usefulness of the program to edit digital negative pictures too. In the [second article](#), I used variations in the white balance menu of the camera and the program *Microsoft Picture Manager* to produce the effect, but in both cases they were just optical tricks.

This time with the help of a black light lamp, I created fluorescence out of subjects that do not seem to emit light but that do emit light. See below.

### Development:

ULTRAVIOLET LIGHT is a kind of electromagnetic radiation whose wavelength oscillates between 400 and 10 nanometers but is mostly invisible to the naked human eye. Nevertheless some devices such as Wood's lamps and the so-called "black light" lamps can emit UV radiation a little longer than the 400 nm so that it can be visible to the naked eye.

"Black light" lamps are a popular instrument used in many applications for their ability of making some substances and objects glow - principally in discotheques, restaurants, dancing halls and expositions where, for the latter, it is intended to show artworks painted with inks that glow under a black light lamp.

While looking for a method of doing fluorescence with my microscope, I found that by covering any source of light with several layers of, for example, transparent tape stained with purple and blue inks it emitted a bluish light that when directed in a dark room onto some objects, they glowed. Nevertheless it was to some extent limited in effect, so I thought of improving a little the technique by using a black light lamp that are used for checking money bills; and the results were much, much better because there are many more objects that when you turn on a black lamp, do glow.

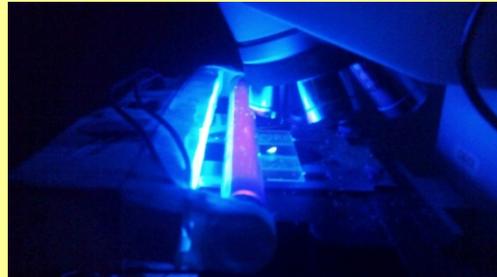
I then thought of taking small samples of those objects and putting them under the objectives of my microscope. Then turning on my black lamp near the objective and seeing if it was possible to illuminate a subject and to observe their own glow under UV light; the same as in the real ultraviolet microscope that obviously uses a shorter wavelength but with the same principle. But this time no software trick was going to be employed, this time the sample had to glow by itself, and I did achieve it.

I found two different black lamps, one in the form of a pipe and one in the form of a spiral. It is true that they are too large but by placing them close enough to the objective, they do produce fluorescence of suitable subjects. Here are the two lamps.



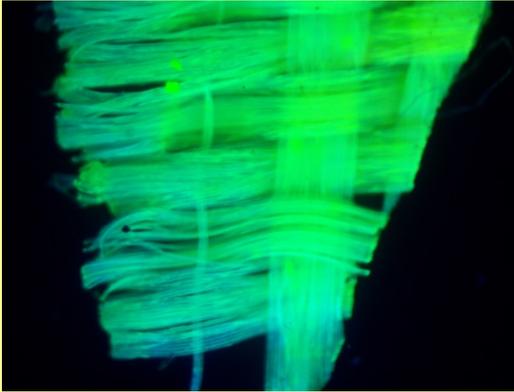
I am going to show different sample's fluorescence under either one or the other because I found no difference in the effect.

Here is how I placed them upon the microscope.

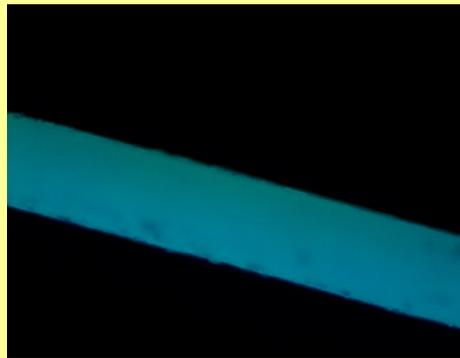


Typical results are shown on the following pages.

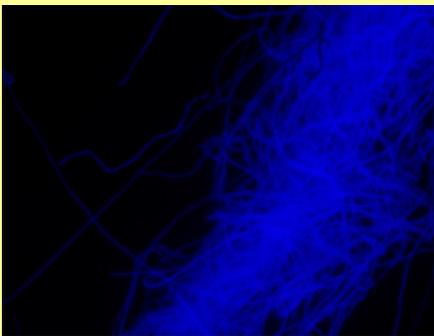
**Results:**



Artificial flower 4x



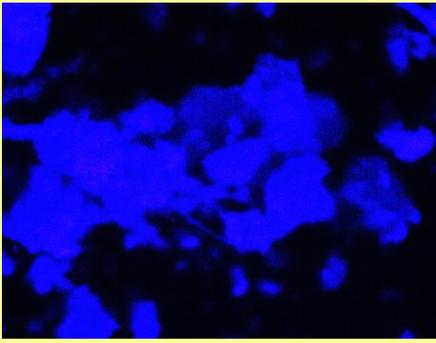
Toothbrush bristle 10x



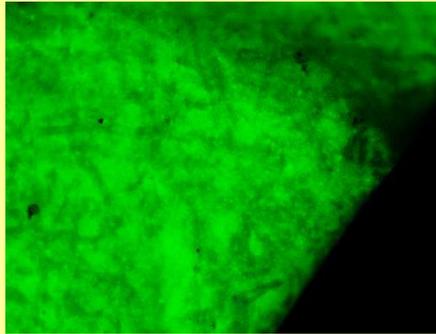
Mop cloth fibers 4x



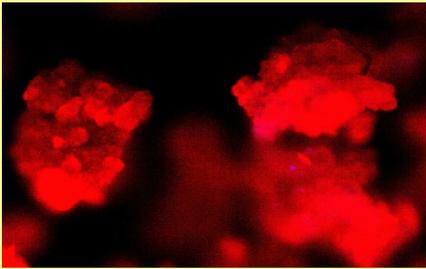
Ribbon as used to adorn a present 4x



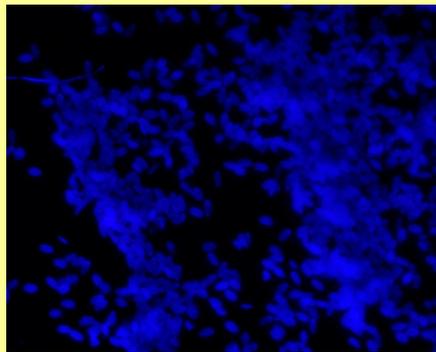
Crystals of the sediment of the toilet bowl 10x



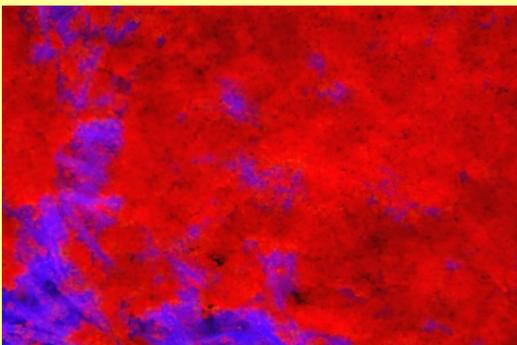
Green fluorescent cardboard 10x



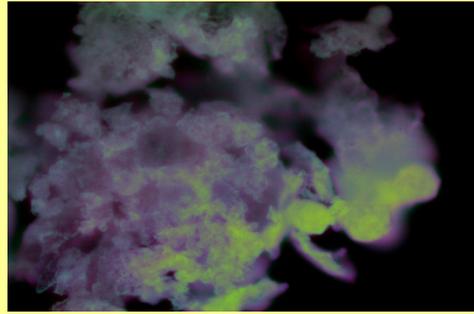
Red vegetable stain 10x



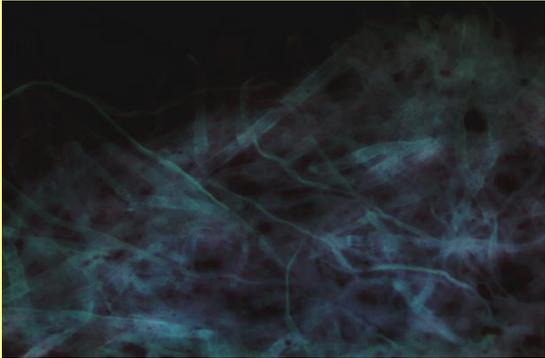
Pollen of *Spathiphyllum wallisii* 10x



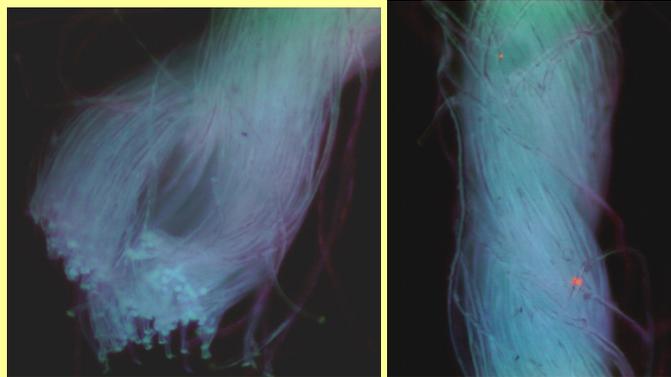
Price label 10x



Detergent 10x



Fibers of a napkin 10x



Polyester thread 10x

**Conclusion:**

As it can be appreciated there are a lot of things that can glow under “black light” in this way and obtaining a kind of epi-fluorescence, try it, it is a great experience.

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(Above in anti-spam format. Copy string to email software, remove spaces and manually insert the capitalised characters.)

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