



Dugdhika: Present Scenario in Perspective of Taxonomy and Ayurveda

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Abstract

In the present scenario, many botanical sources of plants are used in the name of *Dugdhika*. This article aims at reviewing all such botanical species used worldwide. Ayurveda classical literature, Peer reviewed journals, Various Online databases and search engines such as PubMed, DHARA, Google scholar and Ayush research portal were used and data were analyzed for collecting all such useful information. 5 botanical species were identified which are used in the name of *Dugdhika* with some slight change in their Vernacular names. Though different botanical species are used all over world in the name of *Dugdhika*, They all possesses somewhat similar pharmacognostical and Pharmacological properties, so these botanical species can be used as *Pratinidhi dravyas* (substitute of each other).

Keywords: Ayurveda, Botanical Species, *Dugdhika*, Medicinal Plants

1. Introduction

In Ancient times, *Dugdhika* was used by various *Acharyas* for treating various illnesses. In *Brihatreyi*, *Charaka* mentioned *Dugdhika* in the context of *Palitya*¹ (Greying of hairs). *Charaka* and *Vagbhata* has mentioned it in the context of *Raktarsha*^{2,3} {A content of *Yavanyadi churna*} (Bleeding piles). It has also been mentioned in various *Ayurvedic* classics. *Gadnigraha* has quoted it in the treatment of *Dantrogas*⁴, (Dental caries), *Visphota*⁵ (content of *Karanja beejadi lepa*) and *Dadru*⁶ (Skin ailments).

In present scenario, five different botanical species are correlated with the *Dugdhika* and are used in treating diseases. Ayurveda classical literature, Peer reviewed journals, various Online databases and search engines such as PubMed, DHARA, Google scholar and Ayush research portal were used and data were analyzed for

collecting all such useful information. Research papers are filtered on the basis of use of botanical species in the name of *dugdhika* by various tribes and customs of society for their healthcare needs. Near about 15 books of Ayurveda classical literature and books on flora's of various regions have been referred.

2. Classical uses of *Dugdhika*⁷

2.1 *Brihatreyi*

2.1.1 *Charaka Samhita*

Ghee cooked with *kantakari* and *dugdhika* alleviates bleeding piles with pain⁷.

Dugdhika and *karavira* pounded with milk should be applied as snuff to the diseased hairs. They both remove greying of hairs⁷.

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2.1.2 Ashtang Hridaya

Ghee cooked with *kantakari* and *dugdhika* alleviates bleeding piles with pain⁷.

2.2 Other Literature of Ayurveda

2.2.1 Vaidya Manorama

Dugdhika, steamed with cooked rice and eaten with the same after adding oil, prevents dysentery accompanied with blood.

2.2.2 Rajmartanda

Root of *dugdhika* or lotus plant or *ashwagandha* or *snuhi* destroys dental caries if chewed with teeth⁷.

2.2.3 Gadanigraha

Root of *dugdhika* or lotus plant or *ashwagandha* or *snuhi* destroys dental caries if chewed with teeth⁷.

Ring worm – After rubbing diseased skin lesion with dried cow dung, the lesion should be pasted with latex of *dugdhika*.

Dugdhika mixed with *eranda* seeds destroys eruptive boils⁷.

2.3 Mahakashaya of Charaka Samhita

Dugdhika has been mentioned in the *brinhaneey mahakashaya* in the name of *Rajkshavak*⁸.

2.4 Nighantus of Ayurveda (Lexicons of Ayurveda)

2.4.1 Bhavaprakasha nighantu⁹

Synonym: *Svaduparni*, *Kshira*, *Vikshirini*

Properties: *Dugdhika* is heavy in action, drying, vitiates *vata*, promotes conception / impregnation. It is pungent and bitter in taste, hot in potency, palatable. *Dugdhika* is diuretic, secretes sweet milk, constipative, aphrodisiac, reduces enhanced *kapha*, cures skin diseases and acts as vermifuge.

2.4.2 Madanapala nighantu¹⁰

Synonym: *Madhuparni*, *Kshirini*, *Svadupushpika*.

Properties: *Dugdhika* is hot in potency, heavy in action and drying. It is sweet in taste and having *madhura vipaka* (~product of last stage of metabolism). *Dugdhika* vitiates *vata*, promotes conception/impregnation. It is constipative, aphrodisiac, reduces enhanced *kapha*, and acts as vermifuge.

2.4.3 Kaiyadeva nighantu¹¹

Synonym: *Rajakshava*, *Dugdhinika*, *Svadupushpika*, *Kshiravi*, *Kshirika*, *Sheeta*, *Sitambu*, *Madhuparnika*.

Properties: *Dugdhika* is sweet, bitter, pungent and salty in taste, heavy in action, basic in nature, hot in potency, drying and vitiates *vata*. It is cardiogenic, aphrodisiac, diuretic, laxative, constipative, abortifacient, reduces enhanced *kapha*, cures skin diseases and acts as vermifuge.

2.4.4 Shankara nighantu¹²

Synonym: *Dugdhapheni*, *Nagarjuni*

Types: 3

Properties: 1. *Duddhi* - : It is sweet, bitter, pungent and salty in taste, heavy in action, basic in nature, hot in potency, drying, vitiates *vata*. It is cardiogenic, diuretic, laxative, constipative, promotes conception/impregnation, reduces enhanced *kapha*, cures skin diseases and acts as vermifuge.

2. *Dugdhapheni* -: It is salty, bitter in taste. Cold in potency, detoxifying and palatable. It has wound healing property. It has rejuvenation property when used with other such drugs.

3. *Nagarjuni* - : It is sweet, bitter, pungent and salty in taste. It's dried form vitiates *vata*. It is aphrodisiac, constipative, promotes conception/impregnation, cardiogenic, *dhatuvardhak* (~Improves basic metabolic processes of body) and hot in potency. It reduces enhanced *kapha*. It cures diabetes, skin diseases and acts as vermifuge.

2.4.5 Priya nighantu¹³

Synonym: *Bhudugdhika*, *Kshiraparni*, *Nagarjuni*.

Types: 2

Properties: It is sweet and astringent. It is constipative, alleviates respiratory ailments and cures diarrhea. Table 1 shows properties of *Dugdhika* as per various *nighantus* (Lexicons of *Ayurveda*).

3. Botanical Species Used in the Name of Dugdhika

3.1 *Euphorbia hirta* Linn.¹⁴ (Figure 1)

Synonym: *Euphorbia pilulifera* auct. non Linn.

Family: Euphorbiaceae

Table 1. Properties of *Dugdhika* as per various *nighantus* (Lexicons of *Ayurveda*)

Properties	Rasa					Guna			Veerya		Vipaka	
	Madhura	Tikta	Katu	Lavana	Kashaya	Guru	Laghu	Ruksha	Sheet	Ushna	Madhura	Katu
D.N.	-	-	-	-	-	-	-	-	-	-	-	-
M.P.	+	-	-	-	-	+	-	+	-	+	+	-
B.P.	+	+	+	-	-	+	-	+	-	+	-	-
R.N.(Dugdhapheni)	-	+	+	-	-	-	-	-	+	-	-	-
K.N.	+	+	+	+	-	+	-	+	-	+	-	-
P.V.	+	-	-	-	+	-	-	-	-	+	-	-
S.N.												
1.Duddhi	+	+	+	-	-	+	-	+	-	+	-	-
2.Dugdhapheni	-	+	+	-	-	-	-	-	+	-	-	-
3.Nagarjuni	+	+	+	+	-	-	-	+	-	+	-	-

“+” Mentioned; “-” Not mentioned

D.N – Dhanwantari Nighantu; M.P. – Madanapal Nighantu; B.P – Bhavaprakasha nighantu;
R.N – Raja Nighantu; K.N – Kaiyadeva nighantu; P.V. – Priyanighantu
S.N. - Shankar Nighantu

Habitat: Bigger var., *E. pilulifera*/*E. hirta* Linn. is found in warmer parts of India from Punjab eastwards, and southwards to Kanyakumari.

English: Euphorbia, Australian Asthma Weed, Pill-bearing Spurge.

Ayurvedic: *Dudhi*, *Dudhikaa*, *Naagaarjuni*, *Vikshirini*.

Unani: *Dudhi Khurd*.

Siddha/Tamil: *Amman pachharisi*.

Botanical Description¹⁵: This is an annual herb that grows up to 70 cm tall and is hairy with long soft hairs. Near the base, the stems are sparsely branched.



Figure 1. Photograph of *Euphorbia hirta* Linn.

The leaves are opposite and oval to ovate-oblong in shape, with a length of 1–5 cm and a width of 0.3–2.5 cm. The apex is bluntly sharp, with an obliquely triangular to rounded base. The margin is finely serrate and pale to dark green in colour, with purple patches on occasion. Short-stalk with free stipules that are highly pointed.

The inflorescence is made up of an inflorescence stalk, four minute spherical flower clusters, and flat-hairy involucres that grow from axils or terminals. A slender appendage and yellow anthers are found on the green or purplish glands. The capsule is acutely 3-lobed, broadly ovoid-pyramidal, 1 mm x 1.2 mm in diameter, and hairy and lying flat.

The seeds are oblong, with slight transverse wrinkles.

Ethnomedicinal Uses

1. Expectorant, bronchitis, cough and asthma¹⁶.
2. *Euphorbia hirta* L., followed by *Holarrhena pubescens* Wall., *Helicteres isora* L., and *Cassia fistula* L., are the most favored species by the Bhoja community for the treatment of dysentery and diarrhoea¹⁷.

Action: Antiasthmatic, antispasmodic, and pectoral. Used in diarrhoea, dysentery, and intestinal parasitosis; asthma, laryngitis, chronic nasal and bronchial catarrh. Also used to treat postnatal ailments and lactation problems. Latex-
vermifuge used for urinogenital disorders.

Terpenes, anthocyanins, alcohols, and steroids are all found in the herb. Shikimic acid, choline, L-inositol, and free sugars were all found in aerial portions.

Choline and shikimic acid in the herb are thought to have antiasthmatic properties. On the guinea pig ileum, shikimic acid and choline have relaxant and contraction effects.

The herb's aqueous extract has sedative, anxiolytic, analgesic, antipyretic, and anti-inflammatory properties, and it inhibits platelet aggregation. Antidiarrheal action is attributed to quercitrin.

The leaves' methanolic extract is antibacterial and antifungal. Euphorbains, dimeric hydrolyzable tannins, have been isolated from the plant.

Data of Flora

1. It is known as *Rati dudheli* having geographical distribution in India, Srilanka, North America, Africa etc.¹⁸
2. It could be found in all tropical and subtropical countries, as well as the hotter areas of India¹⁹.
3. The plant is used to treat worms, bowel problems, and cough in children; the juice is used to treat dysentery and colic disorder; a decoction is used to treat bronchial affections and asthma, and it is also used in gargles and as a poultice. The latex of the plant is used to treat eczema, scabies, and eye problems²⁰.
4. It is annual slender herb, patently hairy found throughout everywhere²¹.
5. It is procumbent, rigid herb found in all seasons, pantropics common along road sides²².
6. *Nagala Dudheli* is a 15–30 cm tall erect herb with yellow hairs covering the branches and top of the plant²³.
7. Asthma and ringworm are claimed to be treated with the leaves. The plant is used to treat worms, gastrointestinal issues, and cough in children. *Rati-dudheli*, *Nagala-dudheli*, *Moti-dudheli*, and other names for it²⁴.

Researches

1. In alloxan-induced diabetic mice, ethanolic and petroleum ether extracts of *E. hirta* showed considerable antidiabetic action. The effects of the former extract were superior to those of the latter. Body weight, lipid profile, and other biochemical indicators all improved after using these extracts²⁵.
2. The antihyperglycemic effects of *E. hirta* stem extracts are substantial. These extracts also improved biochemical measures such as lipid profile, body weight, and other biochemical markers. Free radical protection is provided by the extract²⁶.
3. An ethanol extract of *E. hirta* was found to be exceptionally effective against gram-positive *Bacillus subtilis* and gram-negative *Pseudomonas aeruginosa*, despite the fact that the reference standard failed²⁷.

4. Using the Vero cell line, methanol extract of *E. hirta* was tested against dysentery-causing *Shigella* spp. It was discovered to be non-cytotoxic and antibacterially efficient²⁸.
5. Ethanolic extracts of *E. hirta* aerial parts showed antimicrobial effects against a wide range of microorganisms, including *Escherichia coli* (an enteropathogen), *Proteus vulgaris*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*²⁹.
6. *E. hirta* exhibited antimicrobial effect using three solvents- methanol, hexane, and distilled water against *Escherichia coli*, *Klebsiella pneumoniae*, *Shigella dysenteriae*, *Salmonella typhi*, and *Proteus mirabilis* which are gram-negative bacteria that commonly causes human gastrointestinal illnesses. When water extracts were utilised instead of organic solvents, the yield was higher and the antibacterial efficacy was higher³⁰.
7. An ethanolic extract of the *E. hirta* entire plant shown substantial burn wound healing activity³¹.
8. Antimicrobial activity of *E. hirta* methanolic extract against investigated bacterial strains was found to be broad. (The bacteria utilised were *Bacillus macerans* and *Staphylococcus aureus* (both gram positive), *Pseudomonas aeruginosa* and *Pseudomonas striata* (both gram negative), and *Aspergillus niger* (fungus)³².
9. *E. hirta* extracts in aqueous and 50 percent MeOH extracts inhibited SIVmac251, HIV-1, and HIV-2 replication in MT4 cells in vitro³³.
10. An anti-anaphylactic effect was discovered in the *E. hirta* ethanolic extract (EH A001). EH-A001, given orally at doses ranging from 100 to 1000 mg/kg, was found to prevent compound 48/80-induced systemic anaphylaxis. EH-A001 prevented passive cutaneous anaphylaxis (PCA) in rats and active paw anaphylaxis in mice at the same dose ranges. The release of TNF- α and IL-6 from anti-DNP-HSA stimulated rat peritoneal mast cells was found to be suppressed by EH-A001³⁴.
11. In guinea pigs before puberty, powdered *E. hirta* increased mammary gland growth and secretory induction, indicating that it has galactogenic activity³⁵.
12. *E. hirta* at a dose of 50 mg/kg significantly reduced sperm motility and density of cauda epididymal and testis sperm suspension, resulting in sterility³⁶.

3.2 *Euphorbia thymifolia* Linn. (Figure 2)

Family: Euphorbiaceae.

Habitat: It's a smaller type of *Dugdhika* that grows in India's tropical plains and low hills, rising to 1,750 metres.

Ayurvedic: *Dudhi* (smaller var.), *Dugdhikaa*, *Naagaarjuni*, *Swaaduparni*.

Siddha/Tamil: *Sittrapaladi*.

Botanical Description³⁷: A prostrate, annual herb with numerous stems that spread across the ground. Leaves are opposite, obliquely oblong, small, and unequally sided at the base, entire or crenulate, glabrous and green or reddish above, and glaucous and pubescent beneath.

Pharmacognosy³⁷: **Stem** : The stem is herbaceous, slender, cylindrical, and pale green or pink when fresh, turning greyish or dark purplish when dried. T.S. of a young stem reveals a single-layered epidermis composed of thick-walled cubical cells covered by a thick cuticle and covering trichomes measuring 100 to 400 microns in length, moderately thickened, uniseriate, two to five cells long, tapering body with pointed to blunt ends, and warty surface. The cortex is made up of six to eight layers of parenchymatous cells that range from circular to oval and have distinct intercellular spaces.

Leaf: Simple, petiolate leaves are 3–6 mm long and 2–4 mm wide, typically green but occasionally coppery red when young, drying to greyish green or dark purple, oval-



Figure 2. Photograph of *Euphorbia thymifolia* Linn.

oblong or obliquely oblong lamina. The apex is rounded or obtuse, while the base is obtuse and extremely oblique. The venation is reticulate, and the margin is dentate towards the apex and smooth towards the base.

Ethnomedicinal Uses¹⁷: The Bhoja community of district Dehradun, Uttarakhand, India, has reported using *E. thymifolia* L. for the first time in the treatment of dysentery and diarrhoea.

Action: Antispasmodic, bronchodilator, antiasthmatic (used to treat bronchial asthma), galactagogue (also used for spermatorrhoea).

Amenorrhoea is treated with root.

Latex is used to treat ringworm and dandruff.

Purgative properties of the leaf, seed, and latex.

Haematuria is treated using a decoction of the herb mixed with honey.

Epitaraxerol, *n*-hexacosanol, euphorbol, two deoxyphorbol-OAC derivatives, 24-methylene cycloartenol, and quercetin galactoside were all found in aerial portions. The phorbol derivatives are responsible for the co-carcinogenic activity. Alkaloids in the plant have antimicrobial properties.

Dosage: 10 to 20 g paste of whole plant (CCRAS.)

Data of Flora

1. It is known as *Nani dudhili* having geographical distribution in India, Srilanka, North America, Philipines etc.³⁸.
2. It is found throughout India and Ceylon in the plains and lower hills, ascending in Kashmir to 5500 ft. also in all hot countries except Australia³⁹.
3. It is a prostrate, often radially spreading, hairy herb found as a weed of cultivated fields throughout the year⁴⁰.
4. It is a prostrate hairy herb, common weed in gardens, occasionally as an escape⁴¹.
5. A prostrate herb, hairy. Leaves oblong, crenulate, slightly oblique at the base. Fruit a hairy capsule⁴².
6. It is known as *Nani-dudheli*. The seeds and dried leaves are astringent, laxative, stimulant and given to children's in bowel-complaints⁴³.

Researches

1. *E. thymifolia* Linn. was discovered to have strong laxative activity up to 8 hours after medication administration, in a dose-dependent manner. It was discovered that the effect was superior to that of the usual drug (Agar -agar). The activity of the extract is

enhanced by fractionation. The most active fraction was determined to be diethyl ether, while the least active portion was petroleum ether⁴⁴.

- At a higher dose tested (400mg/kg, p.o.), an ethanolic extract of *E. thymifolia* Linn. considerably increased urine output as well as urinary electrolyte concentration. The activity was enhanced by fractionating the ethanolic extract. The diethyl ether fraction was shown to be the most effective at increasing urinary output, with an impact comparable to the conventional medication (Furosemide)⁴⁴.
- The extract's considerable antihyperglycemic and antinociceptive properties support the use of *E. thymifolia* in Bangladeshi folk medicine for the treatment of diabetes and pain⁴⁵.
- E. thymifolia* methanolic and aqueous extracts have antihelminthic efficacy against *Pheretima posthuma* and *Ascaridia galli*⁴⁶.
- In vitro, the ethyl acetate (EtOAc) extract and 3-O-galloyl-4,6-(S)-hexahydroxydiphenoyl-d glucose (3OG46HG) of *E. thymifolia* Linn. showed anti-herpes simplex virus (HSV)-2 action. HSV-2 proliferation is inhibited by *E. thymifolia* because virus infectivity is reduced⁴⁷.

3.3 *Euphorbia hypericifolia* auct. non Linn.⁴⁸ (Figure 3)

Synonym: *E. indica* Lam

Family: Euphorbiaceae

Habitat: In India's milder regions, up to 1,500 metres in the Himalaya.

Ayurvedic: *Dugdhikaa*

Botanical Description⁴⁹: Annual plant that grows up to 80 cm tall, with glabrous stems and milky sap. Simple, opposite leaves with blades 0.8–4 cm long, round to subacute at the tip, oblique at the base, glabrous surfaces, serrate margins, and petiole 1–2 mm long. Inflorescence of numerous cyathia with short, practically leafless axillary cymes, each cyathium with a small, glabrous, 4-lobed involucre with 5 glands and a white or pink appendage. Corolla isn't present. Female flower 1 has a superior, 3-lobed ovary with three styles; male flowers 2–20 are small and have only one stamen. Fruit is a glabrous, 3-lobed, subglobose schizocarp that is 1–1.5 mm long and splits into three one-seeded segments.

The glabrous, herbaceous stems, milky sap, opposite leaves, leafless axillary cymes, tiny, white-flowered cyathia



Figure 3. Photograph of *Euphorbia hypericifolia* auct. non Linn.

(a type of inflorescence), and tiny 3-lobed breaking fruit distinguish this species. Similar to *Euphorbia hyssopifolia*, but with narrower linear-oblong leaves and leafy cymes.

Low herb with thin stems and elliptical leaves 1.3 cm long, typically shorter, distally serrulate-denticulate, usually reddish-purplish, and the stems reddish; cyathia in little cymes in higher axils; bracts white; capsules with forked styles.

Ethnomedicinal Uses¹⁶: Externally, acrid milky juice is applied to remove warts.

Action: Colic, diarrhoea, and dysentery are treated using this plant.

Astringent, antidysenteric, and antileucorrhoeic leaf (also used in menorrhagia).

Taraxerol, octacosanol, campesterol, stigmasterol, beta-sitosterol, quercetin, quercitrin, ellagic acid, rhamnetin-3-galactoside, rhamnetin-3-rhamnoside, and kaempferol are among the compounds found in the plant.

Data of Flora

- It is known as *dudheli* having geographical distribution in India, Srilanka, North America, Brazil etc.⁵⁰
- It is found in India's hottest regions, from the Panjab, which rises to 4000 feet in the Himalaya, to the Southern Deccan, Malacca, and Ceylon⁵¹.
- It is annual, erect, suberect or prostrate, slender herb, very common in the field⁵².
- It is an erect 15–45 cms high, unbranched herb commonly known as *Dudheli*⁵³.

3.4 *Oxystelma secamone* (Linn.) Karst. (Figure 4)

Synonym: *O. esculentum* R. Br., *Sarcostemma secamone* (Linn.) Bennet

Family: Asclepiadaceae

Habitat: can be found in Semi-marshy areas throughout India's plains and lower hills, including paddy fields and hedges.

Ayurvedic: *Dugdhi*, *Duudhilataa*, *Usipallai* (Tamil Nadu), *Dugdhani* (Maharashtra), and *Jaladudhi* (Maharashtra) (Gujarat).

Botanical Description⁵⁴: Lianas to at least 4m, stem glabrous. Leaves linear or linear-lanceolate, membranous, base rounded. Inflorescences longer than leaves, flowers white with purple blotches.

Ethnomedicinal Uses⁵⁵: In chronic liver disorders, root juice (10–15ml) is combined with a glass of lukewarm water and administered twice daily for 10 days.

Action

Antiseptic, depurative, and galactagogue herb; decoction is used as a gargle for stomatitis and sore throat.

Vulnerable latex

Fresh Root is used to treat jaundice.

The roots have yielded a pregnane ester oligoglycoside (oxysine), a pregnane triglycoside (esculentin), a cardenolide (oxyline), and two additional cardenolides, oxystelmoside and oxystelmine.

Data of Flora



Figure 4. Photograph of *Oxystelma secamone* (Linn.) Karst.

1. It is commonly known as *Jal-dudhi* having geographical distribution in India, Srilanka, Afghanistan having medicinal properties as diuretic, laxative, aphrodisiac, bronchodilator etc.⁵⁶.
2. It's found all over India's plains and lower hills, from Punjab to Ceylon, Assam, Pegu, and Tenasserim. *Doogdhika* is another name for it⁵⁷.
3. It is commonly known as *Jal-dudhi*. A decoction of the plant is used in sore throats and in ulceration of the mouth⁵⁸.

Researches

1. *Sarcostemma secamone* used to have a strong anti-inflammatory impact in paw edema produced by carrageenan⁵⁹.
2. *Oxystelma esculentum* methanol extract shown excellent antioxidant activity and can be employed as a natural antioxidant⁶⁰.
3. The most efficient laxative activity was observed in a petroleum ether extract of *Oxystelma esculentum*⁶¹.
4. In diabetic rats, an ethanol extract of the whole herb *Sarcostemma secamone* has considerable hypoglycemic and hypolipidemic action⁶².
5. Among all extracts, the petroleum ether extract of *Oxystelma esculentum* possesses the most potent, statistically significant ($P < 0.001$), and dose-dependent anti-ulcer action, comparable to Ranitidine (Standard) at 400 mg/kg. This backs up the plant's reputation as a powerful anti-ulcer remedy⁶³.
6. Methanolic extract of leaves of *O. esculentum* exhibits significant antitumor activity⁶⁴.

3.5 *Euphorbia prostrata* W. Ait (Figure 5)

Synonym: *Chamaesyce prostrata* (Aiton)

Family: Euphorbiaceae

Habitat: It is a pantropical and subtropical weed that originated in the West Indies.

Botanical Description⁶⁵: The stems of this prostrate annual herb are flattened and puberulous or pubescent above, terete and glabrous beneath, and can reach 30 cm in length. Leaf blades are obovate, suborbicular, 3–8 x 1–5 mm, obtuse or rounded at the apex, obliquely rounded at the base, serrulate in the upper half, otherwise entire palminerved reticulate, green. Stipules triangular, lacinate, upper paired, narrow, 0.5 mm long, lower fused, wider, 1 mm long Small pink flowers emerge from leaf axils. Without magnification, distinguishing flower parts is difficult. The dicot prostrate spurge, it's also a prolific

seed producer, with hundreds of seeds germinating at once. Spurge grows a large taproot.

Ethnomedicinal Uses¹⁶: Skin diseases, itching and for ringworms.

Data of Flora

1. It is prostrate, radially spreading herb found throughout Gujarat except Kutch, a weed in cultivated fields and drying moist ground⁶⁶.
2. It is a small, prostrate herb found in dense patches, in stony or rocky grounds; noted only on the higher parts of the hill⁶⁷.
3. It is annual prostrate herb; 18–30 cm high; hispidly hairy found in Gir forest of Guajarat state⁶⁸.

Researches

1. The water soluble fraction of total alcoholic extract of *E. Prostrata* W. Ait. promotes smooth muscle relaxation, which relieves the spasm of Bronchial muscles during an acute attack of bronchial asthma, and so has a favourable impact in Bronchial asthma⁶⁹.
2. Acute inflammatory tests of *E. prostrata* fractions utilising histamine and bradykinin-induced pedal edema revealed that histamine-induced edema was inhibited selectively, implying suppression of the acute inflammatory reaction's first phase⁷⁰.

4. Discussion

In Ayurvedic scriptures, there are primarily two types of *Dugdhika*, i.e., bigger variety and smaller variety.



Figure 5. Photograph of *Euphorbia prostrata* W. Ait.

These two plants are now identified as *Euphorbia hirta* Linn. and *Euphorbia thymifolia* Linn. respectively. But in India, other three botanical species are also used in the name of *Dugdhika* by various tribes or group of peoples in various regions. In *Ayurveda*, Therapeutic efficacy of plant depends upon the *Guna*, *rasa*, *veerya* and *vipaka* present in plant. As shown in (Table 1), all the plants named *Dugdhapheni*, *Duddhi*, *Nagarjuni* mentioned in various classical grantha's of Ayurveda mostly possesses *madhura*, *tikta* and *katu* rasa as their dominant *rasa*. *Guru* and *ruksha* are the properties of plant named *dugdhika* as quoted in various nighantus. Most of the nighantu's has denoted *dugdhika* as *ushna veerya* plant. None of the nighantu's has denoted *vipaka* of *dugdhika*, it is only Madanapala nighantu who denoted *vipaka* of *dugdhika* as *madhura*¹⁰.

In most of the Ayurveda classical texts, various synonyms are used for describing the plant *dugdhika*. In above mentioned botanical species some synonyms, *guna* and *karma*'s are similar as mentioned in (Table 2).

As per pharmacognosy of these plants is concerned, all the plants mentioned above are latex producing plants of which 4 plants are from euphorbiaceae family while 1 plant is from asclepiadaceae family. All botanical species are prostrates as per habit is concerned. See (Figures 1–5) for the pharmacognostical features. Already discussed detailed pharmacognostical characteristics of the botanical species. Ayurveda, the science of life believes in the *guna*, *karma* of drug rather than only external appearance.

Data of the flora depicts that all the common names used by folklores to dectate the species have close resemblance to the name *Dugdhika* as well as having same medicinal properties.

As all 5 botanical species mentioned above possesses somewhat similar characteristics as well as ethnomedicinal uses, so their use by peoples in the name of *Dugdhika* is justifiable.

5. Conclusion

All the botanical species used in the name of *Dugdhika* are similar in major extent by virtue of their *Guna*, *karma* as well as ethnomedicinal uses, so above mentioned 5 botanical species can be used as substitute (*pratinidhi dravyas*) of each other and also can be incorporated as source plants of *Dugdhika*.

Table 2. Table depicting the various similar guna, karma and other properties of five botanical species used in the name of *dugdika*

Guna-karma-properties/ Botanical species	<i>Euphorbia hirta</i> Linn.	<i>Euphorbia thymifolia</i> Linn.	<i>Euphorbia hypericifolia</i> auct.non Linn.	<i>Oxystelma secamone</i> (Linn.) Karst.	<i>Euphorbia prostrata</i> W. Ait
Dugdika (latex producing)	+	+	+	+	+
Sitambu (Watery secretions from its stem)	+	+	+	+	+
Bhumilagnavali (prostrates spreading over ground)	+	+	+	+	+
Ethnomedicinal uses (diarrhoea, dysentery)	+	+	+	+	+
Presence of one of the rasa (taste) mentioned in Lexicon's of Ayurveda	+	+	+	+	+

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