WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 11, Issue 3, 1359-1366. Research Article ISSN 2277– 7105

FLUORESCENCE ANALYSIS OF *Ricinus communis* LEAF: AN IMPORTANT ETHNOMEDICINAL PLANT

Ankit Yadav[a]*, Sheeza Charania[a], Shubham Melekar[a], Hatvi Jain[a], Priya Kalaskar[a] and Surabhi Sawant[b]

[a]Department of Botany, Chikitsak Samuha's S.S. & L.S. Patkar – Varde College (Autonomous), S.V. Road, Goregaon- (West), Mumbai – 400062, Maharashtra, India.

[b]Department of Botany, Hindi Vidya Prachar Samiti's Ramniranjan Jhunjhunwala College of Arts, Science & Commerce (Autonomous), Opposite Ghatkopar- Railway Station, Ghatkopar- West, Mumbai 400086, Maharashtra, India.

Article Received on
06 January 2022,

Revised on 26 January 2022,
Accepted on 16 Feb. 2022

DOI: 10.20959/wjpr20223-23153

***Corresponding Author**
Ankit Yadav
Department of Botany, Chikitsak Samuha's S.S. & L.S. Patkar – Varde College, S.V. Road, Goregaon- (West), Mumbai – 400062, Maharashtra, India.

ABSTRACT

Medicinal plants have an important part in maintaining human health. Euphorbiaceae is a big family with about 300 genera and 7,500 species. They are, in general, flowering plants. *Ricinus communis*, also known as castor oil, has a high traditional and therapeutic value for maintaining a disease-free, healthy lifestyle. Traditionally, the plant has been used as a laxative, purgative, cleanser, and fungicide, among other things. Antioxidant, antihistamic, antinociceptive, antiasthmatic, antiulcer, immunomodulatory, antidiabetic, hepatoprotective, and other beneficial effects. Antifertility, anti-inflammatory, antibacterial, CNS stimulant, lipolytic, wound healing, insecticidal, Larvicidal, and a variety of other properties of medicinal qualities. This action of the plant possesses due to the essential phytochemical elements such flavonoids, saponins, glycosides, alkaloids and steroids etc. However, the majority of the compounds have not been properly investigated in the hopes of discovering a novel lead molecule or pharmacophore. The aim of this paper is to study bioactive compounds which can be further explored as a source of beneficial phytochemical substances in the near future, and may play an essential role in modern medicine.

KEYWORDS: Euphorbiaceae, *Ricinus communis*, Fluorescence analysis, Bioactive compound.

1 INTRODUCTION

It is true that plants posses many medicinal properties, without which our life wouldn't be same. In traditional medicine, there are many crude drugs which have potential to treat various diseases. One of such plant is *Ricinus communis,* belonging to family Euphorbiaceae, commonly known as 'castor plant'. This plant is commonly cultivated for extraction of color and oil from leaf and seed. The castor oil extracted from seed of the plant is extensively used in ayurvedic medicine. After extraction of oil from seed, it is gone under processing to eliminate toxins after which it is given to animal feeds.

The leaves are used to treat skin conditions, kidney infections, and urinary bladder infections.[21] Further, it also contains many toxin organic substance which are consider secondary metabolites namely alkaloids, steroids, tannins, phenol compounds, flavonoids resins, fatty acids, and gums are all substances that might have a physiological effect on the body.[22] *Ricinus communis* is a source of numerous potent and powerful medicines that are used medicinally in many countries.[23-26] It is easy to cultivate for commercial purpose as it is fast growing shrub or soft tree that grows 6 meter or more but usually has a soft wood.

This plant is common and found in forests in India Also, it is cultivated commercially throughout India. The dried leaves of the plant showed the presence of two alkaloids- ricinine (0.55%) and N-demethylricinine (0.016%) and six flavones glycosides- kaempferol-3-O-β-D-xylopyranoside, kaempferol-3-O-β-D-glucopyranoside, quercetin-3-O- β-D-xylopyranoside, quercetine-3-O-ß- glucopyranoside, kaempferol-3-O-β-rutinoside and quercetin-3-O-β-rutinoside.[15] The monoterpenoids (1, 8- cineole, camphor and α-pinene) and a sesquiterpenoid (β-caryophyllene), gallic acid, quercetin, gentisic acid, rutin, epicatechin and elingic acid are major phenolic compound isolated from leaves. Indole-3- acetic acid has been extracted from the roots. The seeds contain 45% of fixed oil, which consists glycosides of ricinoleic acid, isoricinoleic, stearic and dihydroxystearic acids and also lipases and a crystalline alkaloid, ricinine.[16-17] The presence of many phytochemical constituents suggests that the plant has a good capacity for the development of new drugs in near future.

2 MATERIAL AND METHOD

In the present study, dry leaf powder of plant was used. The weed plant is *Ricinus communis.* Fluorescent analysis of the powder was carried out according to Vaidya, 2016.

2.1.1 Collection of plant samples

The fresh sample of *Ricinus communis* was collected from railway track Borivali-(W), Mumbai, Maharashtra, India.

2.1.2 Preparation of leaf powder

The leaf of the weed plant taken for the present study were collected, cleaned and oven dried at 40°C for seven days(Vaidya, 2016). After drying, the samples were then blended using a household electric blender. This fine powder was analysed for the fluorescent characters (Plate 1).

Plate 1: Leaf powder of *Ricinus communis.*

2.1.3 Fluorescence analysis

The behaviour of the sample with different chemical reagents and fluorescence characters of *Ricinus communis* were observed under ordinary and long ultra violet light at 245nm.

3 RESULTS AND DISCUSSION

The experiments conducted in *Ricinus communis* for analysis of fluorescent characters showed the following results.

3.1 Fluorescence analysis: The leaf powder of the plant samples was extracted in Acetone, Acetic acid, 50% KOH, 5% $Fecl_3$, Conc.H_2SO_4, Conc. HCL, Toluene, Iodine solution, Hexane, Chloroform, Ammonia and Distilled water. The fluorescence analysis of these leaf extracts was observed under ordinary visible light and also under UV light (245nm) and recorded in Tables 1. The fluorescence analysis of leaf powder of *Ricinus communis*.

showed green colour under UV light when treated with acetic acid, $FeCl_3$ and water, as well as, when the powder is used as such. Pale green colour was observed under visible light when the leaf powder was treated with FeCl3 and water, as well as, the powder without any chemical treatment. Dark green colour was observed in picric acid and NaOH under UV light. The leaf powder showed brown colour under UV light in HNO3 treatment. Various colours like pale yellow, orange, light green and dark brown were also observed under different light conditions (Table 1).

Table 1: Fluorescence analysis of *Ricinus communis* leaf powder.

Sr. no.	Leaf powder + Chemical reagent	Visible light	UV light
1.	Acetone	Dark green	Fluorescence pink
2.	Acetic acid	Dark green	Fluorescence pink
3.	50% KOH	Dark green	Brown
4.	Conc.H_2SO_4	Dark green	Dark brown
5.	Toulene	Dark green	Fluorescence pink
6.	Iodine solution	Yellowish green	Dark blue
7.	Hexane	Light green	Fluorescence pink
8.	Chloroform	Dirty green	Fluorescence pink
9.	Ammonia	Pale green	Fluorescence sky blue
10.	Distilled water	Pale yellow	Fluorescence sky blue
11.	5% $Fecl_3$	Brown	Purple
12.	Conc. HCL	Light yellow	Light yellow

The findings demonstrated that the plants investigated contained medicinally essential components. Many previous investigations had acquired evidence that the phytochemicals were bioactive. Several studies have demonstrated that these phytochemicals contribute pharmacological and physiological qualities to the plants researched in the treatment of various illnesses. Certain natural materials that do not glow in daylight exhibit fluorescence when exposed to ultraviolet radiation. Although some chemicals are not luminous, they can be transformed into fluorescent derivatives using various chemical reagents, allowing us to analyse the quality of some crude drugs using fluorescence, which is the most significant characteristic in pharmacognostical evaluation.[8,18-20]

As a result, weed plants could be considered a promising source of therapeutics. Further effort should be done to separate, purify, and characterize the active ingredients responsible for the activity of these plants, as well as further work to isolate, purify, and describe the active compounds responsible for the activity of these plants. In addition, more research into the putative mechanisms of action of these plants is required.

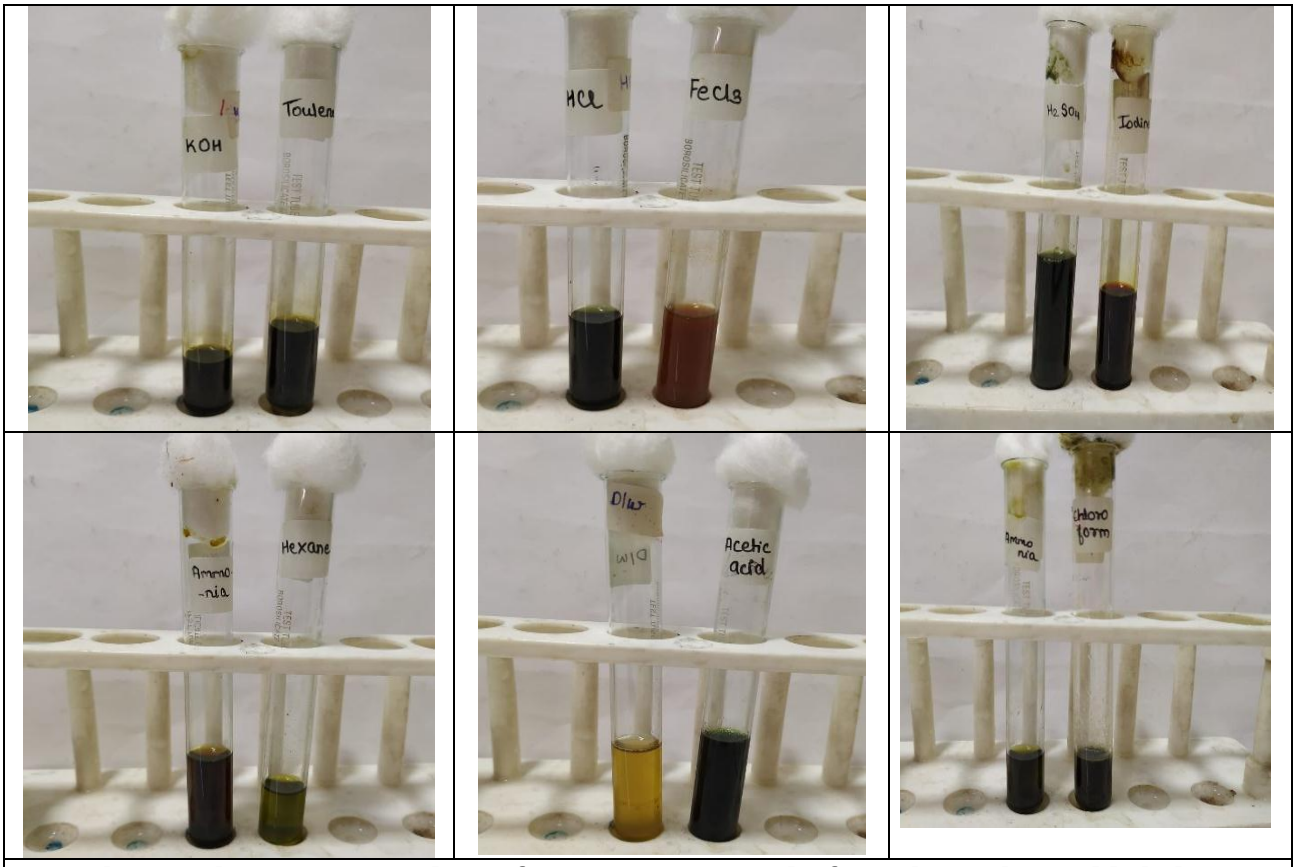

Plate 2: Fluorescence analysis of *Ricinus communis* leaf powder under visible light.

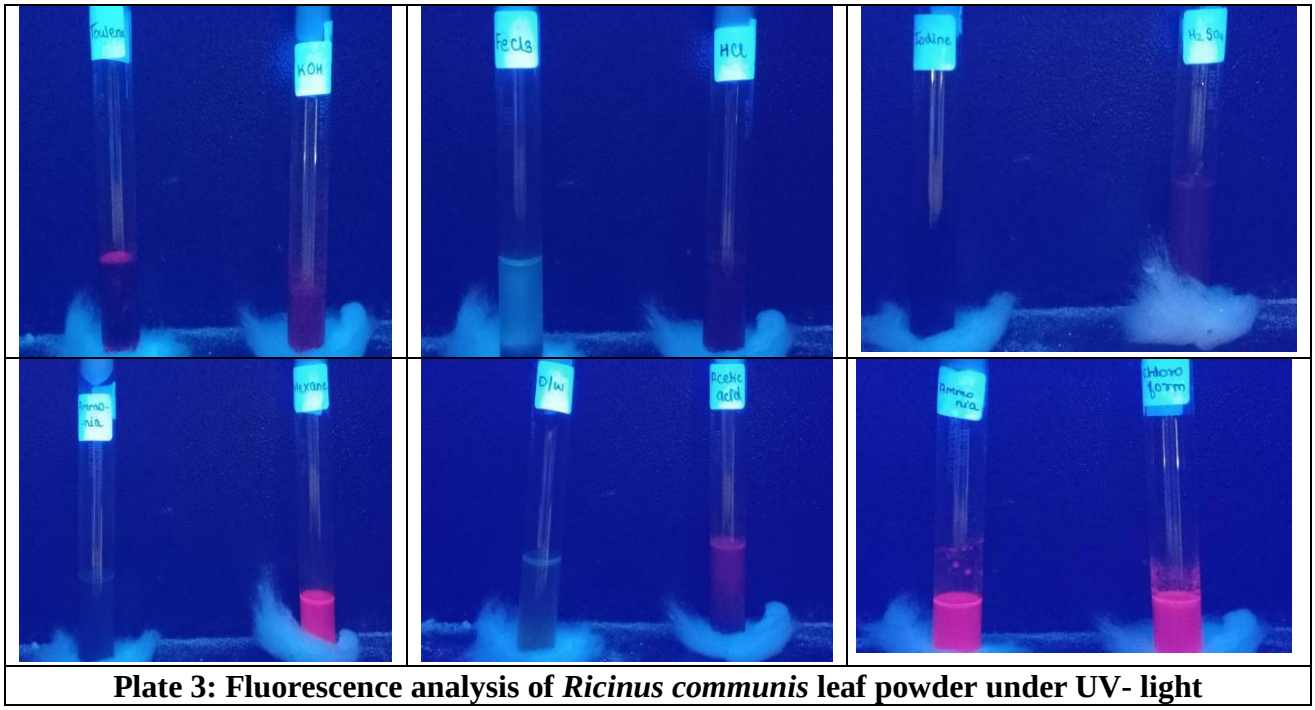

Plate 3: Fluorescence analysis of *Ricinus communis* leaf powder under UV- light

4 CONCLUSION

World Health Organisation (WHO) has addressed its need to ensure quality checks of the materials used in identification and authentication of the medicinal plants through the use of

modern techniques and the implementation of acceptable criteria and standards. The above findings indicate that the leaf contains bioactive substances. Because the plant is widely available as a weed and may be easily collected, this research is being carried out to aid in the detection of bioactive chemicals. The characteristic of fluorescence is exhibited by several chemical elements contained in this plant material. According to Evans, the light absorbed and re-emitted radiations by the various solvents can be utilised to identify the powdered medication (2002).

ACKNOWLWGEMENT

The authors are grateful to Dr. Trisa Joseph, HOD Department of Botany and Vice-Principal, Patkar-Varde College, Goregaon-(W) for valuable support and providing necessary laboratory facilities. Thanks to Surabhi Sawant for providing writing assistance, editing and proofreading.

Conflict of interest

The authors declare no conflict of interest.

BIBLOGRAPHY

1. Vaidya, M. FLOURESCENCE ANALYSIS OF MUSA PARADISIACA L. OF SUB-FAMILY MUSACEAE. Vaidya. World Journal of Pharmaceutical Research, 2016; 5.
2. Anonymous. Macroscopic and Microscopic Examination: Quality Control Methods for Medicinal Plant Materials. Geneva: WHO, 1998.
3. Almeida M.R., Flora of Maharashtra, orient press, Mumbai, 1990; 2.
4. Bhattacharjee S.K., Handbook of Medicinal plant, printed at Sheetal printers Jaipur India, 2004.
5. Charles R. Chase Jr. & Roberson Pratt Fluorescence of powdered vegetable drugs with particular reference to development of a system of identification, Journal of the American Pharmaceutical Association, 1949; 38: 6, 324-333.
6. Evans W.C. & Trease G.E., Pharmacgnosy, ELBS publication, New Delhi, 2002; 15: 193-207.
7. Kokashi, C.J., et al., Fluorescence of powdered vegetable drugs in ultra-violet radiation. Journal of American Pharmaceutical Association, 1958; 47: 715-717.
8. Chase, C.R. and Pratt, R.J. Fluorescence of powdered vegetable drugs. Indian Journal of Experimental Biology, 1949; 33(6): 428-432.

9. Phytochemical analysis of some medicinal plants RNS Yadav* and Munin Agarwala Journal of Phytology, 2011; 3(12): 10-14 ISSN: 2075-6240
10. Chevellier A., The Encyclopedia of medical plant. London. Dorling Kindersley Ltd, 1996.
11. Application of Autofluorescence for Analysis of Medicinal Plants Victoria V. Roshchina, Andrei V. Kuchin, and Valerii A. Yashin International Journal of Spectroscopy, 2017, Article ID 7159609, 8.
12. Fluorescence analysis and extractive values of some Ethno-medicinal plants of Sikkim Himalaya region Sonam Bhutia Advance Pharmaceutical Journal, 2020; 5(1): 31-35.
13. Nagulan S, Kumar SR. Phytochemical, physicochemical and fluorescence analysis of leaf extract of Syzygium calophyllifolium Walp. Asian Journal Pharmaceutical and Clinical Research, 2016; 9(1): 275-278.
14. Rai B, Bhutia S, Pal P, Kakoti BB. Phytochemical analysis and antibacterial evaluation against selected gram strains by Oroxylum indicum (L.) Kurz stem bark extract, a folklore medicine of Sikkim Himalaya. Journal of Pharmacognosy and Phytochemistry, 2020; 9(1): 11-16.
15. Kang, S. S., Cordell, G. A., Soejarto, D. D., & Fong, H. H. Alkaloids and flavonoids from Ricinus communis. Journal of natural products, 1985; 48(1): 155-156.
16. Ladda, P.L. and Kamthane, R.B. Ricinus communis (castor): an overview. Int. J. of Res. in Pharmacology & Pharmacotherapeutics, 2014; 3(2): 136-144.
17. Ladda, P.L. and Magdum, C.S. Evaluation of anti tumor activity of Ricinus communis L. by proportion of nra. and bact. alert method. International journal of pharmacy and pharmaceutical sciences, 2012; 4(3): 474-478.
18. Gupta, M.K., et al., Pharmacognostical evaluation of *Grewia asiatica* International Journal of Plant Sciences, 2006; 1(2): 249-251.
19. Kokashi, C.J., et al., Fluorescence of powdered vegetable drugs in ultra-violet radiation. Journal of American Pharmaceutical Association, 1958; 47: 715-717.
20. Ansari, S.H. Essential of Pharmacognosy, 1st Edition Birla publications Pvt. Ltd, New Delhi, 2006.
21. Boulos, l. Medicinal plants of North Africa, Algonoc, Michigan Reference Publication, Inc. USA, 1983.
22. O.T. ERDOGRUL, Antibacterial Activities of Some Plant Extracts Used In Folk Medicines. Pharma. Biol., 2002; 40: 269 – 273.
23. V. K. Sasidharan, Krishnakumar T, Manjula CB Philippine J. sci, 1998; 127: 65-71.
24. L. Semra, S. Filiz, C. Ferda, F. Cansu and F.E. Zerrin Turk J. Biol, 2006; 30: 149-152.

25. B. Suffredini, M. L. B. Paciencia, A. D. Varella and R. N. Younes The Braz. J. Infectious Diseases, 2006; 10(6): 400-402.
26. D. Kubmarawa, G. A. Ajoku, N. M. Enwerem and D. A. Okorie. Afr. J. Biotechnol, 2007; 6(14): 1690-169.
27. Kang, S.S., Cordell, A., Soejarto, D.D., Fong, H.H.S., 1985.
28. Alkaloids and flavonoids from Ricinus communis. J. Nat. Prod, 48(1): 155–156.
29. Kang, S.S., Cordell, A., Soejarto, D.D., Fong, H.H.S., 1985.
30. Alkaloids and flavonoids from Ricinus communis. J. Nat. Prod, 48(1): 155–156.
31. Kang, S.S., Cordell, A., Soejarto, D.D., Fong, H.H.S., 1985.
32. Alkaloids and flavonoids from Ricinus communis. J. Nat. Prod, 48(1).