Ethnobotanical and phytopharmacological review of *Scindapsus officinalis* (“*Gajapippali*”)  
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**ABSTRACT**

*Scindapsus officinalis* (*S. officinalis*) holds a reputed position in Ayurvedic system of medicine. It has been ethanobotanically used to treat diarrhea (“*atisara*”), worm infestation (“*krmiroga*”), and as antipyretic. Literature survey on *S. officinalis* was carried out via electronic search in PubMed, SciFinder, Scirus, Google Scholar, Agricola and Web of Science and a library search. Results revealed that a very specific botanical description of the plant is still not available. The plant is mistaken within the hybrids and other plants of genus *Scindapsus* and family Araceae. Since ethnobotanically the plant is of much importance, chemistry of the plant yet needs to be fully explored. Thus the need of the hour is to comprehend the fragmented information available on the botany, traditional uses, phytochemistry and pharmacology of *S. officinalis* which could help in the correct identification of the sample and avoid adulteration due to mistaken identity.

1. Introduction

The genus *Scindapsus* Schott (1832) contains about 35 species from Northeastern India to Western Polynesia [1]. It is an epiphytic climbing shrub, with ovate oblong, ovate oblong cordate or oblong lanceolate leaves [2], bisexual flowers and naked spathe [3]. Florets are without perianth, each having four stamens and a one-celled ovary with a solitary basal ovule [4]. About fifteen species of the plant and numerous hybrids, all of which are evergreen, root clinging climbers with juvenile and adult stages, belong to this genus [5]. The various species of genus *Scindapsus* include *Scindapsus caudatus*, *Scindapsus decursivus* Schott (Sylhet, Bangladesh), *Scindapsus giganteus* Schott (Penang, Singapore), *Scindapsus glaucus* Schott (Khasaya Paras, Nepal), *Scindapsus officinalis* Schott (*S. officinalis*) (India, Burma), *Scindapsus papepla* Endl (Sylhet, Bangladesh), *Scindapsus pertusus* Schott (Coromandel, South Konkan), *Scindapsus pinnatifidus* (Roxb.) [6], *Scindapsus pictus* (*S. pictus*), *Scindapsus scortechinii*, *Scindapsus hederacea*, *Scindapsus perakensis*, *Scindapsus crassipes*, *Scindapsus becarii* and *Scindapsus cuscuarium* [7]. *S. officinalis*, a plant with perennial stem, is a large epiphytic climber with adventitious aerial roots growing on trees and rocks [8]. The mature inflorescence without the spathe is transversely sliced into pieces and dried [9] and is commonly known as “*Guj-pippul*” [10]. In Ayurvedic system of medicine, it is known to cure “*atisara*” (diarrhea), “*svasa*” (dyspnea), “*kanthmaya*” (throat diseases) and “*krmi*” (parasitic infestation) (Figure 1) [11].

![Figure 1. Leaf and fruit of *S. officinalis*.](image-url)
2. Botanical description

2.1. Habitat

*S. officinalis* is a common plant in tropical forests of many parts of India, Myanmar [12], China [13] and Nepal [14]. In India the plant is cultivated for its fruits at Midnapur, Bengal [9,13,15,16] and is found in southern cities of Calicut and Cochin. It is also present in Rosa thicket in managed sal (*Shorea robusta* Gaertn.) forests of Gorakhpaur region [17]. Reaching the northeastern states, the plant is strikingly noticeable in Phangpui National Park situated at Blue Mountain, Mizoram [18] and Kurung Kumey, East Kameng and West Kameng districts of Arunachal Pradesh. According to GPS, in the location with coordinates of 27°57.176' N and 93°09.877' E, the density of the plant is 0.3/m² area in 100 m² quadrat size [19]. In Mayanmar, the plant is frequently present in Chappedong, Moulmein, Rangoon and Monghir mountains [13],

2.2. Morphology

The leaves of *S. officinalis* are large (upto 25 cm long), leathery [9], with dark green peduncle. They are solitary with terminal much shorter than the petiole [7]. Their shape is ovate, elliptic ovate or nearly orbicular, caudate acuminate with rounded or slightly cordate base. The primary nerves are distinct [16], marked with the presence of dilated or winged petiolar sheaths [14,16,20]. The stem of the plant is as thick as a little finger [7] and turns almost woody when old [20]. The roots of the plant are adventitious and aerial, clinging on trees and rocks [21]. The winged petiolar sheaths [14,16,20]. The stem of the plant is as stout, short and terete peduncle [16]. The spathe is about 4 cm in width, 0.4 cm in length which is smooth, shiny, grayish-brown with a dent [22]. The ovary is densely packed [20], truncate, one-celled with one seed attached in an oblique manner [8]. There is a marked presence of grooves with short four-celled anthers [20]. Substance of the ovary is replete with rigid, sharp, vertical bristles which readily detach and stick in the skin causing pain and itching [8]. The seed has hard testa [3]. The seed is ovate cordate [7,16], kidney-shaped [22] or horseshoe-shaped and is covered by a membrane [23] with the dimensions of 0.3–0.4 cm in width, 0.4–0.6 cm in length which is smooth, shiny, grayish-brown with a dent [22]. Hilum overlies the chalazal end and is marked by an irregularly bordered scar. The micropyle is dorsal to the hilum and is subtended dorsally by a thickened ridge [23],

2.3. Microscopy

*Epipremnum* and *Scindapsus* are characterized by simple vascular bundles and axial bundles [24].

2.3.1. Fruits

The microscopy showed loosely arranged, thin-walled parenchymatous cells having isodiametric cells filled with brown content and numerous acicular crystals of calcium oxalate [22],

2.3.2. Spadix

Transverse section of the spadix of the fruits of *Scindapsus* revealed a central lobed axis with hollow central core and lobed inflorescence axis. The axis bears radial circle of fruits which are separated from each other by thin radial septa (covering membrane) [25], and also present in sclereids which are branched with arms that project into intercellular spaces (trichosclereids). In lamina distinct idioblasts are present [26].

3. Adulteration

It is of great concern that the plant is often adulterated knowingly or unknowingly due to mistaken identity. Significant pharmacognostical variations were observed in the marketed samples of the fruits collected from five different districts of Uttar Pradesh. Besides macroscopy and microscopy, quantitative estimation of the powder with fluorescence analysis depicted adulteration in the samples [27].

3.1. Adulteration with *Piper chaba* Hunter (*P. chaba*)

“Gajapippali” (*S. officinalis*) has long been a drug of controversial origin. According to Bhavaprakasa, a lexicon of Ayurveda, *P. chaba* ("Cavika" or "cavya") has usually been considered as probable adulterant of *S. officinalis* [28]. In Ayurvedic system of medicine “pippalmuda" i.e. root of *Piper longum* (family Piperaceae) is used as “pratindhi dravyas" (substitute drug) for fruit of “gajapippali" [29]. Latin name *S. officinalis* is given for “gajapippali” and in the same work “gajapippali” as well as “cavya" are the common names of *P. chaba*. Since the morphology of leaf sheath of *S. officinalis* resembles that of six species of *P. chaba* [31], it is equated with *P. chaba* and is also used as diaphoretics, sudorifics, anti diarrheals, antiasthmatics and stomachics [32]. *S. officinalis* is used as the biological source for the isolation of piperine, which illustrates significant antimutagenic activity against 2-aminoanthracene-induced mutagenicity and was non-toxic [33]. “Cavika" and “gajapippali" (*P. chaba* and *Scindapsus*) are alike in their properties, but “gajapippali" is more potent as expectorant than “cavika" [34].

3.2. Adulteration with *Balanophora* species

*Balanophora fungosa* J. R & G. Frost (Balanophoraceae) is a root parasite with a coral-like fleshy body and superficially resembles *Scindapsus*, but it is neither reported to be of any medicinal value [35] nor matches the characteristic pharmacognostic features of *S. officinalis* as seeds, stone cells, epidermis, starch, calcium oxalate crystals, vascular bundles and oil globules are absent in *Balanophora* [36]. Sliced and dried inflorescence of *Balanophora indica* is also sold as “attittippali" (another vernacular name of *S. officinalis*) [9]. “Gajapippali" is also mistaken with male or female in attittippali.

3.3. Adulteration with *Pothos scandens*

Dried, transverse pieces of *S. officinalis*, known as “Guji-pippal" are important in Hindoo Materia Medica but are sold by the druggist under the name Roxb. *Pothos scandens*. It is employed in India as a remedy for putrid fever [38,39] and its decoction is used for rheumatic complaints [40].
4. Phytochemistry

Species of Araceae family are rich in simple anthocyanins content present in inflorescence, fruit, leaf or petiole of the plant. Cyanidin 3-rutinoside is the most common pigment; pelargonidin 3-rutinoside and cyanidin 3-glucoside are also present, and C-glycosides (82%) and proanthocyanidins (35%–45%) are the major flavonoids [41]. Scindapsus species contain oxalates typically in the form of calcium oxalates [42].

The fruits of S. officinalis contain sterol, oil, a mixture of sugars and two glycosidic coloring substances [22,43,44], scindapsin A and B which on hydrolysis yield the aglycons i.e. scindapsinidine A and B. Free sugars like rhamnose, fructose, glucose and xylose together with some di- and trisaccharides are identified in the plant [37]. Purification of ethanolic extract of fruits of S. officinalis by column chromatography yielded three brownish sticky residues, pipeline, mixture of glycerin and ascobic acid, and ascobic acid, respectively [45]. Polyphenols mark their prominent presence and are extracted by ultrasonic extraction method [46]. Based on infrared spectroscopy, nuclear magnetic resonance, mass spectroscopy and chemical degradations, a hydroxy fatty acid was isolated from S. officinalis seed oil as 11-hydroxy-cis,cis,5,8-tetracosadienoic acid together with cycloprenoid fatty acids [47]. The presence of steroids, carbohydrates, flavonoids, alkaloids, tannins, saponins, terpenoid compounds [46,48,49], phenolics, glycosides, fat and oils is noteworthy in the ethanolic extract [50]. In a study, the total phenolics content in acetone extract and methanolic extract of the plant was reported to be (7.81 ± 0.13) and (54.35 ± 0.52) mg/g, respectively. The flavonoids in acetone extract and methanolic extract were reported to be (63.12 ± 0.19) and (33.11 ± 0.18) mg/g, respectively [51]. Inorganic elemental analysis on ash of the fruit revealed the presence of Ca, Fe, Mg, phosphate, K, Na and sulfate [50]. Six essential elements, namely, Ca, Mg, Mn, Fe, Zn and Cr were also acknowledged in S. officinalis [52].

Flavonoid sulphates and a mixture of flavone and flavonol sulphates are present in S. pictus [41]. Scindapsus aureus (S. aureus) contains 16 mineral elements including K, P, Ca, Mg, S, Al, Si, Fe, Na, Mn, Zn, Sr, B, Ba, Cu and Ti [53]. Elongated rhombohedral calcium carbonate (CaCO₃) crystals [54] were synthesized by using the leaves of the plant S. aureus. Biomolecules such as proteins in S. aureus leaves were responsible for temptation and control of the nucleation and growth of CaCO₃ crystals [55].

5. Traditional and contemporary uses

According to Ayurveda, S. officinalis is used to treat “ati-sara” (diarrhea), “svasa” (dysnea), “Krmiroga” (worm infestation) and “kanthya roga” (throat infections).

According to Ayurveda, the pharmacodynamics of the plant is explained by “Rasa” (taste), “Guna” (property), “Virya” (potency), “Vipaka” (post-digestive effect) and “ Karma” (pharmacology). The taste of the plant is pungent, with dry and sharp properties. The roots have hot (“Ushna”) potency and the fruits have cold (“Sheeta”) potency. The fruits have sweet post-digestive effect [56]. The pharmacological activities of the plant include “Dipana” (increasing appetite), “Agniwarshak” (peptic), treating “Kanthya” (throat infections), “Kaphahara” (productive cough), “Stanyat” (breast problems) and “Varnya” (improving skin complexion) [22].

Table 1 summarizes the traditional use of different parts of the plant for various ailments.

Table 1
The traditional use of different parts of the plant for various ailments.

<table>
<thead>
<tr>
<th>Plant parts</th>
<th>Uses/ailment</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves</td>
<td>Bone fracture, rheumatism and body pain</td>
<td>[57]</td>
</tr>
<tr>
<td></td>
<td>Applied over spleen</td>
<td>[58]</td>
</tr>
<tr>
<td>Stem</td>
<td>Decoction is used to treat gastric complaints</td>
<td>[57]</td>
</tr>
<tr>
<td>Fruits</td>
<td>Analgesic and antidiarrheal (aqueous extract or decoction)</td>
<td>[59]</td>
</tr>
<tr>
<td></td>
<td>Infections caused by deranged phlegm</td>
<td>[60]</td>
</tr>
<tr>
<td></td>
<td>Hypoglycemic</td>
<td>[59,61–63]</td>
</tr>
<tr>
<td></td>
<td>Applied externally for rheumatism</td>
<td>[37,57]</td>
</tr>
<tr>
<td></td>
<td>Anti-protozoal</td>
<td>[59,61]</td>
</tr>
<tr>
<td></td>
<td>Aphrodissiac, expectorant, diaphoretic, carminative and anthelmintic. It is useful to combat “vata” (the energy of movement and the force governing all biological activity) and “kapha” (the energy of building and lubrication that provides the body with physical form, structure, and the smooth functioning of all its parts), cough, bronchitis, pharyngophathy</td>
<td>[9,16,57,60,61,64,65]</td>
</tr>
<tr>
<td>Berries</td>
<td>Bone fracture, rheumatism and body pain</td>
<td>[57]</td>
</tr>
<tr>
<td>Whole plant</td>
<td>Rheumatism, improving blood circulation and as an agent for hair growth</td>
<td>[57]</td>
</tr>
<tr>
<td></td>
<td>In male reproductive dysfunction, it is used to increase the power of erection and number of coitus</td>
<td>[66]</td>
</tr>
<tr>
<td></td>
<td>Stimulant, diaphoretic and anthelmintic</td>
<td>[67]</td>
</tr>
<tr>
<td></td>
<td>Used as an ingredient of hot poultice for goiter</td>
<td>[59]</td>
</tr>
<tr>
<td></td>
<td>Used in medicated oils administered internally for asthma</td>
<td>[68]</td>
</tr>
<tr>
<td></td>
<td>Used internally for edema, piles, indigestion, colic and intestinal catarrh</td>
<td>[69]</td>
</tr>
<tr>
<td></td>
<td>Powdered and suspended in warm water for bleeding after child birth</td>
<td>[70]</td>
</tr>
<tr>
<td></td>
<td>Used in ghees, powders, medicated ointments, enemas to cure abdominal tumors</td>
<td>[68–70]</td>
</tr>
<tr>
<td></td>
<td>Sweetened with honey and sugar for diarrhea with blood and mucus</td>
<td>[71]</td>
</tr>
<tr>
<td></td>
<td>Used in fracture and abortion</td>
<td>[57]</td>
</tr>
<tr>
<td></td>
<td>Used to treat diabetes mellitus</td>
<td>[62,72]</td>
</tr>
<tr>
<td></td>
<td>Aphrodissiac</td>
<td>[73]</td>
</tr>
</tbody>
</table>
5.1. Marketed formulations of the plant

*S. officinalis* is used as an active botanical ingredient in the preparation of “Guggulutikakam gritham” (an ayurvedic medicine) employed in the treatment of osteoarthritis [74]. With the aid of high performance thin layer chromatography and gas chromatography-mass chromatography, it was proved that “Guggulutikakam gritham” was polar in nature [75]. Traditionally, there are many formulations which use *S. officinalis* as their ingredient for treatment of “Kubjaprarsarni taila” (muscular rheumatism), “Punarnavadi churna” (dropsy), “Kantkari ghrita” (bronchitis), “Panchgavya ghrita” (epilepsy, hysteria), “Kantkarya avaleha” (cardiac asthma and coughs), “Devadarvadi lepa” (abdominal inflammations), “Sarva jwara hara loha” (fever), “Dhatakadyatri quath” (infantile diarrhea and dysentery), “panchhatikata guggulu curanam” (skin diseases including leprosy) and used as “Vangeshwaradi vati rasa” (aphrodisiac) [76,77], Table 2 demonstrates some of the formulations with their uses and manufacturers.

5.2. Traditional uses of the plant in different localities

The plant is conventionally used in different places for different ailments. Table 3 shows the utilization of the different parts or formulations of the plant in different localities.

### Table 2

<table>
<thead>
<tr>
<th>Formulation</th>
<th>Uses/ailment</th>
<th>Manufacturers</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Agastya Haritaki Rasayana”</td>
<td>“Pranavaha Sroto Vikaras” (respiratory disorders) like “Kasa” (cough), “Swasa” (asthma), “Hikka” (hiccough) etc.</td>
<td>Kottakal Arya Vaidya Sala, Alva Pharmacy, AVP, AVN</td>
<td>[78]</td>
</tr>
<tr>
<td>“Rajanyadi Churna”</td>
<td>“Vataja udararoga” (dropsy)</td>
<td>The Arya Vaidya Nilayam, Ashoka Pharmaceuticals, Nagarjuna Ayurvedic Group AVP, AVS (Kottakkal), Baidyanath</td>
<td>[79,80]</td>
</tr>
<tr>
<td>“Punarnava asava”</td>
<td>Diarrhea</td>
<td>Shree Baidyanath Ayurveda, Bhavan Ltd., Patna</td>
<td>[81]</td>
</tr>
<tr>
<td>“Kumari Ashavai”, “Basanamalki rasa”</td>
<td>Rheumatism</td>
<td>Shree Baidyanath Ayurveda, Bhavan Ltd., Patna</td>
<td>[82,83]</td>
</tr>
<tr>
<td>“Mahayograj Guggula” (used as an ingredient of “Swarna Guggula”)</td>
<td>Rheumatism and arthritis, neuritis, sciatica, obesity, cardiac diseases and respiratory diseases such as asthma and gastrointestinal diseases such as colitis</td>
<td>SNP Specialty Natural Products Co. Vyas Pharmaceuticals, Rasashram, Baidyanath</td>
<td>[84,85]</td>
</tr>
<tr>
<td>“Bheema shakti rasayana”</td>
<td>Used as carminative, stimulant, tonic and anthelmintic to treat impotency, spermatorrhea</td>
<td>Divya Pharmacy</td>
<td>[86]</td>
</tr>
<tr>
<td>“Kunch Pak”</td>
<td>Urinary tract disorders, anemia, jaundice, backache, orchitis, hyper glycemia, piles, liver and splenic disorders</td>
<td>Dehvi Naturals, Cipla, Baidyanath</td>
<td>[87–89]</td>
</tr>
<tr>
<td>“Divya pidantaka kvathi”</td>
<td>Restores the hormonal balance, increases the endometrium and improves capillary permeability</td>
<td>Aimil Pharmaceuticals</td>
<td>[90]</td>
</tr>
<tr>
<td>“Chandraprabha Vati”, in a dose of 2 tablets with warm water twice daily</td>
<td>Improves loss of appetite</td>
<td>Charak</td>
<td>[91]</td>
</tr>
</tbody>
</table>

### Table 3

<table>
<thead>
<tr>
<th>Part/formulation</th>
<th>Uses/ailment</th>
<th>Localities</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushed roots of young plant (10 g)</td>
<td>Stomachache</td>
<td>Barind Tract of Bangladesh</td>
<td>[92]</td>
</tr>
<tr>
<td>The fruit is cut in slices and given with food</td>
<td>Diarrhea and dysentery in animals (cattle and goats)</td>
<td>Nepal</td>
<td>[93]</td>
</tr>
<tr>
<td>Stems and leaves boiled with water</td>
<td>Body nourishment</td>
<td>Bung Khong Long Non-Hunting Area, Northeast Thailand</td>
<td>[94]</td>
</tr>
<tr>
<td>Whole plant mixed with honey</td>
<td>Sore throats or the ailments related to elephants</td>
<td>Tamil Nadu</td>
<td>[95]</td>
</tr>
<tr>
<td>Whole plant</td>
<td>Jaundice</td>
<td>Villages of Challakare Taluk of Chitradurga District of Karnataka</td>
<td>[96]</td>
</tr>
<tr>
<td>Fresh or dried fruits with pepper</td>
<td>Throat infections</td>
<td>Dhenkanal Orrisa</td>
<td>[97]</td>
</tr>
<tr>
<td>Fruit</td>
<td>Stimulant, diaphoretic, carminative and anthelmintic</td>
<td>Mizonaram</td>
<td>[18]</td>
</tr>
<tr>
<td>Decoction of green leaves</td>
<td>Asthma</td>
<td>Bhola District, Bangladesh</td>
<td>[98]</td>
</tr>
<tr>
<td>Leaf</td>
<td>Used as anti-emetic, or to treat helminthiasis, indigestion</td>
<td>Andhra Pradesh</td>
<td>[99]</td>
</tr>
<tr>
<td>200 mg–1 g powder of fruits mixed with honey, or decoction, 5–10 mL twice a day orally</td>
<td>Asthma</td>
<td>Bangladesh</td>
<td>[100]</td>
</tr>
<tr>
<td>Whole plant</td>
<td>Rheumatoid arthritis</td>
<td>Bangladesh</td>
<td></td>
</tr>
</tbody>
</table>
5.3. Some different formulations which use *S. officinalis* as their ingredient

There are some different formulations using *S. officinalis* as their ingredient: (1) *Aegle marmelos* fruit (7.1 g), *S. officinalis* (1.8 g), *Andropogon muricatus* (1.8 g) and *Symposcos racemosa* (1.8 g) in a dose of 1.3–1.9 g are used for chronic diarrhea and dysentery [101]; (2) 4 mg of *S. officinalis* are employed as an ingredient of formulation helpful in curing urinary stones and crystalluria [102]; (3) *S. officinalis* is used in the preparation of “Surendryaksha” (a kind of medicated wine) [103]; (4) *S. officinalis* is used as an ingredient in the treatment of transverse myelitis using “Rookshana Karma” (dehydrating therapy) [104]; (5) the powder of *Withania somnifera* Dunal. root, the *S. officinalis* fruit, the *Saussurea lappa* Clarke. root, and the *Acorus calamus* Linn. rhizomes is added to the butter made from buffalo's milk. The preparation increases the bustline, makes the breast firm and improves breast shape [105]; (6) *S. officinalis* is used as an ingredient in the formulation employed to treat “kushtha” (obstinate skin disease including leprosy), “kilasa” (leucoderma), “ilakalaka” (black moles), different types of piles and “carmakila” (warts) in skin [106].

6. Pharmacological reports

The methanolic extract of *S. officinalis* exhibits anti-inflammatory, analgesic [48] and antimicrobial activities [107,108]. It normalized the levels of aspartate aminotransferase, alanine aminotransferase and alkaline phosphatase thereby confirming its high antihyperglycaemic properties [46]. The extract shows evidence of mast cell stabilizing and activities as bronchodilator due to its anti-asthmatic activity [108]. The methanolic extract shows antioxidant and antitumor effects, substantiating its cytotoxicity on human cancer cell lines [109].

The ethanolic extract is also proved to be anti-inflammatory and analgesic [110] as it triggers significant pain reduction [111] in carrageenan-induced rat paw edema at the doses of 50, 100 and 200 mg/kg [110]. It restrains the digestion and absorption of carbohydrates because of its hypoglycemic properties [49,111]. The ethanolic extract also regularizes the altered levels of serum glutamic pyruvic transaminase, serum glutamic oxaloacetic transaminase, alkaline phosphatase, bilirubin, total protein and tissue glutathione showing evidence of its hepatoprotective activity [112].

Both 50% ethanolic and ethyl acetate extracts were found to exhibit concentration-dependent free radical scavenging activity [113,114] and antidiabetic activity [115].

The hydroalcoholic extract of the fruits of the plant has shown antiulcerative activity contributing to gastric ulcer healing and gastric antisecretory outcomes [116]. Total cholesterol, low density lipoprotein and triglyceride levels were declined after treatment with the plant extract revealing its noteworthy hypolipidemic properties [117]. Prominent *in vitro* effect of the extract on the motility of mature *Haemonchus contortus* of goat origin was observed [118–120].

The extract of *S. officinalis* fruits illustrated dose-dependent positive inotropic effect and transient myocardial depressant activity in frogs [121], and also demonstrated cytotoxic effect. Taking cisplatin as a reference drug, the cytotoxic effect of *S. officinalis* was examined, which exhibited 93% growth inhibition against COLO 320 tumor cells [122]. The plant also revealed the presence of nitrogen-fixing microorganism in its phyllosphere. Most of the isolates appear to be biotypes of *Klebsiella pneumoniae* [123]. A study done on impact of *S. officinalis* on fitness of captive red-eyed tree frog (*Agalychnis callidryas*) revealed that the plant significantly promoted greater diversity of bacteria associated with the skin of the frog and increased the stability and productivity of the community [124].

As far as other species of *Scindapsus* are concerned, ethyl acetate fraction of extract from *S. aureus* has potential inhibitory activity against alpha-glucosidase and antioxidant effects, and n-butanol fraction has great antioxidative effects [125] while methanolic extracts of the fruit have significant broad-spectrum antimicrobial activity against *Staphylococcus aureus*, *Escherichia coli* and yeast *Saccharomyces cerevisiae* at a concentration of 2.5 mg/mL [126], *S. aureus* (syn. *Epipremnum aureum*) also uptakes low-molecular-weight aldehydes and ketones [127]. *S. aureus* sorbed 0.98 μg CO/cm² leaf surface in 6-h photoperiod [128]. The decoction of the plant did not exhibit any toxicity upto 10 mL/kg [65]. The species of *Scindapsus*, *i.e.* *S. aureus* and *S. pictus* are proved to purify formaldehyde polluted air [129]. The plant of genus *Scindapsus* was found to stabilize the indoor ion concentration and reduce its fluctuations. These plants help to increase the concentrations of negative ions and decrease the concentration of positive ones [130].

7. Conclusion

*S. officinalis* is used as an important ingredient in many Ayurvedic formulations just on the basis of its traditional medicinal uses. Due to insufficient and contradictory literature on morphology of the plant, the identification is mistaken most of the times, which results in the adulteration (accidental or intentional). Neither the plant nor its extract is standardized. Thus, it is difficult to pinpoint the bioactive metabolites. Therefore, there is a need of pharmacognostic and phytochemical standardization. The upshot of the review will further assist in presenting its potential scientific use in modern medicine.

Conflict of interest statement

We declare that we have no conflict of interest.

References

We declare that we have no conflict of interest.


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