

## A Review: Phytochemical constituents and medicinal importance of Dashapushpam

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### ABSTRACT

The Dashapushpam group consists of ten holy flowers, which are used in the Ayurvedic medical system and have amazing medicinal and prospective effects. It contains many flowers with distinctive personalities. These flowers, which have divine power, belong to various families, including Amaranthaceae, Oxalidaceae, Sapindoidae, Asteraceae, Convolvulaceae, Poaceae, and Hypoxidaceae. It covers things like anti-inflammatory, antimicrobial, cancer-fighting, anti-fungal, antipsychotic, anti-rheumatic, antiarrhythmic, anti-diarrheal, anthelmintic, and anti-diabetic activities. It offers a well-established conventional medical system. They also provide therapeutic advantages without any negative side effects. The main goal of this article is to inform readers about these herbs generally and their value as medicines.

**Keywords:** Dashapushpam, phytochemicals, phytoconstituents, sacred plants, therapeutic potential

### INTRODUCTION

Plants have satisfied all of man's needs for food, shelter, taste, aroma, not to mention medicine and other essentials, since the dawn of civilization. These plants additionally play a role in people's religious practices. Kerala is one of the main states of South India, where the use of plants is evident in both traditional and Ayurvedic medicines. The populace of Kerala has ten herbs that are revered as sacred, and they are known as "Dashapushpam" or "Ten Sacred Plants" (Fig.1). Dashapushpam literally translates to "ten flowers" (where "Dasha" stands for "ten" and "Pushpam" for "flowers") in Sanskrit. Dashapushpam is a collection of ten species of angiosperms that come from several plant groups and are valued by South Indians, especially Keralites, for their religious use and medicinal or therapeutic properties. A brief description of Dashapushpam has been given in the Table 1. The Western Ghats, situated in the state of Kerala, is one of the 34 biodiversity hotspots worldwide. Dashapushpam, the sacred plant of Kerala history and culture, is one of the more than 200 taxa of plants employed in Ayurveda. Over 4,500 different blooming plant species, including 1,500 endemic taxa, can be found throughout the state. Kerala is renowned for its abundance of medicinal

plants and its history of using an indigenous medicine called Ayurveda. Herbs are important in the pharmaceutical industry because they are natural sources of medicine that can save lives. In Karkkidamasam (mid-July–mid-August), dashapushpas are ingested in the form of Karkkidaka kanji to avoid aggravating vatadosha during the forthcoming varsharitu (monsoon season). Folk medicine has long utilized these herbs to treat a wide range of ailments, including vomiting, lithiasis, gonorrhoea, indigestion, intermittent fever, skin disorders, and urogenital diseases. Majority of them have been medicinally verified for several bio-activities.

### Different Dasapushpam along with its phytochemical's constituents

#### *Aerva lanata*

According to the World Health Organisation's most recent data, 80% of people worldwide rely on herbal medicines for a portion of their basic healthcare (Adepu *et al.*, 2013). One such gift among the many medicinal herbs that nature has provided is *Aerva lanata*. It is a prostrate, upright undershrub (Goyal *et al.*, 2011). In Hindi, it is known as Kapurijadi or Gorakhabooti, while in English, it is known as Mountain Knotgrass. It is

also known as Gorakshaganja, Satkabhedhi, and Aadaanpaak in Sanskrit (Nagaratna *et al.*, 2014). It could be considered a form of Pashanbheda, which is a remedy used in Ayurveda to remove urinary tract stones. It is native to Saudi Arabia, tropical Africa, Sri Lanka, Philippines and Java, where it grows to a height of 30 to 80 cm (Rajesh *et al.*, 2011). It has a wide range of therapeutic uses in conventional and folk medicines across numerous geographical contexts (Bitasta *et al.*, 2016). A paste made from the entire plant is utilised, for the treatment of spermatorrhoea, while a paste made from the leaves is used to treat wounds (Malik *et al.*, 2012). The plant extract is effective as a diuretic, emollient, vermifuge, astringent, and in the treatment of diabetes and ureteral stones (Kumar *et al.*, 2011; Sharma *et al.*, 2011). It cures bleeding piles and malaria and serves as a snake venom antidote (Sukumaran *et al.*, 2014). The plant's leaves are utilized in the treatment of diabetes, hypertension, fever, and cough (Chander *et al.*, 2014). The entire plant as well as root portion is used for lithotriptic, astringent, and cough purposes (Sivasankari *et al.*, 2014).

#### **Phytochemicals constituents in *Aerva lanata***

As per Ragavendran *et al.* (2012) Indian water lily is rich in diverse array of plant-based constituents. Through phytochemical screening, it has been found to contain various types of phytochemicals. Furthermore, FTIR analysis of different parts of the plant, including roots, stems, leaves, and flowers (Yamuna *et al.*, 2012), unveiled the existence of various functional groups, such as alcohols, aldehydes, nitro compounds, amides, carboxylic acids, ethers, amines, alkyl halides, and phenols. This indicates the diverse array of chemical constituents present in *Aerva lanata*. Additionally, the entire plant includes necessary trace elements like calcium, silica, magnesium, potassium, chloride, carbon, and oxygen (Ragavendran *et al.*, 2012). According to an ethanolic extract HPTLC study, the roots contain a significant amount of gallic acid. Quinones, phenols, triterpenoids, phytosterols, and phlobatannins were all detected during a phytochemical screening of the root extract (Vijaylakshmi and Ravindhran, 2012).

When analysed by HPLC, the soluble extract that comes from the stem included 3,5,7,3,4,5,-OH (myricetin), apigenin-7-O-glucoside (apigenin), quercetin-3-O-rutinoside (rutin), and 3,4,5-OH (gallic acid) (Kumar and Kumar, 2011). Total chlorophyll content, methoxykaempferol chlorophyll a, and chlorophyll b were reported to be present in the white and yellow-coloured varieties of *Aerva lanata* (Denniand Mammen, 2013). When the leaves, stems, roots, flowers, and seeds were analysed using GC-MC, a variety of different substances were found, including pyridine, hydroquinone, monobenzyl ether, docosane, dotriacontane, R,Z-12-hydroxy-9-octadecenoic acid, 2-isopropyl-2,5-dihydrofuran, and a wide variety of other substances (Mariswamy *et al.*, 2013).

#### ***Biophytum sensitivum***

The *Biophytum sensitivum* is primarily found in tropical Asia, America, and the Philippines. According to Ayurvedic tradition, it is bitter, expectorant, stimulant, and tonic, and it is mainly used to treat fever, malaria, tuberculosis, burns, phthisis, arthritis, back pain, bone spurs, bursitis, carpal tunnel syndrome, cervical spondylitis, degenerative joint disease, degenerative neck disease, fibromyalgia, and leg cramps (Bharati *et al.*, 2012). It has been used historically through medicine to treat indigestion, asthma, somnolence, convulsions, chest pain, and tumours. Whole plant decoctions are taken orally. In the foothills of the Himalayas in India, Ayurveda prescribes the root for gonorrhoea and lithiasis and uses it typically for inflammation and chronic skin conditions.

According to Nagbeli, an ancient form of medicine practiced in Nepal and the foothills of the Himalayas, leaves are taken orally to treat diabetes. In Mali, Africa, powdered leaves and seeds are applied topically to treat wounds. In India, both Ayurveda and Siddha claim that snake envenomation is cured by an entire plant decoction swallowed internally (Sakthivel *et al.*, 2012).

#### **Phytoconstituents constituents of *Biophytums sensitivum***

Numerous chemical components, primarily polyphenolic and phenolic compounds, saponin, polysaccharides, essential oils, and pectin, have

been identified by studying the phytochemistry of *B. sensitivum*. Two bioflavonoids, amentoflavone and cupressuflavone, three flavonoids, isoorientin, 3-methoxy-uteolin 7-O-glycoside, and luteolin-7-methyl ether, as well as two acids, 4-caffeoilinic acids, and aerial parts of *B. sensitivum* were wet-isolated to make up the major bioactive components. Additionally, it contains proanthocyanidins, which are condensed forms of tannins, 3'-8 pipigenin, and a few phenolic compounds. The airborne portion of the system was separated from these compounds (Sakthivel and Guruvayoorppan, 2012; Pawar and Vyawahare, 2014).

### ***Eclipta alba***

*Eclipta alba* (L.) an annual, multi-branched herbaceous plant. It typically reaches a height of 30–50 cm and can have an prostrate growth habit. The plant has white-colored hairs in it, and its leaves have hairs on both surfaces. The fruiting period of *E. alba* occurs between September and October (Fenz *et al.*, 2019 and Sunita and Mishra, 2016). The stem of this plant is red in color. It is considered a weed and can grow up to 2000 meters above sea level in subtropical and tropical regions around the World, including Africa, Asia, and South America. It is particularly widespread in countries such as Taiwan, Brazil, Japan, Indonesia, the Philippines, India, China, Bangladesh, Thailand, and the United States. In India, it is commonly found in states like Bihar, U.P, Assam, and Manipur (Mithun *et al.*, 2011; Singh *et al.*, 2017; Soni and Soni, 2017; Sinha *et al.*, 2016; Thenmozhi and Jayanthi, 2019). The medicinal properties of this herb are more known than its other pharmacological effects, they have beneficial rejuvenating qualities as well as analgesic, anti-inflammatory, anti-hepatotoxic, anti-hyperglycemic, antioxidant (Thenmozhi and Jayanthi, 2019) etc.

### **Phytochemicals constituents of *Eclipta alba***

Bhringraj, also referred to as *E. alba*, is a plant that includes a variety of phytochemical molecules, among which are flavonoids, coumestans, polyacetylenes, alkaloids, glycosides, triterpenoids and, as well as phenolic acids, sterols, saponins, sesquiterpene lactones, amino acids, proteins, and

carbohydrates (Saxena *et al.*, 2016; Latha *et al.*, 2017). Detail Phytochemical constituents are presented in Table 2.

### ***Cyanthillium cinerea***

*Cyanthillium cinerea* is a widespread common plant that is utilized in various traditional Indian medicines. It is a perennial herb that features flat-topped clusters of many flower heads with rosy ray petals. Various traditional uses of the plant have therapeutic potential. Infections of the eyes and fever are treated using the entire plant. To obtain anthelmintic and alexipharmic medication, seeds are employed as a source. The leaves of *Cyanthillium cinerea* possess analgesic, antipyretic, and anti-inflammatory effects. Whole plant is used to treat renal problems, dermatitis, menstrual cramps, stomach ache, diarrhea, and as a diuretic decoction. Children who wet the bed are given this plant's juice to help them (Abdullahi *et al.*, 2015).

### **Phytochemical constituents of *Cyanthillium cinerea***

The triterpenes are the main components. Luteolinmonobeta-D glucopyranoside was produced via aerial components. The entire plant produced potassium chloride, phenolic resin and triterpene chemicals like beta amyryl acetate, lupeol acetate, lupeol and beta amyryl. It also produced sterols like beta-sitosterol, stigma sterol and alpha-spinasterol. The flower (used to treat conjunctivitis), seeds (used as an anthelmintic), roots (used to treat dropsy) and juice (used to treat piles) are among the helpful parts (Raj *et al.*, 2013).

### ***Evolvulus alsinoides***

A flat perennial herb with a weakly branched wood rootstock is called *Evolvulus alsinoides* belongs to Convolvulaceae family. They are rounded in shape and have several annual branches that are about 30cm long on the outside. The branches typically crouch and encircle lengthy hairs. The elliptic-shaped small leaves are found in *Evolvulus alsinoides*, they are acute, sensitive and densely branched and every part of this plant is utilized to make Ayurvedic medication to cure fever, a cough and a cold. Inflammation related neurodegenerative diseases are also treated with them (Prochazkova *et al.*, 2011).

### **Phytochemicals constituents of *Evolvulus alsinoides***

Three alkaloids, namely betaine, shankhpushpina, and evolvine, are found in the *Ecliptaalba* plant. Additionally, fresh plants of this species contain volatile oil, a yellow neutral fat, organic acids, and saline materials. Several substances were identified from *E. alsinoides* through chemical analysis, including 1,3-di-O-caffeoyl quinic acid methyl ester, caffeic acid, and 3-Hydroxy-4-(2,3,4-trihydroxy-2-methylbutoxy)-phenyl-2,3,4-trihydroxy-3-2-propenoate (1). kaempferol-3-O-glycopyranoside, quercetin-3-O-glycopyranoside, kaempferol-7-glycopyranoside, and 6-methoxy-7-glycopyranoside coumarin (Raj et al., 2013).

### ***Emilia sonchifolia***

In Malayalam, it is Muylalcheviyan. The herb is glabrous, slender, and 30–40 cm tall. The flowers are purple, and the leaves are obliterated. It is sometimes referred to as Cupid's razor. Typically, waste grounds and damp regions are where we can find the plant. The entire plant is utilized for a variety of therapies. Dysentery is treated using a tea brewed from the leaves. The leaf juice is applied topically to treat wounds, sore ears, eye inflammation, and night blindness. Roots are used to treat diarrhea. There are claims that the methanolic extract and fresh juice of *E. sonchifolia* leaves have anti-inflammatory and antioxidant properties. The water extract of the plant shows antibacterial activity (Raj et al., 2013).

### **Phytochemical constituents of *Emilia sonchifolia***

Alkaloids, flavonoids, and terpenes have all reportedly been found in the plant's aerial parts. Senkirkine, doronine, and pyrrolizidine alkaloids are present in the aerial portions. Similar sitosterol, palmitic, and triacontannic acids are also said to be present in the plant (Raj et al., 2013).

### ***Cardiospermum halicacabum***

This is the common term for balloon vines. Tamil for "Mudakkathan". Annual climbers have tenders that have a light pubescence. Biternate leaves are actually trifoliate leaves with three leaflets on each section and coarse serration on each leaflet. The axillary heads of the flowers are

normally white with a yellow centre, and there are three flowers by abortion. Fruit is a green, inflated, membranous capsule that is over 2cm long and turns brown as it dries. Round dark seeds with noticeable heart- or kidney-shaped markings (Jayanthi et al., 2012). This plant thrives on the plains of Bangladesh, India, Pakistan, and America and is common throughout the world's tropical and subtropical climates (Rajasekaran et al., 2014). The entire plant has long been used to treat rheumatism, stiffness in the limbs, snake bites, and anxious diseases like diaphoretic, diuretic, stomachic, and sudorific; its leaves and stalks are also used as a poultice for swellings and diarrhoea and are used to treat dysentery and headaches. (Vinoth et al., 2013). For the treatment of bone fractures, it is used in Sri Lanka. On the market, there are a number of *C. halicacabum* products available, including gel, lotion, shampoo, and spray. Dry, itchy skin and scalp may benefit from these products (Patil et al., 2011).

### **Phytochemical constituents of *Cardiospermum halicacabum***

Proteins, carbohydrates, tannins, alkaloids, glycosides, steroids, and saponins were found in *C. halicacabum*, according to a phytochemical investigation (Raza et al., 2013; Patil et al., 2011). In addition to other active compounds, gas chromatography identified 1,2,4-trioxolane-2-octanic acid, 5-octymethyl ester, ricinolenic acid, [1,1-bicyclopopyl], 2-[9-octadecenyloxy], and 1,2,3-trioxolane-2-octanic acid in *C. halicacabum* (Kumar and Kumari, 2012). Oleic acid, 2-hexylmethyl ester, 11-octadecenoic acid, methyl ester, 7-methyl-7-tetradecan-1-ol acetate, and 1,2,3-propanetriyl ester are among the substances that mass spectrometry has identified (Rajesh et al., 2016). Apigenin-7-o-glucuronide, arachidic acid, chrysoeriol-7-o-glucuronide, linoleic acid, luteolin-7-o-glucuronide, and stearic acid are the components that make up (+) pinto (Aishwarya et al., 2014).

### ***Curculigo orchioides***

The plant called "Kali musali" in Sanskrit, is a little tuberous herbaceous plant. Flowers across the entire region are yellow and have narrow, linear

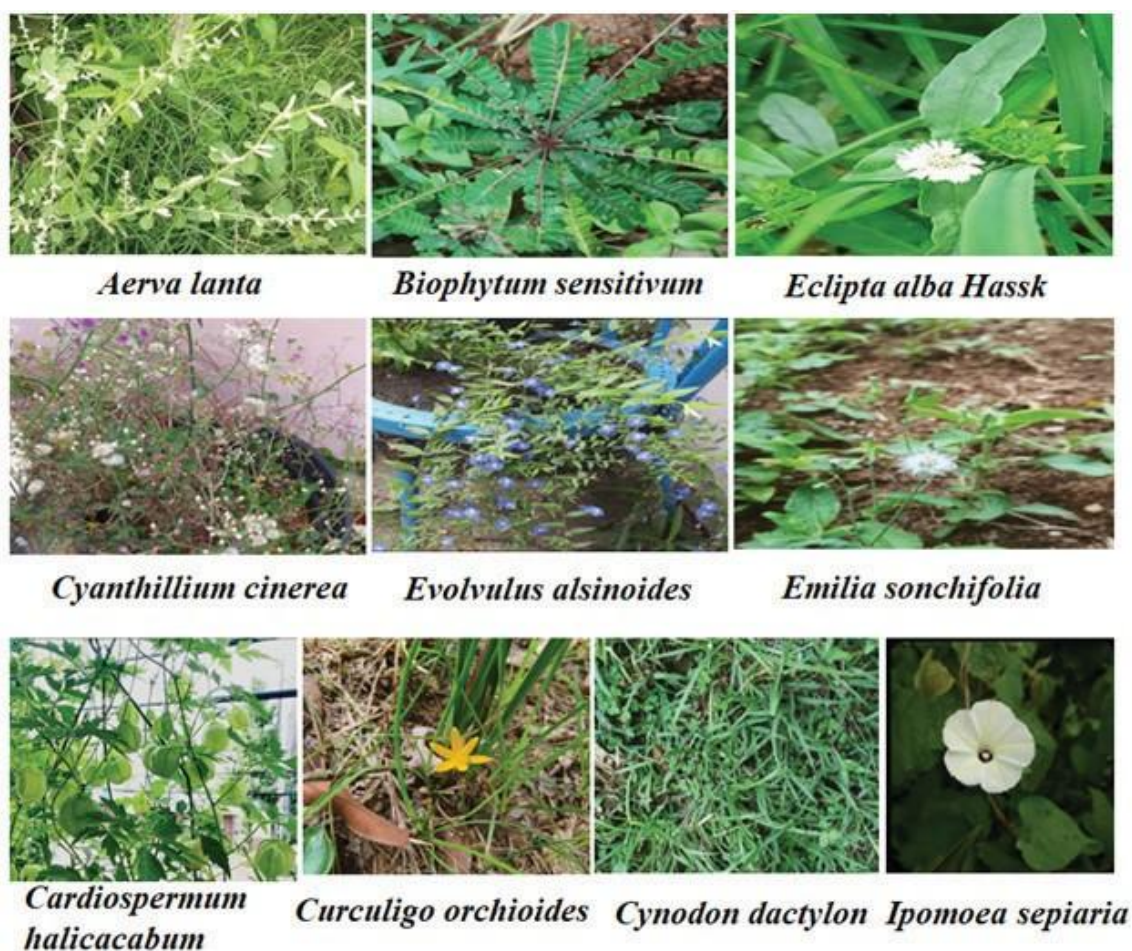


**Table 1 : Brief description of Dasapushpam**

Names in Latin	In Sanskrit	In English	Family	Part utilized	References
<i>Aerva lanta</i> (L.) AL Juss. Ex Schultes	Bhadra	Indian water lily	Amaranthaceae	Whole plant	Bitasta <i>et al.</i> (2016)
<i>Biophytum sensitivum</i> (L.) DC	Viparithalajjalu	Sensitive wood sorrel	Oxalidaceae	Whole plant	Sakthivel and Guruvayoorappan (2012)
<i>Cardiospermum halicacabum</i> Linn.	Indravalli	Balloon vine	Sapindaceae	Shoot/ leaves	Shree and Azamthulla(2019)
<i>Curculigo orchioides</i> Gaertn.	Musali	Black musali	Amaryllidaceae	Tubers	Nagesh <i>et al.</i> (2016)
<i>Cynodon dactylon</i> (Linn.) Pers	Murva	Bermuda grass	Poaceae	leaves	Parihar <i>et al.</i> (2021)
<i>Eclipta alba</i> (L.) Hassk	Bhringaraja	False Daisy	Asteraceae	Shoot/ leaves	Kumari <i>et al.</i> (2021)
<i>Emilia sonchifolia</i> (L.) DC	Akhukarni	Canada Flea-bane	Convolvulaceae	Shoot/ leaves	Xu <i>et al.</i> (2020)
<i>Evolvulus alsinoides</i> Linn.	Harikrantha	Slender Dwarf Morning Glory	Convolvulaceae	Whole plant	Arun <i>et al.</i> (2013)
<i>Ipomoea sepiariakoen.</i> Ex Roxb	Lakshamana	Ipomoea	Convolvulaceae	Whole plant	Arun <i>et al.</i> (2013)
<i>Cyanthillium cinereum</i> (L.) H.Rob.	Sahadevi	Ash coloured Flea-bane	Asteraceae	Whole plant	Arun <i>et al.</i> (2013)

**Table 2: Phytochemical constituents of *Eclipta alba* Hassk**

Nature of phytoconstituents	Phytoconstituents	References
Coumestans	Wedelolactone, demethylwedelolactone, demethylwedelolactone-7-glucoside	Kumari <i>et al.</i> (2021)
Terterpenoids and their glycosides	Eclalbasaponins VII-X (taraxastanetrirterpeneglycosides), Eclabasaponins I-VI (oleananetrirterpeneglycosides), Eclabasaponins I-VI (triterpene glycosides), ecliptasaponins C and D (triterpenoid glycosides), $\alpha$ -amyrin, Oleanolic acid, ursolic acid (triterpenoids).	Rafif <i>et al.</i> (2022)
Sterol	Stigmasterol, daucosterol, Stigmasterol-3-O-glucoside $\hat{a}$ -sitosterol.	Kaur <i>et al.</i> (2011)
Alkaloids	[(20S) (25S)-22,26 imino-cholesta-5,22(N)-dien-3 $\hat{a}$ , 23-ol] (verazine), [20-epi-3-dehydroxy-3-oxo-5,6-dihydro-4, 5-dehydroverazine], [(20R)-20-pyridyl-cholesta-5-ene-3 $\hat{a}$ ,23-diol] (ecliptalbine), [25 $\hat{a}$ -hydroxyverazine].	Rafif <i>et al.</i> (2022)
Flavonoids	Luteolin-7-glucoside, leteolin, apigenin, orobol (isoluteolin)	Kumari <i>et al.</i> (2021)
Volatile oils	Heptadecane, 6,10,14-trimethyl-2-pentadecanone, n-hexadecanoic acid, pentadecane, eudesma-4(14),1-diene, phytol, octadic-9-enoic acid, 1,2—benzenediacarboxylic acid di-isooctyl ester, (Z,Z) -9,octadecadienolic acid, (Z)-7,11-dimethyl-3-methylene -1,6,10-dodecateriene, (Z,Z,Z)-1,5,9,9-tetramethyl1,4,7-cycloundecatriene	Kumari <i>et al.</i> (2021)
Saponins	Eclalbatin (triterpenesaponin), dasyscyphin C	Kumari <i>et al.</i> (2021)



**Fig. 1: Different types of Dashapushpam**

leaves. This medicinal plant is used to cure asthma, osteoporosis, diabetes, jaundice, make tonics, prevent the disease and fight cancer (Nagesh *et al.*, 2016; Xia *et al.*, 2016; Sharma *et al.*, 2017). Numerous phenol and phenolic glycosides, lignans, lignans glycosides and polysaccharides were discovered as a result of chemical analysis of *C. orchioides* (Niet *et al.*, 2013; Wang *et al.*, 2019; Xia *et al.*, 2016).

#### **Phytochemical constituents of *Curculigo orchioides***

The fruit of the plant has been used to isolate Curculin C, which is a peptide containing amino acids (Raj *et al.*, 2013). The rhizome also contains additional saponins, sapogenins, phenolic glycosides, a triterpene alcohol, and curculigosaponin C and F.

#### ***Cynodon dactylon***

*Cynodon dactylon* (Linn.) Pers called “Dhruva” in Sanskrit, may flourish in unfavorable conditions. Bermuda grass, also known as Dhruv grass, was highly regarded by the Hindus and is still used in temple devotion today. A huge twining herb with soft-to-the touch extremities and deeply furrowed corky bark on older stems. It flourishes all over India’s southern region. It thrives in open spaces that frequently experience disturbances like grazing, flooding, and fire.

#### **Phytochemical constituents of *Cynodon dactylon***

Triticin, hydrocyanic acid, and cynodin are all present in Bermuda grass. The plant has been linked to the p-coumaric, syringic, phenolic phytotoxins ferulic, vanillic, p-hydroxybenzoic, and o-hydroxyphenyl acetic acids. The leaves contain flavone C glycosides and flavonoid sulphate (Raj *et al.*, 2013).

### ***Ipomoea sepiariako***

This plant is known as “Lakshmana” in Sanskrit (Majumder *et al.*, 2013). The perennial climber *Ipomoea sepiaria* is a significant ethano medicinal plant having phytochemical constituents like carbohydrates, alkaloids, glycosides, saponins, flavonoids, phenolic compounds and tannin. Human prostate cancer cell lines known as PC3 (PC-3) are widely utilised to study the biochemical alterations that occur in prostate cancer cells (Meesala *et al.*, 2017).

### **Phytochemical constituents of *Ipomoea sepiaria***

Ipobscurine A, B and C, non-ergoline type indole alkaloids, as well as Ipobscurine C, a serotonin alkaloid, are found in the seeds of *Ipomoea* resin (Majumder *et al.*, 2013).

### **CONCLUSION**

These ten sacred plants have limitless therapeutic potential and are underutilized for treating a variety of diseases. The creation of novel therapeutic compounds from these plants has to be fostered through research and development. Its criteria, pharmacological activity, toxicity, and clinical trials should all be carefully examined in order to produce novel drugs for a range of illnesses. Research on phytomedicine has significantly increased on a global scale. Therefore, the potential for developing drugs from these plants is enormous. Over the past few decades, certain research projects have been conducted on these plants, which has sufficiently inspired the scientific community to learn more about these revered plants. The potential of Dashapushpam should be the subject of research and development.

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