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Comparative Anatomical and Histochemical Studies Morphological Similar Two Species of Genus of Euphorbia, *Euphorbia hirta* L. and *Euphorbia indica* L. (Stem)

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A B S T R A C T

Dudhi is one of the significant crude medication utilized in Ayurveda. *E. indica* is utilized as the veritable source plant of medication Dudhi, it forces properties like, utilized for skin issue, sexual scatters, compelling medication for asthma., the runs, looseness of the bowels. The current investigation manages the near investigation of morphological, anatomical, histochemical characters of *E. hirta* and *E. indica*. Two plants show likenesses and contrasts between them at morphological, anatomical and histochemical levels. Morphologically these two plants show contrasts in numerous characters. Be that as it may, histological investigations of the two plants are practically comparable. The histochemical investigation of the two plants shows contrasts. This investigation assists with recognizing the authentic plants of the medication Dudhi for the planning of Ayurvedic medication.

Key words: Dudhi, Ayurveda, Morphological, Anatomical, Histochemical levels, Authentic

Therapeutic and sweet-smelling plants structure a numerically huge gathering of financially significant plant which gives essential crude materials to drugs, scents, flavors and beautifying agents. These plants and their items not just fill in as important wellspring of pay for little holders and business people yet additionally help the nation to acquire significant outside trade by method for send out. Therapeutic plants are those plants which are wealthy in optional metabolites and are potential wellspring of medications (Tandon and Sharma 2011). Therapeutic plants are inexhaustible normal assets and along these lines, their preservation and economical use should fundamentally include a long haul, incorporated, deductively situated all-encompassing activity program (Yadav and Sardesai 2002). With this foundation the relative histological and histochemical work was embraced in two significant Ayurvedic therapeutic plants (Esau 1965). The chose plants are *E. hirta* and *E. thymifolia*. *E. hirta* has a place with the family Euphorbiaceae and variety Euphorbia. It is slim stemmed yearly shaggy plant with numerous branches from the base to top (Mangaly *et al*. 1979). Leaves are inverse, elliptic-oblonglanceolate, intense or sub intense. *E. thymifolia* is an individual from the Euphorbiaceae family. It is a monocious, prostrate, yearly herb (Dwivedi and Mahra 2013). The stem is with white latex. The leaves are inverse, basic, cutting edge applaud. Inflorescence is as termin.

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MATERIALS AND METHODS

The information regarding to Genus *Euphorbia* L. used in the region was collected from various sources such as tribals Hakims, Vaidyas, Street Vendors and local people. During the first phase, the collections of species of *Euphorbia* were made by visits to various localities from Marathwada and its adjoining regions. Several tours were arranged to collect plant species in different seasons Specimens collected from different localities were dried with help of blotter method and made into hebarium specimens and deposited in the herbarium of Department of the Botany, Shri Shivaji College Parbhani as voucher specimens for ready reference. Specimens were identified with the help of floras and difficult ones were referred to the

experts for correct valid identify. The fresh material of specimen's and their parts used in anatomy were collected from the field and preserved in FAA (100% alcohol 70 CC, Acetic acid 25 CC and formalin 5 CC) for microscopic studies.

For gross anatomical studies of root, stem and leaves free hand section were taken with the help of blade (microtome for leaves) and sections were stained by using double stained differential staining technique. Illustrations of internal structures were drawn with the help of Camera Lucida using Indian ink.

2. For leaf architectural the leaves were cleaned by immersing in 10-20% aqueous sodium trichloroacetic acid and phenol solution 2.1 and stained with cores stamp pad purple ink (Rao *et al*. 1980) and micro photographs were taken with the help of Asia Pentax camera.

3. For dermal studies peals from fresh preserved leaf materials were taken and stained it in 1% Safranin, line drawings and micro photo.

4. For study of vessels the preserved material were made into small pieces and boiled and cooled repeatedly until free from the air. A macerated fluid was prepared by taking aqueous chromic acid (as per Jeffrey's). The pieces of wood were kept in the fluid for 24 hours and after 24 hours the material was crushed with the help of glass rod and washed with distilled water to remove excess stain. The material was stained in 1% saffranin for 6 hours and microscopic observations. The camera Lucida of the vessels were drawn by taking measurements the illustrations were drawn with India ink and microphotographs were taken wherever possible.

Observations

The various characters of vessel elements viz. size wall thickening, shape, tail and characters of perforation plate like number, orientation and shape were studies. A survey of about 30-50 vessel elements of stem was carried out.

The range of length and width of vessel elements was determined by the measurement of 20-25 vessel elements and were classified as per the classification given by Radlford *et al*. (1974). Which is reproduced here for perusal's:

A.	Extremely short	:	Less than 175 um
B.	Very short	:	175 to 250 um
C.	Moderately short	:	251 to 350 um
D.	Medium size	:	351 to 800 um
E.	Moderately Long	:	801 to 1100 um
F.	Very Long	:	over 1900 um

5. The micro-chemical tests were performed as per (Johansens 1940, Gurr 1965) and results were tabulated for ready (Table 5) reference.

6. For determination of ash value and percentage extractives methods were used as recommended by Anonymous (2004). All the observations were statistically analyzed using suitable methods (Freud 1977).

RESULTS AND DISCUSSION

Gross anatomy of Euphorbia hirta L.

Transverse section of stem (Plate No. 19b)

Transverse section of stem is circular and single layer epidermis. Epidermal cell containing purple or red pigment. The cortex tissues are filled with simple globular starch grains and latex tube. Vascular bundles are collateral land closed. Pith containing isodiametric thin walled parenchymatous cells with large intercellular space in older stem it change into hollow space.

Vessel ememen of Euphorbiahirta L.

Vessel element of stem - (Table No. 13b, Plate No 20d)

Dimension: Extremely short (class A) very short (class B) moderately short (class c) medium size (class D) vessels were observed. The frequency of medium size was higher (39.50) very short (class B) shows less frequency the average diameter of vessel element is 18.50 mu.

Lateral wall thickening: Simple pitted thickenings were common pits alternate.

Tail: Short blunt, short oriented tall were commonly observed.

Perforation plate: In the vessel, only simple perforation plates were observed.

Orientation: The vessel with oblique and transverse perforation plate were observed.

Shape of perforation plate: More commonly vessels have oval or lenticular perforation plate.

Stem fibers: The length of stem fiber is between 320 to 720 mu. and the average length is 630 mu. The diameter of fibers in between 18.1 to 32 mu. and the average diameter is 20.00 mu.

Tracheid: The length of tracheid's element is between 350-570 mu. and average length of tracheid is 414 mu. the diameter of tracheid element is between 18-28 mu. average diameter is 19.50 mu. all the tracheid are spindle shaped (Sivarajan and Balachandran 1999).

Classification (Radford *et al*. 1974) and relative frequency (%) of different classes of vessel element in the root and stem of *Euphorbia hirta* L.

Table 1 Vessel element of stem

Class A		Class B		Class C		Class D	
Percentage	Range of length (um)	Percentage	Range of length	Percentage	Range of length	Percentage	Range of length
19.80	153 to 170	10.50	195 to 234	33.20	192 to 335	39.50	378 to 410

Gross anatomy of Euphorbia indica Lamk.
Transverse section of stem (Plate No. 21c)

T.S. of stem is circular, rounded and single layered, epidermal cells are long elongated cells contain yellowish pigment, cortex region followed by sec. phloem layer which is compact tissues sec. xylem elements mixed with medullary rays, at the center a large parenchymatous pith is developed.

Vessel element of stem (Table No. 14b, Plate No. 21d)

Dimensions: Extremely short (class A), very short (class B) moderately short (class C) medium sized (class D) vessels were observed. The frequency of moderately short vessel was higher (30.49) and extremely short vessels (10.50) shows lower frequency the average diameter of vessel element is 23 mu.

Shape: The shape of vessel element is cylindrical, linear.

Lateral wall thickening: Simple pitted thickening was common, pits alternate.

Tail: Tail with long blunt, short blunt long pointed were observed.

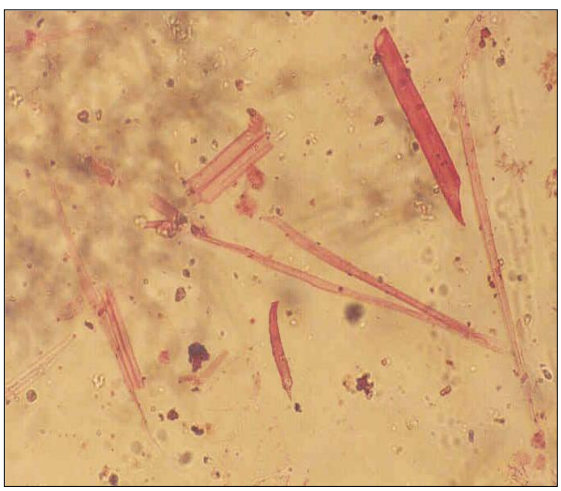
Orientation: The vessels with oblique and transverse perforation plate were observed.

Shape of perforation plate: More commonly vessels have perforation plate oval in shape.

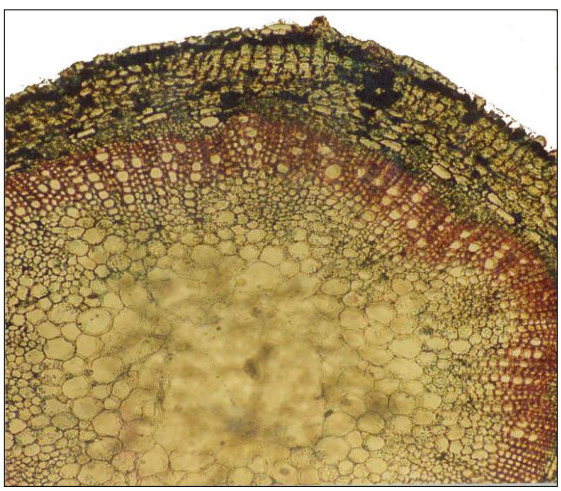
Stem fibers: The length of stem fibers in between 390-630 mu. the average diameter is 504 mu. the diameter of fiber in between 19-28 mu. and the average diameter is 23 mu. all the fibers are pointed at both ends.

Tracheids: The length of tracheid element is between 300-525 mu. and the average 490 mu. the diameter of tracheid is in between 19-2s0 mu. and average diameter is 19.5 mu. all the tracheid elements are spindle shaped.

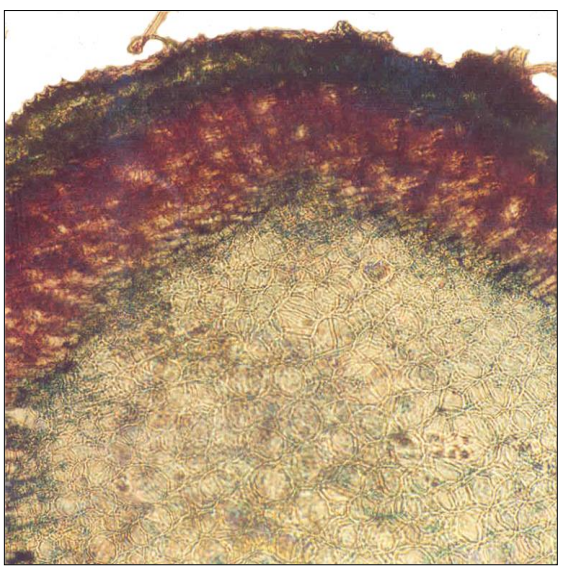
Classification (Radford *et al*. 1974) and relative frequency (%) of different classes of vessel element in the root and stem of *Euphorbia indica* Lamk.



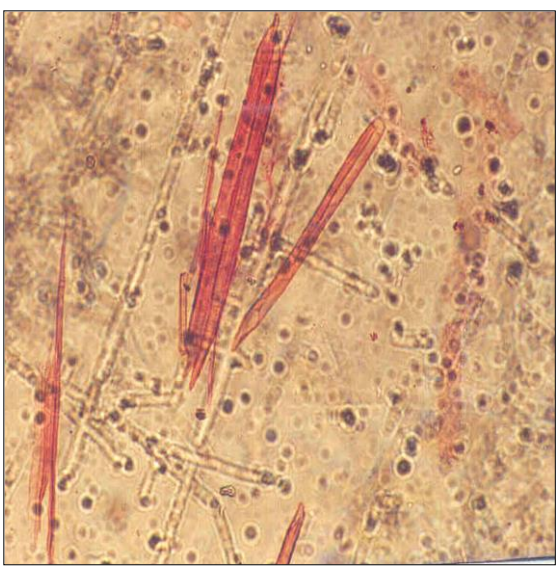
Vessel elements of stem of *Euphorbia indica*



T.S of stem *Euphorbia indica*



T.S of stem *Euphorbia hirta*



Vessel elements of stem of *Euphorbia hirta*

Table 2 Vessel element of stem

Class A		Class B		Class C		Class D	
Percentage	Range of length (um)	Percentage	Range of length	Percentage	Range of length	Percentage	Range of length
10.50	150 to 162	30.00	180 to 234	30.49	252 to 342	29.01	395 to 504

Table 3 Differentiation between two species of Euphorbia i.e. *Euphorbia hirta* L. and *Euphorbia indica* Lamk.

Euphoribia hirta L.	*Euphorbia indica* Lamk.
1) Epidermal cell containing purple or red pigment.	1) Epidermal cells are long elongated cells containing yellowish pigment.
2) The cortex tissues are filled with simple globular starch grains and latex tube.	2) Cortex region followed by sec. phloem layer which is compact tissues sec tissue.
3) Intercellular space in older stem it changes into hollow space.	3) The center a large parenchymatous pith is developed.
4) Short blunt, short oriented tall were commonly observed.	4) Tail with long blunt, short blunt long pointed were observed
5) The length of stem fiber is between 320 to 720 mu. and the average length is 630 mu.	5) The length of stem fibres in between 390-630 mu. the average diameter is 504 mu.
6) The length of tracheid's element is between 350-570 mu.	6) The length of tracheid element is between 300-525 mu.
7) vessels size shows great diversity in all class.	7) vessels size shows great diversity in all class.

Both the species of Euphorbia i.e. *E. hirta* L. and *E. indica* Lamk are morphologically similar but its shows great variation in their anatomical and histo-chemically so these similar species are differentiated in to each other's.

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