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A review of comparative pharmacognostic and phytochemical study of drugs mentioned as Rasna: (*Pluchea lanceolata* (DC.) Oliv. & Hiern versus *Alpinia galanga* (L.) Willd.)

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Abstract

India has a rich diversity of medicinal plants found all geographical regions of the country. The medicinal plants have played a significant role in ancient traditional systems of medicine. Rana is one of the most important medicinal plants having many therapeutic uses. In this review article we select two species from the different families *Pluchea lanceolata* (DC.) Oliv. & Hiern and *Alpinia galanga* (L.) Willd. The present research review has reported their drug regularity affairs and drug controlling, phytochemical constituents, morphological and anatomical taxonomy and ethnobotanical authentication.

Keywords: *Pluchea lanceolata*, *Alpinia galanga*, pharmacognosy, phytochemical analysis, taxonomy

Introduction

India has a rich diversity of traditional medicinal plants from the ancient time. Folklore and traditionally medicinally plants information are available in Materia Medica of India proceeding. In our country, traditional medicine includes Ayurveda, Siddha and Unani system of the medical system. 'Ayurveda' word is derived from 'Ayur' means life and 'Veda' means science. Therefore, Ayurveda literally means, the science of life, as Ayurveda is an independent and self-sufficient in certain diseases like rheumatoid arthritis and asthma etc. Most of them Ayurvedic medicines are based on plants or natural resources of the ecosystem. The herbal drugs represented by a major part in all the traditional system of medicine. They are an integral part of our food and human health care. Based on WHO report approximate 80 percent of the world populations are based on plant medicines treatment.

Natural product remains a prolific source of discovery of new drugs from the ancient Vedic period. India has a long history of management of human health through Ayurveda which came into existence more than 6000 yrs ago. Charak and Sushrut had contributed a lot to the development of plant-based medicine and surgery. In recent years, there have been growing interest in complementary medicine, functional and therapeutic uses of natural products, especially those derived from plants. Thus, natural products including terrestrial and marine plant extracts have become a source of optimism for drug discovery. The rich medicinal diversity of India has attracted the attention of researcher, which remained untouched as far as the new drug discovery is concerned, having rich medicinal plant diversity that offers habitats for different medicinal plants like herbs, shrubs, flowering and non-flowering plants etc. including most commonly used plant in Ayurvedic science *Rasna*.

Rasna is an Ayurvedic drug. The Sanskrit synonyms *Rasna* (tongue like leaf), *rashna* (tongue like leaf), *rasana* (tongue like leaf), *rasya* (with higher degree of pungency), *sugantha moola* (root is fragrant), *suvaltha* (anti rheumatic), *elaparni* (leaf resemble *Elettaria*), *surpagandha* (snake like odour), *atirasa* (with high pungency) and *rasadhya* (high pungency). This drug is known from the Vedic period as a major ingredient in compound formulations. Rather than formulation in classical literature, it has wide application in traditional and tribal medicines. In most of these preparations, *Rasna* is used as the appropriate choice in rheumatic complaints. Due to this superior efficacy of *Rasna*, Charaka includes it in the "vayasthapana varga" the group of drugs that can maintain vigour and strength. He commends that "rasna vataharanam" - best among vatahar drugs, means the right choice for rheumatic complications (Pandya, 1983).

Rasna is an effective anti-rheumatic and anti-arthritis drug, which has wide application as a single drug in our indigenous system of medicine.

Apart from this, it is used in gastro intestinal complications like flatulence, dyspepsia and upper respiratory diseases like bronchitis and asthma. About 34 plants have been identified as *rasna* in the Ayurvedic system of medicine. These plants have various pharmacological properties like immunostimulant, antibacterial, antiviral, anti-inflammatory, anticancer, antirheumatic etc. Controversial drug is one, which is known by different names at different places or the same name stands for more than one drug (Bapalal, 1982) [4]. In the present study, we targeted two species of *Alpinia galanga* (L.) Wild. (Family Zingiberaceae) and *Pluchea lanceolata* (DC.) Oliv. & Hiern (family Asteraceae) are used as source plants of *Rasna*. The species of *Alpinia galanga* are used in Kerala, and North India *Pluchea lanceolata* is used as the source of *Rasna*. Sharma and Sharma (1977) [31] reported that the water soluble fraction of the alcoholic extract of *Pluchea lanceolata* is significantly effective in inflammatory conditions but less effective than *Alpinia galanga*. The sun-dried rhizomes of *Alpinia galanga* are the useful part, and the whole plant of *Pluchea lanceolata* is used in the treatment. Most of the information of *Rasna* is on morphological and anatomical or physicochemical and phytochemical parameters of *Alpinia galanga*, and *Pluchea lanceolata* are reported in some publications. But the comparative study of *Alpinia galanga* and *Pluchea lanceolata* are not available. Thus, the present work is carried out on pharmacological studies on *Alpinia galanga* and *Pluchea lanceolata* drugs.

Materials and Methods

Identification of plant materials (morphological and microscopical)

The macroscopic characters of *Pluchea lanceolata* leaf, stem and root were morphologically identified based on the earlier published literature (Kokate *et al.*, (1986) [20] & Evans (2003) [12] while *A. galanga* rhizomes were determined organoleptically (Anonymous *et al.*, 1998; Evans, 2004) [1, 13]. Apart from this shape, size, colour, odour, taste and external markings were done in macroscopical studies. Microscopic studies were done on both drugs according to the method of (Brain and Turner., 1975) [5, 6]. For microscopical studies; a few drops of chloral hydrate solution were added to a sample of powdered plant material on a slide and heated gently over a micro Bunsen. The slide was covered with a glass coverslip for examination under the microscope and different cell components were observed. Freehand section of drug material was taken and stained with safranin and phloroglucinol followed by concentrated hydrochloric acid (Johansen, 1940) [16]. The measurement of different tissues and cell components were performed with the help of ocular, stage micrometre and camera lucida (Babu *et al.*, 2010) [3].

Chemicals and reagents

For the present study authors using Petroleum ether (Merck, India) and ethanol (Changshu Yangyuan Chemicals, China) and were purchased from genuine vendors. The reagents for phytochemical identification were obtained from the freshly prepared stock will be used.

Preparation of Extracts

A). For the *Pluchea lanceolata* drug (leaves, stem and root) using air-dried plant material for the quantitative determination of ash and extractive values. Fluorescence analysis of the root powder was carried out by the usual

standard methods [(WHO/QCMMPPM guidelines, 1992) [36], Chase & Pratt, (1949) [8], Kokoski *et al.*, (1958) [23], Brain & Turner (1975) [5, 6] and Kokate (1986) [20].

B). The leaves and rhizomes of *Alpinia galanga* dried in the shade and make powdered in hand mixer. About 100 g of powdered material was taken and extracted with cold percolation using different solvents like petroleum ether, carbon tetrachloride, chloroform, ethyl acetate, acetone, ethanol, methanol and water. Each process was repeated thrice for complete extraction after extraction; extracts were combined and evaporated to dryness *in vacuo* at 40 °C.

Preliminary phytochemical screening

A). *Pluchea lanceolata* screening was carried out by using the standard procedure described by Kokate *et al.* (1986) [20] and Harbone (1998) [14]. Total flavonoid content was determined as described by Singleton & Rossi (1965) [33].

B). *Alpinia galanga* screening was carried out for alkaloids, glycosides, resins, tannins, saponins, carbohydrates, amino acids, phenols, terpenoids, coumarins and gums using standard procedures described to identify the constituents (Khandelwal, 2010; Kokate, 1994 & 2006) [19, 21, 22].

Quantitative Evaluation

Physico-chemical analysis

Physico-chemical analysis, i.e. percentage of ash values and extractive values was performed according to the official methods prescribed by WHO guidelines on quality control methods for medicinal plant materials (WHO/QCMMPPM guidelines, 1992) [36]. Fluorescence analysis was carried out according to the method prescribed (Chase and Pratt, 1949; Kokoski *et al.*, 1958) [8, 23]. The colour and consistency of the extracts were also recorded.

Medicinal signification of *Rasna*

Pluchea lanceolata (DC.) Oliv. & Hiern belongs to the family Asteraceae has been used for the treatment of rheumatoid arthritis in Indian (Nadkarni 1954). The drug is also used for the inflammatory conditions such as arthritis, bronchitis, cough and piles. It is a major ingredient of the famous anti-inflammatory ayurvedic decoction "Maharasnadi Qwath". Leaves are aperients are used as a substitute for seen (Chopra *et al.* 1958) [10]. The ethanolic extract of *P. lanceolata* exhibited significant anti-inflammatory activity, which was further investigated after fractionation. The result showed that activity was localized in the hexane fraction, from which taraxasterol acetate was isolated which proved to be one of the active constituents. Taraxasterol acetate, isolated from hexane fraction, accounted for only part of the activity of that fraction. It is obvious that there are other active substances present in the hexane fraction which need to be isolated and characterised (Srivastava *et al.*, 1990) [34, 35].

Alpinia galanga (L.) Willd., belongs to the family Zingiberaceae has been used traditionally for the treatment of eczema, bronchitis, coryza, morbili, pityriasis versicolor, otitis interna, gastritis, ulcers and cholera. The seed of drug is used for emaciation and to clean the mouth, stimulates the digestive power, appetite and as a purgative. The flowers, rhizome and young shoots are used as vegetable, spice and source of essential oil. The drug is contained flavonoids and volatile oils 2-24.

Pharmacognostic studies***Pluchea lanceolata* (DC.) Oliv. & Hiern****Macroscopic characters**

The plant is an erect allelopathic, perennial under shrub growing up to 30-100 cm high, with a cylindrical stem of 2-3 mm in diameter. The stem is herbaceous and cylindrical with the smooth outer surface is hairy, branched and the branches are terete, ashy and pubescent. Leaves are simple (0.6-1.6 x 2.5-2.7 cm), alternate coracious, sessile, oblong or lanceolate, obtuse apiculate narrowed at the base, the margin is entire and the apex is round. The inflorescence is compound corymbs usually with purple-tinged flowers. Roots are about 3 to 20 mm in diameter, 10 to 20 inches in length, somewhat twisted and gradually tapering. The external surface is white when young while it is light to dark brown in mature one and the wood is brownish. External surface showed longitudinal rough striations. Odour indistinct and fracture is short.

Microscopic characters

Leaf: Transverse section passing through midrib of the leaf (Figure 1A) reveals its isobilateral nature that has upper and lower epidermis with a thick cuticle, traversed with stomata. The leaf has both covering and glandular trichomes; the covering trichomes were uniseriate, multicellular (2-5 cells of about 90 µm in size) and lignified while the glandular trichomes were sessile as well as stocked. Although collenchymatous tissues lie under both upper and lower epidermis, it is strongly developed towards the upper side. Vascular bundles are collateral, centrally located; meristele is encircled by a parenchymatous bundle sheath. Transverse section of the leaf passing through lamina reveals a row of small-sized palisade under both upper and lower epidermis in continuation within midrib. The remaining mesophyll comprises spongy parenchymatous cells partially filled with oil globules, small sized cluster and rosette calcium oxalate crystals; vessels are traversing mesophyll was seen in the section.

Stem: The transverse section of the stem is almost circular in outline covered with a thick cuticle. The epidermis consists of single layer of thick-walled cells along with covering and glandular trichomes. Covering trichomes are uniseriate, multicellular with two to many thick walled cells while glandular ones are sessile as well as stalked. Collenchymatous hypodermis lies underneath the epidermis, followed by 5-7 layered parenchymatous cortex. A ring of open collateral vascular bundles is seen in the outer cortex region. Each vascular bundle consists of well-developed phloem and xylem. Phloem is made up of sieve tube, companion cells and parenchyma. Cambium is distinct 2-3 layered while the centre portion is occupied by collenchymatous pith.

Root: The transverse section of the root is almost circular in outline. Epiblema is a single outer most layer made up of parenchymatous cells along with uniseriate multicellular root hairs. Cortex is next to epiblema and consists of parenchymatous cells with sufficient intercellular spaces. The cells of cortex contain starch grains, oil cells and lignified cells. Cortex is followed by endodermis and pericycle. Phloem parenchyma and Phloem fibers are present. Phloem fibers are available as thick-walled, lignified, and arranged in bundles of ten to fifty fibres. A parenchymatous sheath surrounds each bundle. Cambium is thin-walled five or more layered. Xylem is present as trachieds, vessels, xylem fibres and xylem parenchyma. Vessels are large, thickened, lignified

cells. Medullary rays are parenchymatous and multiseriate. Pith consists of large parenchymatous cells with sufficient intercellular spaces (Plate 2).

Powder microscopy

Powder microscopy showed patches of upper and lower epidermis in surface view along with the ranunculaceous type of stomata, plenty of uniseriate unicellular, as well as multicellular covering trichomes, were also seen along with glandular trichomes with or without stalks. The preparation also showed transversely cut fragments of lamina with a row of palisade underneath upper epidermis, fragments of fibres, vessels, with spiral and reticulated thickening. Rosette shaped crystals of calcium oxalate were seen in unstained slide preparation.

Root Powder microscopy showed patches of polygonal, thin-walled parenchymatous cells, lignified thickened phloem fibres, fragments of lignified reticulate, annual and spiral vessels, starch grains, Unicellular and multicellular uniseriate root hairs and Crystals of calcium oxalate (Plate 3).

Physicochemical analysis**Ash value**

Air dried material was used for both drugs of quantitative determination of physiochemical values. Therefore, the loss on drying of plant materials should be determined, and the water content should also control. This is especially important for materials that absorb moisture easily or deteriorate quickly in the presence of water. Total, acid insoluble and water soluble ash was determined for five times and recorded. Similarly, ethanol, alcohol, methanol and water-soluble extractives were determined for five times recorded. Alcohol and water extractive was determined as per WHO recommendations. Water-soluble extractive was found to be very high when compared to other extractable matter in the drug.

Extractive values

The extractive values are used to evaluate the chemical constituents present in the crude drug and also help in estimation of specific constituents soluble in a particular solvent.

Alpinia galanga* (L.) Willd.*Macroscopic characters**

The leaves are a green colour, 30-50 cm. in length alternate, oblong-lanceolate, upper surface is glabrous and shining. The leaves are simple, dorsi-ventral, petiolate, stipulate, venation is linear. *Alpinia galanga* is a perennial herb. The roots are adventitious, in groups, fibrous, persistent in dried rhizomes, The rhizome is about 08 to 10 cm long and 06 to 12 cm in diameter and yellowish-brown in colour, cylindrical, branched, stout, aromatic, longitudinally ridged with prominently rounded warts (remains of roots) marked with fine annulations; scally leaves arranged circularly; externally reddish-brown, internally orange-yellow in colour; fracture, hard and fibrous; fracture, surface rough; odour, pleasant and aromatic; spicy and sweet in taste.

Microscopic characters

Root: T.S. of root circular in outline, single layered epidermis with barrel-shaped cells having unicellular root hairs, hypodermis 3 or 4 cells deep and sclerenchymatous cortex, many cells deep, with well-developed intercellular spaces; endodermis showing prominent casparian strips and 'v' shaped

thickening, followed by many-celled sclerenchymatous pericycle; xylem and phloem in separate radial strands; centre occupied with a parenchymatous pith.

Rhizome: Transverse section of rhizome in *Alpinia galanga* shows an outer cortical region and an inner stellar region. The outer cortex is 1 to 1.1 cm wide, and the central stele is 1.2 cm in diameter. The cortex consists of an epidermis, which is composed of a single row of tangentially elongated cells. Below the epidermis, in the remaining part of the outer zone consists of numerous vascular bundles in a scattered manner and each bundle is surrounded by lignified layer. Vascular bundles are nearly circular in shape and consist of groups of xylem elements and a small patch of phloem. Xylem consists of parenchyma, vessels, tracheids & fibers. Phloem is seen above the xylem and consists of sieve elements, companion cells. The cells of the cortex are thin-walled, polygonal and arranged with small intercellular spaces. Cortical and stellar region demarcated by a continuous ring of endodermal layer. The stellar region is composed of thin-walled parenchymatous

cells with numerous vascular bundles. Small vascular bundles are radially arranged xylem elements are present beneath this layer. These parenchymatous cells are slightly smaller than that of the cortical region and polygonal to circular in shape and compactly arranged with small intercellular spaces. Smaller bundles are towards the peripheral region and larger ones occupy the central part. Oleoresin cells are present near to each bundle. Sclerenchymatous sheath partially encircling the bundle is less thickened. Starch grains are simple, elongated and are more in number. Numerous oleoresin cells are scattered throughout the rhizome.

Powder microscopy

Powdered microscopy revealed the presence of fragments of epidermal cells in surface view, parenchymatous cells with yellow colouring matter and starch grains. Vessels are thick walled, elongated having scalar form or reticulate thickening with simple pitting. Starch grains show variation in size and shape; few are circular. The majority are long rod-shaped with the rounded broad end. Tracheids are present (Plate 1).

Table 1: Comparative physicochemical screening of *Pluchea lanceolata* and *Alpinia galanga* (Arya & Patni, 2013, Namdeo & Kale, 2015) [2, 27].

Parameter	<i>Alpinia galanga</i>		<i>Pluchea lanceolata</i>		
	Leaves	Rhizome	Leaves	Stem	Root
Ash value (%)					
Total ash	1.73%	4.10	7.5	17.24	12.25
Acid in soluble ash	0.89	4.1	1.75	3.15	1.95
Water soluble ash	12.10	15.3	2.25	4.10	3.15
Loss on drying at 110 °C	2.35	4.65	-	-	-
Alcohol soluble Extractive	9.10	1.25	-	-	-
Extractive value (%)					
Acetone	3.30	5.57	18.2	12	5.1
Pet-ether	7.50	6.60	19	14	9.2
Chloroform	7.60	5.60	-	-	-
Ethanol	11.25	2.93	10	10	5.1
Methanol	8.20	14.40	42	25	5.3
Water	11.25	8.30	-	-	-
Acetic acid	1.10	2.10	-	-	-

Preliminary phytochemical screening

This study will help in the prediction of nature of drugs and also useful for the detection of different constituents present in different polarity solvent. So it could be helpful to extract out particular constituents by the solvent. The phytochemical study of *Alpinia galanga* revealed the presence of alkaloids, tannins, terpenoids and phenolics, alkaloids, carbohydrates, tannins, amino acids, and saponins, while the phytochemical study of *Alpinia officinarum* revealed the presence of alkaloids, tannins, coumarins, terpenoids and phenolics,

carbohydrates, tannins, glycosides, amino acids, phenols, gums and saponins (Namdeo & Kale, 2015) [27], while in *Pluchea lanceolata* the presence of protein-starch, fixed oil, steroid, glycosides, triterpenoid and flavonoids. This serves as an important tool for the quality assurance of plant for future studies. Total flavonoid content of the plant was determined in five different samples and was found to be 67.24±1.4 µg/mL. The fluorescence analysis is a tool for the determination of constituents in the plant that gives a definite idea of the chemical nature (Khan *et al.*, 2010) [18].

Table 2: Comparative Preliminary phytochemical screening of *Pluchea lanceolata* and *Alpinia galanga* (Chauhan *et al.*, 2015 and Khan *et al.* 2010) [9, 18].

Constituents	<i>Alpinia galanga</i>		<i>Pluchea lanceolata</i>		
	Leaves	Rhizome	Leaves	Stem	Root
Alkaloid	-	-	+	-	+
Glycoside	+	++	+	+	+
Tannins	-	+	+	-	+
Steroids	+	++	+	+	+
Flavanoids	+	++	+	+	+
Saponins	+	+	-	-	-
Carbohydrates	+	+	+	+	+
Terpenoids	-	-	+	+	+
Proteins	-	-	+	+	+
Phenols	-	-	+	+	+

Note (-): Absent, (+): Present, (++) more intensive

Morphological characteristics of *Pluchea lanceolata* and *Alpinia galanga*

All the extracts of *Pluchea lanceolata* are hyaline to brownish and showed semisolid consistency where as the aqueous

extract is brown in colour and showed powder consistency while extracts of *Alpinia galanga* are brown to brownish yellow and showed semisolid consistency while aqueous extract is brown and showed solid consistency.

Table 3: Fluorescence analysis of rhizome extracts of *Pluchea lanceolata* (leaves, stem & root) (Arya & Patni, 2013 & Namdeo & Kale, 2015) [2, 27]

Drug powder in organic Solvents	Plant parts					
	Leaf		Stem		Root	
	Day light	UV light	Day light	UV light	Day light	UV light
50 % H ₂ SO ₄	Greenish black	Greenish black	Black	Black	Black	Black
1N HCl	Black	Black	Black	Black	Black	Black
Aqueous 1N NaOH	Light brown	Pale green	Light brown	Light green	Yellowish Brown	Green
Alkaline 1N NaOH	Light green	Green	Yellowish brown	Green	Brown	Light green
H ₂ O	Green	Green	Yellowish brown	Light green	Brownish red	Greenish yellow
Chloroform	Dark green	Dark green	Light green	Yellowish green	Dark brown	Dark brown
Benzene	Dark greenish black	Dark greenish black	Light green	Light green	Brown	Light green
Hexane	Greenish black	Greenish black	Light green	Light green	Brown	Light green
Acetone	Greenish black	Brownish green	Brownish green	Yellowish green	Light Brown	Light green
Methanol	Greenish dark brown	Yellow	Yellowish brown	Green	Brown	Light green

Fluorescence analysis of rhizome extracts of *Alpinia galanga*.

Table 4: Fluorescence powder drug analysis of an aerial part (leaves) and rhizome of *Alpinia galanga* (Chauhan *et al.*, 2015) [9].

Drug powder in organic Solvents	Normal Light		UV 254nm		UV 365nm.	
	Leaves	Rhizome	Leaves	Rhizome	Leaves	Rhizome
Dry Powder	Green	Light Brown	Green	Green	Yellowish Green	Yellowish Green
Powder +5%NaOH	Dark Brown	Dark Brown	violet	Green	Orange	Orange
Powder +5% KOH	Light Brown	Light Brown	violet	Green	Light Red	Red
Powder+ Conc.H ₂ SO ₄	Black	Black	Dark Brown	Dark Brown	Black	Black
Powder+Dil. Ammonia	Light Brown	Brown	indigo	Red	Orange	Dark Red
Powder +HCl (Conc.)	Dark Green	Dark Brown	Blue	Red	Dark Blue	Dark Red
Powder+Conc. HNO ₃	Reddish Brown	Reddish Brown	Orange	Orange	Red	Red
Powder+Dil. HNO ₃	Redish Brown	Redish Brown	Green	Green	Light Red	Light Red
Powder+Venillin H ₂ SO ₄	Blue	Dark Brown	Black	Orange	Light Black	Yellow
Powder+Iodine	Blue	Blue	Dark Blue	Dark Blue	Dark Red	Dark Red

Discussion

The present study carried out various macroscopic, physicochemical, phytochemical analysis and fluorescence analysis of the two species of Rasna drug. The present pharmacognostical parameters analysis is useful for setting standards for crude drugs (Ravichandra & Paarakh 2011) [29]. Apart from this, the microscopic analyses of the specimen will offer a helping hand to establish the identity of the phytodrugs (Mukherjee 2008) [24]. Morphological studies revealed that *Pluchea lanceolata* perennial under shrub growing up to 30-100 cm high, with a cylindrical stem of 2-3 mm in diameter. The stem is herbaceous and cylindrical with the smooth outer surface is hairy, branched and the branches are terrete, ashy and pubescent. Leaves are simple (0.6-1.6 × 2.5-2.7 cm), alternate coracious, sessile, oblong or lanceolate, obtuse apiculate narrowed at the base, the margin is entire, and the apex is round while *Alpinia galangal* is cylindrical, 2 to 8 cm in diameter. Externally reddish- brown; odour pleasant and aromatic, taste spicy and sweet.

Pluchea lanceolata showed patches of upper and lower epidermis in surface view along with the ranunculaceous type of stomata, plenty of uniseriate unicellular, as well as multicellular covering trichomes, were also seen along with glandular trichomes with or without stalks. Whereas in root

showed polygonal, thin-walled parenchymatous cells, lignified thickened phloem fibres, fragments of lignified reticulate, annual and spiral vessels, starch grains, Unicellular and multicellular uniseriate root hairs Rosette shaped crystals of calcium oxalate were seen in unstained slide preparation. On the other hand, in the powder microscopy study *Alpinia galanga* showed the presence of Epidermal cells, Parenchyma cells with starch grains, Vessels with scaiari form thickening, Vessels, Starch grains, Trachied, Starch grains.

The Physio-chemical evaluation of the drug is an important parameter in detecting adulteration or improper handling of drugs. The extractive values are used to evaluate the chemical constituents present in the crude drug and also help in estimation of specific constituents soluble in a particulars solvent (British Pharmacopoeia 1980) [7]. The total ash, insoluble acid ash, water soluble ash, loss on drying of *Alpinia galangal* found a low comparison of *Pluchea lanceolata* (Table 1). Similarly, the ether-soluble extractive value, chloroform soluble extractive value, ethanol soluble extractive value, methanol soluble extractive value and water-soluble extractive value of both drugs were analysed see table 1. The phytochemical screening will helpful in the prediction of nature of drugs and also useful for the detection of different constituents present in different polarity solvent. So it could

be helpful to extract out particular constituents by solvent (Harborne *et al.*, 1998) [15]. The phytochemical study of the phytochemical study of *Pluchea lanceolata* revealed the presence of alkaloids, tannins, terpenoids and phenolics, carbohydrates, tannins, glycosides, phenols and saponins while *Alpinia galanga* revealed the presence of alkaloids, tannins, terpenoids and phenolics, alkaloids, carbohydrates, tannins, amino acids, and saponins. All the extracts of *Pluchea lanceolata* and *Alpinia galanga* are brown to brownish yellow sometimes hyaline in colour and showed semisolid consistency while aqueous extract is a brown in colour and showed solid consistency.

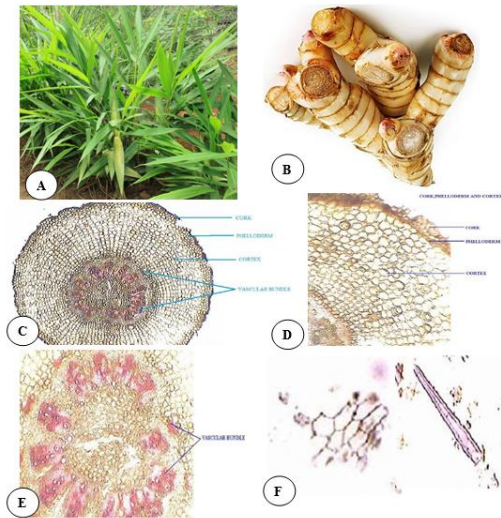


Plate 1: Fig. (A). Plant of *Alpinia galanga* (L.) Willd, (B). Rhizome, (C). T.S of *Alpinia galanga* roots (D). Cork, Phelloderm and Cortex (E). Vascular bundle (F). Powder microscopy-Cortex cell and Powder microscopy-Xylem vessels [Pictures from www.google.com and Kadam *et al.*, 2012]

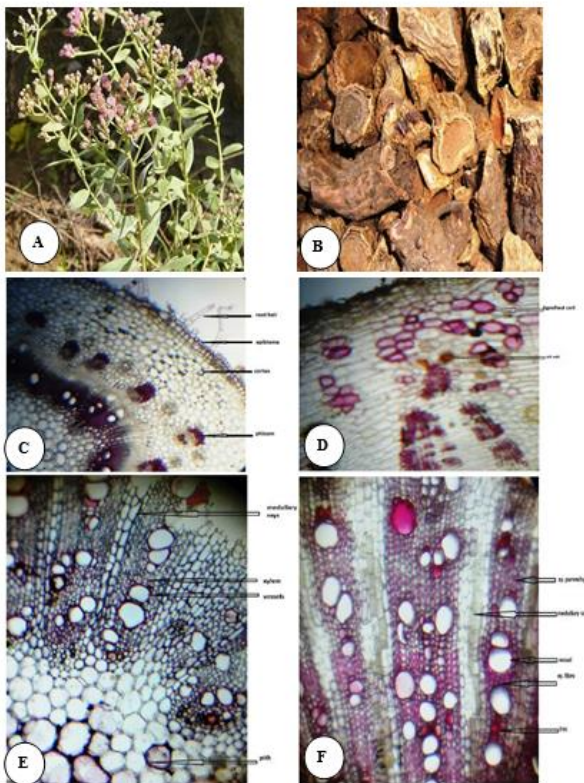


Plate 2: Fig. (A) *Pluchea lanceolata* (DC.) C. B. Clarke tree (B). Root (C-D). Microscopy of the root of *Pluchea lanceolata* [pictures from www.google.com and

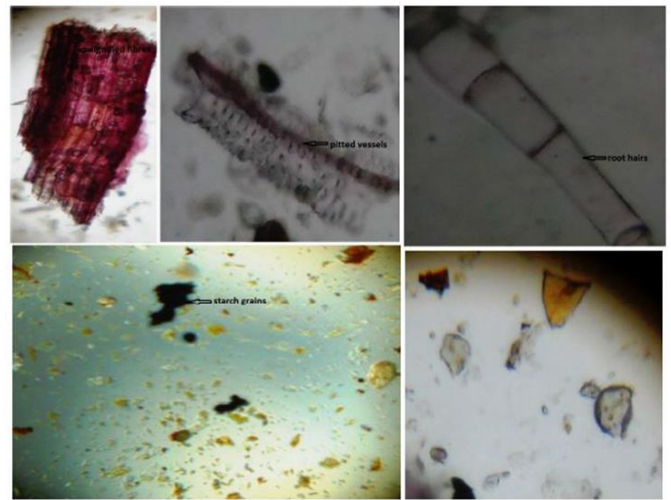


Plate 3: Figure of Powder microscopy of root showing lignified fibres, pitted vessels, root hairs and starch grains [pictures from Sharma and Goyal, 2012]

Conclusions

The present study of pharmacognostic and phytochemical parameters of both the drugs are very useful for the identification of the species and preparation of the monograph. The study had shown the standards which will be useful for the detection of its identity and authenticity. The morphological and anatomical studies viz. physical evaluation, preliminary phytochemical test adds to its quality control and quality assurance for proper identification. The present documentation including comparative organoleptic, microscopic characters, physicochemical values, preliminary phytochemical screening and pharmacognostical studies, can be used as a diagnostic tool for the correct identification of the leaves, stem, root and rhizomes of the *Pluchea lanceolata* and *Alpinia galanga* drugs.

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