

## **Fluorescence Analysis on the Roots of Rauvolfia Serpentina (L.) Benth. Ex Kurz Under UV Radiation.**

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### **ABSTRACT:**

The present study deals with an analysis of the roots of Rauvolfia serpentina (L.) Benth. Ex Kurz under ultraviolet radiation and also under daylight. The coarsely powdered roots were treated with various chemical reagents and the characteristic fluorescence patterns emitted were recorded and are reported in this paper. This study was undertaken as a pharmacognostic standardization to ascertain the authenticity of the roots of this plant in its crude form and also to check any adulteration that may be used in trade.

### **INDRODUCTION**

The Plant R. Serpentina (L.) Benth. Ex Kurz is an erect evergreen perennial undershrub with tuberous root, belonging to the family apocynaceae. In India, the medicinal values of the roots of this plant have been known even in early days and have been used in the Ayurvedic system of medicine under the trade name 'Sarpagandha'.

The root is bitter, acrid, heating sharp, Pungent and antihelmintic; balances 'tridosha', cures ulcers, the poisonous effects of scorpion-sting and snake-bite. The decoction of the root is employed in labours to increase uterine contractions (Kirtikar & Basu, 1984).

The importance of this drug plant was made known to the world only after isolating a major alkaloid 'reserpine' from its roots which has been recognized in the allopathic system of medicine in the treatment of hypertension and as a sedative or tranquillising agent. (Anonymous, 1969).

An increasing demand for the roots of R. Serpentina has resulted in an indiscriminate exploitation of this plant in the wild. In order to save this rare plant species from becoming extinct in the wild, the government of India has recently placed this plant under Negative list of Exports to regulate its legal trade and to ban its illegal trade.

The vegetable drugs are normally treaded in their crude form where the adulteration is highly feasible. To get the desired therapeutic effects, the crude drugs that are sold in the market should be genuine and free from any adulterants. Therefore, a critical pharmacognostic evaluation is essential to assess the genuineness of the crude drugs and to check the adulterants.

Fluorescence analysis is one of the Pharmacognostic procedures useful in the identification of authentic samples and recognizing adulterants (Tyler et al., 1976).

In the fluorescence analysis, the plant parts or crude drugs may be examined as such, or in their powdered form or in solution or as extracts. Although, in most of the cases the actual substances responsible for the fluorescence properties has not been identified, the merits of simplicity and rapidity of the process makes it a valuable analytical tool in the identification of plant samples and crude drugs (Denston, 1946)

Gupta (1956) has examined different species of Rauvolfia microscopically including the root barks of R. Serpentina treated with phloroglucinal and HCl under ultraviolet light. He has found the results satisfactory under ultraviolet light in distinguishing the different species of Rauvolfia.

The Present study deals with a detailed analysis of the coarsely powdered roots of R. serpentine under ultraviolet radiation and also under day light which would be an useful aid to confirm authenticity and to check adulterants in crude form.

## **MATERIALS AND METHODS**

The coarsely powdered dried roots of R. serpentine were studied initially under day light and also under ultraviolet radiation. Later, about 1 gm of the root powder was treated with 10ml of various reagents such as solvents like water, hexane, chloroform, methanol and acetone; alkaline solutions like aqueous and alcoholic 1 Nhydrochloric acid, 50% sulphuric acid and 50% nitric acid and left over night. The next day, the residue was removed and the filtered solution was examined initially under daylight and then under ultraviolet radiation in a dark room for their characteristic fluorescent properties. The Ultraviolet lamp with transmitting radiation in the range of 3600 to 4200 Angstrom units was used in

this study. Standard pharmacognostic books were referred and the methodology employed by Kokoski et al. (1958) and also by the senior author in his thesis (Selvam, 1994) in particular was followed with some modifications.

## **RESULTS AND DISCUSSION**

The characteristic fluorescent properties or colours emitted by the powdered roots of R. serpentine before and after treating with various reagents were recorded and are presented in the Table-1.

The powdered roots as such appeared very pale brown under daylight and very pale green under ultraviolet radiation. After treating with various reagents, under daylight, it showed different shades of green and brown except the hexane and chloroform extracts, which emitted no colour and light cream colour respectively as described in table-1. However, under ultraviolet radiation, it emitted different shades of sky blue except hexane extract, alkaline solutions like 1N aqueous and alcoholic sodium hydroxide and acids like 50% sulphuric acid and 50% Nitric acid, with fluoresced aqua green, greenish brown and light brown colours respectively.

## **CONCLUSION**

The characteristic fluorescent properties or colours recorded through this study (Table – 1) could be used as a standard in the identification and authentication of the roots of R. serpentine in its crude form. Further, the contents of this table could also be used as an aid to check adulteration, where the adulterated samples would show variation or difference in the emission of colours when compared with the genuine samples.

**Table -1**

**Fluorescence properties emitted by the powdered roots of Rauvolfia serpentina under day light and under ultra-violet radiation**

<b>S.No</b>	<b>Tests</b>	<b>Colour observed under day light</b>	<b>Colour observed under UV radiation</b>
1	Drug powder	Very pale brown	Very pale green
2	Drug powder treated with distilled water	Very light green	Light sky blue
3	Drug powder Treated with hexane	Colourless	Aqua green
4	Drug powder Treated with chloroform	Light cream	Greenish sky blue
5	Drug powder Treated with methanol	Light yellowish green	Greenish sky blue
6	Drug powder Treated with acetone	Very light green	sky blue
7	Drug powder Treated with 1N sodium hydroxide in water	Light brown	Greenish brown
8	Drug powder Treated with 1 N sodium hydroxide in methanol	Light brown	Greenish brown
9	Drug powder Treated with 1N hydrochloric acid	Light yellowish green	sky blue
10	Drug powder Treated with sulphuric acid diluted with an equal volume of water	Light yellowish brown	Light brown
11	Drug powder Treated with nitric acid diluted with an equal volume of water	Light yellowish brown	Light brown

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