FLUORESCENCE ANALYSIS OF LEAF AND ROOT POWDERS OF *FURCRAEA FOETIDA* (L.) HAW.

[1]R. SITRARASI and [2]M. RAZIA
[1]Research Scholar, [2]Assistant Professor
[1,2]Department of Biotechnology,
[1,2]Mother Teresa Women's University, Kodaikanal, India.

Abstract: The present study deals with the analysis of leaf and root powders of *Furcraea foetida* (L.) Haw. under daylight and ultra violet radiation(254 and 365nm). The root and leaf powders were treated with different chemical reagents and their fluorescence patterns were analysed after overnight incubation. Under daylight the leaf mostly showed various shades of green and brown while the root showed different shades of red. The colours and the characteristic fluorescent properties of various extracts of leaves and roots of *Furcraea foetida* recorded in this study helps in preliminary identification of potential phytocompounds as many are fluorescent in nature. It could also be used as a standard in the identification and authentication of its crude form.

Keywords: *Furcraea foetida*, Fluorescence, Ultra-violet radiation.

1. Introduction

Furcraea foetida (L.) Haw. belongs to the family Asparagaceae and sub-family Agavoideae [1]. It is commonly known as Mauritius hemp, giant cabuaya, and green-aloe. This plant is cultivated in many countries for fibre extraction. Many cultivars are also used as ornamental plants around the world. It has been naturalised in India. *F. foetida* is of medicinal value and is used for its anti-tumor and anti-inflammatory properties [2].

Fluorescence is a form of luminescence where a substance emits light after absorption of light or other electromagnetic radiations. Most substances emit light of lower energy and longer wavelength compared to that of the absorbed radiation. When the absorbed radiation is invisible to the human eye (i.e ultraviolet region of the spectrum), the emitted light is in the visible region. This gives the fluorescent substance a distinct colour that can only be seen when exposed to UV light. Fluorescence analysis is an important pharmacognostic procedure used in the authentication of the samples and identification of adulteration [3].This analysis process is well known for its simplicity and rapidity thus making it a valuable analytical tool for identification of crude drugs made of plant samples [4].

2. Materials and methods

The plant *F. foetida* was collected from Kodaikanal, Tamil Nadu. The plants were washed in tap water thrice and then rinsed with distilled water. The leaves and roots of the plant were separated, chopped into small pieces, dried and powdered.

The coarsely powdered dried leaves and roots were initially studied under day light and also under two different wavelengths of ultraviolet radiation (254 and 365nm). 1 g of the plant powders were taken in a test tube and 10ml of various reagents were added- solvents, bases and acids. The contents of the tube were gently mixed by tapping and incubated overnight. They were filtered and the resultant filtrate was observed under daylight and UV light for their characteristic fluorescent properties [5].

3. Results and discussion

The characteristic fluorescent properties or colours emitted by the leaf and root powders of *F. foetida* before and after treating with various reagents were observed and recorded.

The powdered leaf appeared light green under daylight and green under ultraviolet radiation. After treating with various reagents, under daylight, it showed different shades of green and brown. Under UV light similar results were found except ethyl acetate, acetone and chloroform extracts which showed various shades of orange under different wavelengths of UV radiation (Table 1).

The root powder appeared red under daylight and very dark brown under ultraviolet radiation. After treating with various reagents, under daylight, it showed different shades of red, brown and black except the hexane and petroleum ether extracts, which emitted no colour as (Table 2). However, under ultraviolet radiation, it emitted different shades of blue and green when treated with distilled water and 1N solutions of aqueous NaOH, alcoholic NaOH and HCl.

Table 1 Fluorescence properties emitted by the powdered leaves of *Furcraea foetida* under day light and under ultra-violet radiation

S.No	Tests	Visible/Daylight	UV light (254nm)	UV light (365nm)
1.	Powder as such	Light green	Green	Green
2.	Powder + Distilled water	Light brown	Light green	Light green
3.	Powder + Hexane	Light green	Orange	Fluorescent orange
4.	Powder + Chloroform	Brownish green	Orange	Fluorescent orange
5.	Powder + Methanol	Brownish green	Green	Green
6.	Powder + Acetone	Green	Orange	Fluorescent orange
7.	Powder + Ethanol	Green	Green	Green
8.	Powder + Petroleum Ether	Light green	Orange	Fluorescent orange
9.	Powder + Ethyl Acetate	Green	Orange	Fluorescent orange
10.	Powder + 1N aqueous NaOH	Brown	Brownish green	Brownish green
11.	Powder + 1N alcoholic NaOH	Light green	Fluorescent light green	Fluorescent light green
12.	Powder + 1N HCl	Light brown	Light green	Fluorescent light green
13.	Powder + 100% Sulphuric acid	Black	Brown	Brown
14.	Powder + 50% Sulphuric acid	Black	Black	Black
15.	Powder + Acetic acid	Light brown	Brownish green	Brownish green

Table 2 Fluorescence properties emitted by the powdered roots of *Furcraea foetida* under day light and under ultra-violet radiation

S.No	Tests	Visible/Daylight	UV light (254nm)	UV light (365nm)
1.	Powder as such	Dark red	Black	Brown
2.	Powder + Distilled water	Brown	Light green	Fluorescent light green
3.	Powder + Hexane	Colourless	Colourless	Colourless
4.	Powder + Chloroform	Very light pink	White	White
5.	Powder + Methanol	Red	Dark brown	Brown
6.	Powder + Acetone	Red	Brown	Pink
7.	Powder + Ethanol	Red	Pink	Light red
8.	Powder + Petroleum Ether	Colourless	Colourless	Colourless
9.	Powder + Ethyl Acetate	Pink	Fluorescent blue	Fluorescent blue
10.	Powder + 1N aqueous NaOH	Dark red	Dark green	Dark green
11.	Powder + 1N alcoholic NaOH	Light brown	Light green	Light green
12.	Powder + 1N HCl	Light brown	Light green	Light green
13.	Powder + 100% Sulphuric acid	Black	Black	Black
14.	Powder + 50% Sulphuric acid	Black	Black	Black
15.	Powder + Acetic acid	Red	Dark red	Red

Many natural products like alkaloids exhibit fluorescence under UV light. It is an important parameter of pharmacognostical evaluation as it can be often used to assess some crude drugs qualitatively. The usage of chemical reagents may convert some of the substances that are not fluorescent in nature into fluorescent derivatives [6,7].

4. Conclusion

The colours and the characteristic fluorescent properties of various extracts of leaves and roots of *Furcraea foetida* recorded in this study (Table 1 and 2) could be used as a standard in the identification and authentication of its crude form. It can also be used to detect adulteration in samples.

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