ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25apr324

Seed Surface Characteristics and Preliminary Phytochemical Analysis of *Erythrina variegata* L. Leaf and Seed of Family Fabaceae

Ulhe P.P.[1]

[1] Department of Botany, Narayanrao Kale Smruti Model College (Art, Commerce and Science) Karanja (gh.) Dist :-Wardha .

Publication Date: 2025/04/18

Abstract: In India Ayurveda have a great value and historical importance of traditional medicine. Indian medicine shows scientific support and recent research in this field. Traditional herbal medicine also shows a good background and importance. The *Erythrina variegata* L.is a coral tree belongs to family Fabaceae. The local name is pangara. It is a multipurpose deciduous, thorny tree. For the identification of seeds of *Erythrina variegata* L. the shape, size, symmetry, hilum position are also the important parameters that characterizes the identity of seeds. The structural form depends on all these factors. The SEM investigation i.e. Scanning electron microscopy play a very important role in differentiating and identification of micromorphological characters of seeds. The preliminary phytochemical analysis of *Erythrina variegata* L. leaves and seeds extraction detect various phytochemicals. Detection of sugar in seed by thin layer chromatography methods is important for identification and separation of organic compounds. From above observations essential for seed surface study, phytochemicals and sugar detection in the seeds and leaves are important constituents for drug preparations.

Keywords:- *Seed Morphology, Scanning Electron Microscopy (SEM), Biochemical, Phytochemical Analysis, Fabaceae.*

How to Cite: Ulhe P.P. (2025) Seed Surface Characteristics and Preliminary Phytochemical Analysis of *Erythrina variegata* L. Leaf and Seed of Family Fabaceae. *International Journal of Innovative Science and Research Technology*, 10(4), 418-422. https://doi.org/10.38124/ijisrt/25apr324

I. INTRODUCTION

Indian medicine has ancient importance and gives a healthy way of life. The traditional herbal remedies often include religious belief and rituals that represents an important link between past and present culture. This traditional knowledge about the medicinal properties of plants has been mostly inherited from ancient generations passing the information to successor and traditional practices. *Erythrina variegata* L. also known as *Erythrina indica.* Seeds are evolved as a unique structural and functional entity to face the challenges imposed by changing environmental conditions. Seeds have acquired diversification in both external and internal characteristics so much so that each can be specified independently with definite set of characters. Ethnomedicinally coral tree is important. In traditional Chinese, Indian medicine it is used to treat joint pain and parasitic infections (Kumar *et.al.*2010). *Erythrina variegata* L.is a thorny tree. It is also known as tiger's claw or Indian coral tree. It is a deciduous and an ornamental tree also. The seeds are poisonous in their raw state. The seeds can be cooked and eaten also (Wikipedia). It belongs to family Fabaceae. The local name is pangara.

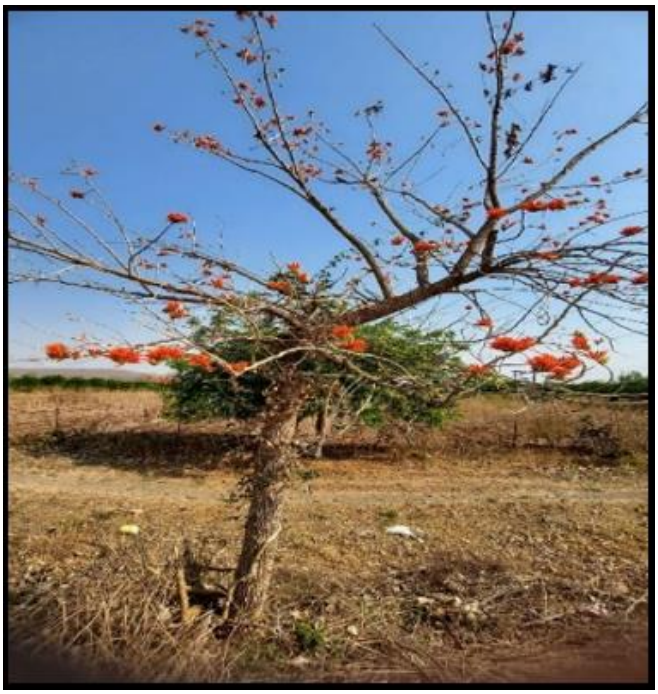

Fig 1 *Erythrina variegata* L. Tree, Leaves Fallen (Habit)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25apr324


Fig 2 Plant with Flowering


Fig 3 Flowering


Fig 4 Leaves of *Erythrina Variegata* L


Fig 5 Stem with Thorn


Fig 6 Axillary, Dense Raceme Inflorescence.

The inflorescence is an axillary, dense raceme. The flowers are clustered in group. The fruits are legume or cylindrical pods in which seeds are present. The seeds are glabrescent indehiscent, ellipsoid to reniform, reddish brown in color (Orwa *et.al* 2009; Peter,2007). It is showy, spreading, deciduous tree legume. Also a multipurpose tree, often used in agroforestry systems (Hanelt *et al.*,2001). The chemical compounds like alkaloids, flavonoids, triterpenoids present in it and also distributed in tropical and subtropical regions. It grows about 60 feet tall (Suryawanshi A.R. *et al*. 2022). Phytochemicals are important due to their potential health benefits and medicinal properties. **(Fig:-01,02,03,04,05,06)**

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25apr324

II. MATERIALS AND METHODS

➢ *Sample Collection: -*

Seeds of family Fabaceae like *Erythrina variegata* L. were collected from local places of Karanja Ghadge Dist-(Wardha). For seed coat study, all the seeds parameters were studied using dissecting and binocular microscope. Digital weighing balance was used for weighing the seeds in mg. The morphological observations of seeds were done followed by their photography, using 1 cm. scale.

➢ *Plant Powder Preparations: -*

Leaf of *Erythrina variegata* L. was washed thoroughly, air-dried and cut into small pieces. The plant part was further dried in 40ºC in an oven until a constant weight was obtained and then leaves and seeds grinded to a coarse powder.

➢ *Seed Coat Morphology (SEM): -*

To study the seed coat morphology scanning electron microscopy is most important. For this purpose, the individual seeds were dipped in alcohol for 5-10 min. to remove the dust from them. The seed mounted on pin type stubs using double sided adhesive tape or conductive silver paint to prevent charging of the surface during scanning and then coated with a very thin layer of gold in a polaron sputter coating unit. For spermoderm study of seed photomicrograph were taken in the scanning electron microscope (SEM) (LEO 430) at Birbal Sahani Institute of paleobotany, Lucknow.

➢ *Preliminary Phytochemical Tests: -*

The preliminary phytochemical analysis is most important for detection of various chemical constituents. Trease and Evans (1989) test were done. Qualitative phytochemical analysis of the crude powder of the seeds of the plant for the identification of phytochemicals like alkaloids, carbohydrates, reducing sugars, steroids, glycosides, flavonoids, triterpenoids, saponin, protein, tannins, furan, quinine, amino acids, volatile oil or essential oil. Preliminary phytochemical test were done using different extract.

➢ *Observations: -*

Fig 7 Seeds of *Erythrina variegata* L. Reddish Brown.

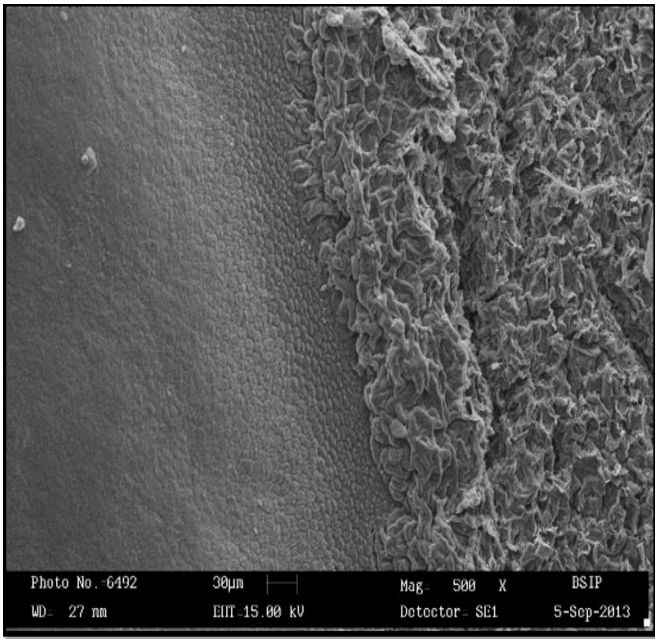

Fig 8 × 500 -Scanning Electron Microscopy of *Erythrina variegata* L. Seeds Shows Intricate, Thick Layer Reticulate Wrinkly Surface Near to Hilar Region, Seed Surface Smooth.

Seed 2.01 cm. - 1.38 cm, subreniform, reddish brown or yellowish brown, 743.44mg, bilateral, hilum median, elliptical, seed surface smooth, presence of shallow depression laterally on one side. Seed coat hard. **(Fig: - 07).** Seeds are kidney shaped, dark purple to red and 1 – 1.5 cm (0.4-0.6 in) in length. (Suryawanshi A.*et al.* 2022). The hilar region of seed is elongated, outer layer of hilum is white and inner layer blackish.

Scanning electron microscopy (SEM) can used to study structure and development of hilum region and tissues present near to it. This study helps to identify different types of cells, tissues in the hilum region. Surface study is also important. It helps to understand the relationship between seed morphology and seed quality. Near hilar region some features like palisade cells, tracheids cells, parenchyma cells are important. These features help for nutrient transport and development of seed. Seedcoat tough, smooth. One lateral side shows slightly notched. Hilum shape elliptical. Surface smooth, near hilar region outer layer is thick, reticulate, intricate surface. It is ridged surface near hilum which is wrinkly to reticulate, groovy ridged in them also. Seed coat surface smooth. Regular reticulate surface near hilar region. Outer side of hilum granulated reticulation seen. **(Fig:-08)** The aim of present study is to investigate macro and micromorphological characters of *Erythrina variegata* L. for distinguishing the taxa which we studied.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25apr324

Table 1 Preliminary Phytochemical Observations of Dried Seeds of *Erythrina variegata* L. with Various Extracts.

Sr no.	Phytochemical	*Erythrina variegata* L. plant part (Seeds)				
		Methanol	Ethanol	Ethyl acetate	Chloroform	Aqueous
01	Alkaloids	+	+	+	_	+
02	Flavonoids	+	+	+	+	+
03	glycosides	+	_	_	+	+
04	Phenols	+	+	+	+	+
05	Tannin	+	_	+	+	+
06	Steroids	+	_	+	+	+
07	Quinine	_	+	_	_	_
08	Saponine	+	_	+	_	+
09	Furan	_	_	+	_	_
10	Triterpenoids	+	+	_	+	_

Present (+), Absent (-)

Different ancient system have a great value and medicinal importance. The preliminary phytochemical analysis of *Erythrina variegata* L. seed shows various phytochemicals which we treated with different extract. In these observations we find that flavonoids and phenols are obtained in all extract. Alkaloids, tannins, steroids are obtained in some extract also. In very less quantity quinine obtained in ethanol extract and furan present in ethyl acetate. Highest phytochemicals were present in methanol extract. Ethyl acetate and aqueous extract also shows various phytochemicals. **(Table - 01)**

Table 2 Preliminary Phytochemical Observations of Leaves of *Erythrina variegata* L. with Various Extracts.

Sr no.	Phytochemical	Erythrina variegata L. plant part (Leaves)				
		Methanol	Ethanol	Ethyl acetate	Chloroform	Aqueous
01	Alkaloids	+	+	+	+	_
02	Flavonoids	+	+	+	+	+
03	glycosides	+	+	_	+	+
04	Phenols	+	+	+	+	+
05	Tannin	+	+	+	+	+
06	Steroids	+	+	+	+	+
07	Quinine	_	_	_	_	+
08	Saponin	+	+	+	_	+
09	Furan	_	_	+	_	_
10	Triterpenoids	_	+	+	+	_

Present (+), Absent (-)

Erythrina variegata L. leaf shows various phytochemicals which we treated with different extract. In these observations we find that flavonoids, phenols, tannins, steroids present in all extract. Alkaloids, glycosides, saponin, triterpenoids also contain various phytochemicals. Quinine presents in aqueous and furan present in ethyl acetate. Ethanol and ethyl acetate detect more phytochemicals. Some phytochemicals present in Methanol, chloroform and aqueous extract also. **(Table-02)**

Fig 9 This Layer Chromatography (TLC) of Detection of Reducing Sugars in *Erythrina variegata* L.

The qualitative analysis through thin layer chromatography is one of the most important techniques. Detection of sugars from seed samples like sucrose, glucose and fructose is useful for identification and separation of organic compounds. *Erythrina variegata* L. shows seed as a sample which detected sucrose and fructose through this technique. **(Fig:-09)**

- *Medicinal uses:* -

Medicinal plants also known as medicinal herbs. *Erythrina variegata* L. seeds are poisonous, use as a rat poison, fish poison. As a component in traditional remedies for various ailments. *Erythrina* leaves are used on liver problems, fever, arthritis, joint pain, wounds, bacterial infections. The whole plant and also seeds used for a variety of illness in Indian system of medicine. The leaves were used to relieve pain and inflammation when crushed and applied to rheumatic joint. The whole plant and seeds contain antihypertensive, antimicrobial, sedative, immunosuppressive and anti-inflammatory properties. (Balmurugan G.,2010).

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25apr324

III. DISCUSSION

Indian medicine has ancient importance and gives a healthy way of life. The traditional medicine included knowledge, skills and practices based on the theories. These theories used for maintenance of health, prevention, diagnosis physical and mental illness also. From the above observations it is seen that the *Erythrina variegata* L. plants are important to study micromorphological characters. Seed morphological features are important to study the seed surface characters. There are various parameters which are helpful in distinguishing the taxa at suprageneric level. The scanning electron microscopy of seed shows surface variations. Seeds are reticulate, intricate, wrinkly ridges were present near hilar region. Seed coat smooth.

The medicinal plant whose parts like flowers, fruits, leaves, stems, roots, seeds use directly or for preparation of medicine for curing of various diseases. In pharmaceuticals industry having a great value due to their theruptic efficacy. In preliminary phytochemical analysis of *Erythrina variegata* L. seeds and leaves different phytochemicals obtained in various extracts. In seed sample methanol extract contain more phytochemicals and ethanol contain less phytochemicals. Flavonoids and phenols present in all extract. Quinine and furan present in very less extract. In leaf sample flavonoids, phenols, tannin, steroids present in more extract. Quinine, furan present in very less extracts. Ethanol and ethyl acetate contain more phytochemicals while methanol, chloroform, aqueous extract contain less phytochemicals. Plants contain different chemical compounds which is very important for preparation of different types of medicines. In qualitative analysis thin layer chromatography of sugar detected sucrose and fructose in seed sample for identification and separation of organic compounds. For human health and well being, medicinal plants have healing properties.

The medicinal plant having great importance for curing diseases and home remedies also. The term phytochemicals include chemical constituents present in plants which is biologically active. These constituents are naturally occurring compounds provide health benefits. Medicinal plant protects plants from disease and damage and contribute to the plant's color, aroma and flavor (Saxena M.*et al* 2013). The high phytochemical diversity, biological activities and medicinal properties found in nature plant.

➢ *Acknowledgement:* -

The authors are thankful to the Director, Birbal Sahni Institute of Paleobotany, Lucknow for extending SEM facilities.

REFERENCES

[1]. Balamurugan G; Shantha A, 2010 Oct-Dec;2(4); Effect of *Erythrina variegata* seed extract on hyperlipidemia elicited by high-fat diet in wistar rats. *Journal of Pharmacy Bioallied Sciences* . 350-355.
[2]. Hanelt, P; Lilian, W.,2001. Mansfeld's *Encyclopaedia* of Agricultural and Horticultural crops (excepts ornamentals) Institute fur pflanzengenetik und kulturpflanzenforschung Gaterslebben (COR)
[3]. Harborne J.B.,1994. Phytochemical methods: A guide to modern techniques of plant analysis, Chapmann and Hall pub. New York.
[4]. Hargreaves, Dorothy; Hargreaves, Bob (1970). Tropical trees of the pacific. Kailua, Hawaii: Hargreaves.P.24.
[5]. https://en-wikipedia.org>wiki. traditional-medicine
[6]. https://www.Feedipedia.org
[7]. Kumar, A: Lingadurai, S; Jain, A; Barmann,N.R.2010.*Erythrina variegata* Linn. A review on morphology, phytochemistry and pharmacological aspects. *Pharmacognosy review,*4(8);147-152
[8]. Orwa, C: Mutua, A: Kindt, R: Jamnadass, R; Anthony, S.2009. Agroforestree Database: a tree reference and selection guide version 4.0. World Agroforestry centre, Kenya
[9]. Peter, K.V., 2007.Underutlized and underexploited horticultural crops, vol.1.New India publishing agency, New Delhi, India.
[10]. Sadasivam, S. and Manickam, A.2005. Separation procedures. Biochemical methods. New age international publishers. 220-228
[11]. Sexena M. Saxena J. Nema R. Singh D. Gupta A.2013.vol.1(6). Phytochemistry of medicinal plants. *Journal of pharmacognosy and phytochemistry*.168-182.
[12]. Suryawanshi A.R., Patil S.S. Wakode S. J. Poul B.N.2022.Vol 24(3). A brief overview of *Erythrina variegata. International Journal of pharmacy and pharmaceutical research.*126-138.
[13]. Thimmaiah S.R.1999. Standard methods of biochemical analysis. Kalyani publishers. 472-482.
[14]. Wagner, H. and Bladt, S.1996. IInd edt^{n}. Plant drug analysis. A thin layer chromatography atlas. Springer
[15]. Wikipedia. The free encyclopaedia edited(2025)*Erythrina variegata*. http://en.wikipedia.org/wiki/Erythrina_variegata
[16]. www.phytojournal.com