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VIDANGA (EMBELIA RIBES BURM.F.*)* IN AYURVEDA: A LITERARY AND SCIENTIFIC REVIEW

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ABSTRACT

Background: *Vidanga* (*Embelia ribes* Burm. f.), a classical Ayurvedic herb from the family Primulaceae, is one of the most potent *Krimighna* (anthelmintic) drugs extensively mentioned in *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and various Nighantus. Traditionally, *Vidanga* has been used for its anti-parasitic, digestive, and detoxifying properties, and forms an essential ingredient of several formulations including *Vidangarishta*, *Vidangadi Churna*, and *Krimimudgar Rasa*. **Aim:** To present a comprehensive review of *Vidanga* by integrating classical Ayurvedic references with modern botanical, phytochemical, and pharmacological evidence. **Materials and Methods:** Classical Ayurvedic texts and Nighantus were reviewed to document the nomenclature, *Gana/Varga* classification, properties, and therapeutic indications of *Vidanga*. Scientific data on taxonomy, morphology, phytochemistry, and pharmacological actions of *Embelia ribes* were collected from peer-reviewed journals and databases such as PubMed, Scopus, and Google Scholar. Technical terms were standardized using the NAMASTE portal. **Results:** *Vidanga* is classified under *Krimighna*, *Kushthaghna*, *Shirovirechaniya*, and

Pippalyadi groups, and exhibits *Katu Rasa, Ruksha Laghu Guna, Ushna Virya, Katu Vipaka,* and dominant *Krimighna* and *Vatakaphahara* actions. Morphologically, it is a scandent shrub with characteristic blackish berries, which constitute the main medicinal part. Phytochemical analysis reveals the presence of embelin, christembine, benzoquinone derivatives, resins, fatty acids, sterols, and alkaloids. Modern studies demonstrate a wide range of pharmacological activities including analgesic, anthelmintic, antibacterial, antifungal, antioxidant, antidiabetic, anticonvulsant, anticancer, hepatoprotective, antihyperlipidemic, antifertility, antihyperhomocysteinemic, and wound-healing properties. Embelin, the principal bioactive constituent, plays a major role in these therapeutic effects. **Conclusion:** *Vidanga* is a highly valued Ayurvedic herb with strong traditional and scientific support for its anthelmintic and digestive actions. Its wide spectrum of pharmacological activities highlights its potential for managing metabolic disorders, parasitic infections, inflammatory diseases, reproductive dysfunctions, and neurodegenerative conditions. Further clinical studies are needed to validate classical uses and establish safe therapeutic dosage standards.

KEYWORD: *Embelia ribes*, Embelin, *Krimighna*, Anthelmintic activity.

INTRODUCTION

Vidanga (Botanical name: *Embelia ribes Burm. f.*) is an important medicinal plant widely described in Ayurvedic classics for its powerful *Krimighna* (anthelmintic) properties. It is commonly known as False Black Pepper or Embelia, and is a climbing shrub belonging to the family Primulaceae (Myrsinaceae). Ayurveda considers *Vidanga* as one of the most potent herbs for eliminating intestinal parasites and improving digestive health. References to *Vidanga* are found in *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and various Nighantus, where it is praised as the best *Krimighna dravya*. It is included in several classical formulations such as *Krimimudgar Ras, Vidangarishta, Hingvastak Churna, Chitrakadi Vati,* and *Pippalyadi churnas. Vidanga* is a climbing shrub that grows abundantly in subtropical forests of India, mainly in the Himalayas, Western Ghats, and Central India. The plant bears small reddish flowers and produces characteristic globular blackish berries, which are the main medicinal part used. The fruits of *Vidanga* contain several bioactive compounds, including: Embelin, a major constituent responsible for anthelmintic, antimicrobial, and antioxidant activity.

MATERIALS AND METHODS

This review is based on a comprehensive analysis of classical Ayurvedic texts, including the *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya* and various *Nighantus to* document the traditional uses, synonyms, properties and therapeutic indications of *Vidanga*. Scientific information regarding the Taxonomy, Vernacular names, Morphology, phytochemistry and pharmacological activities of *Embelia ribes* was gathered from peer-reviewed journals, electronic databases (such as PubMed, Scopus, and Google Scholar), and authoritative botanical references. The probable English equivalent of technical terminologies was noted referring NAMASTE portal.

RESULT

Etymology

विडङ्गः (भा०) - विडति भिनत्ति कृमीनिति (B.P.)[1]

It means *Vidanga* has the potency to kill the worms.

Table No. 1: Classical Classification of *Vidanga*.

Ayurvedic Text	Group / *Gana* / *Varga*
Charaka Samhita[2]	*Krimighna Mahakashaya* *Kushthaghna Mahakashaya* *Shirovirechniya Mahakashaya*
Sushruta Samhita[3]	*Pippalyadi Gana* *Sursadi Gana*
Ashtanga Hrudaya[4]	*Pippalyadi Gana* *Sursadi Gana*

Table No. 2: Synonyms of *Vidanga* as per Different Authors.

S. N	Synonyms	B. N[1]	R. N[5]	D. N[6]	K.N[7]	M.P.N[8]
1.	*Vidanga*	+	+	+	+	+
2.	*Jantughni*		+			
3.	*Amogha*	+	+	+	+	
4.	*Kairali*		+	+	+	
5.	*Krimiha*		+	+		
6.	*Chitratandula*	+	+	+	+	
7.	*Tanduloyaka*		+			
8.	*Vataritandula*		+			
9.	*Kshudratandula*					+
10.	*Mrigagamini*		+	+	+	
11.	*Gahvara*		+			
12.	*Kapali*		+			
13.	*Vara*		+			
14.	*Suchitraveeja*		+			
15.	*Jantuhantri*		+	+		

16.	*Jantunashana*	+				
17.	*Krimighna*	+				+
18.	*Krimighni*			+		
19.	*Tandula*	+		+	+	+
20.	*Vella*	+			+	
21.	*Krimijit*				+	
22.	*Jantughna*				+	
23.	*Krimihantru*				+	
24.	*Krimihara*				+	
25.	*Ghosha*				+	+
26.	*Bhutaghna*					+
27.	*Krimihrit*				+	
28.	*Jantuhanana*					+

Table No. 3: Ayurvedic Properties of *Vidanga.*

Acharyas	*Rasa*	*Guna*	*Virya*	*Vipaka*	*Prabhava*	*Doshaghnata*
B. N[1]	*Katu*	*Tikshna, Ruksha*	*Ushna*			*Sleshmavatahara*
R. N[5]	*Katu*	*Laghu*	*Ushna*		*Krimighna*	*Vatakaphahara*
K. N[6]	*Katu,Tikta*	*Ruksha,Laghu*	*Ushna*	*Katu*		*Vatakaphahara*
D. N[7]	*Ishat Tikta*	*Ruksha,Laghu*	*Ushna*	*Katu*		*Vatakaphahara*
M.P. N[8]	*Katu,Tikta*	*Ruksha,Laghu*	*Ushna*			*Sleshmavatahara*
P. N[9]	*Katu*	*Tikshna*	*Ushna*	*Katu*	*Krimighna*	*Kaphavatahara*

REFERENCES OF *VIDANGA* IN *BRIHAT TRAYI*

Table No. 4: References of *Vidanga* in *Charaka Samhita.*

S.N.	Preparation	Indication/Action	References
1.	*Churna*	*Medoroga*	*C.Su.21/23*
2.	*Vyosadhya Saktu*	*Prameha, Kustha, Arsha,Kamala*	*C.Su.23/19*
3.	*Kaphaja pramehahara yoga*	*Kaphaja prameha*	*C.Ci.6/27-28*
4.	*Madhvasava*	*Kaphaja and pittaja prameh, Paṇḍuroga*	*C.Ci.6/41*
5.	*Vidangadi taila*	*Kustha, Arsa*	*C.Ci.4/18*

Table No. 5: References of *Vidanga* in *Susruta Samhita.*

S.N.	Preparations	Indication/Action	References
1.	*Dhanvantara ghrta*	*Meha, Gulma, Asha Pliha,Vidradhi, Pidika*	*S.Su.12/5*
2.	*Vidangadi taila*	*Anuvasana relives Pliha, Kaphaja roga, Prameha, Arsha*	*S.Su.37/39*
3.	*Kalyanaka sarpi*	*Sarpaviṣa, Apasmara, Paṇḍuroga,*	*S.Ka.6/8*

Table No. 6: References of *Vidanga* in *Ashtanga Hridaya.*

S. N.	Preparations	Indication/Action	References
1.	*Madhukasava*	*Grahani, Prameha*	*A.H.Su.10/47*
2.	*Kasaya*	*Kaphaja Prameha*	*A.H.Su.12/7*
3.	*Dhanvantara ghrta*	*Meha, Gulma, Arsha Pliha, Vidradhi, Pidika*	*A.H.Su.12/22*

Table No. 7: References of *Vidanga* in various *Nighantus.*

SN	Nighantu	Reference
1	*Raj Nighantu*[5]	*Pippalyadi Varga*
2	*Kaiydev Nighantu*[6]	*Aushadhi Varga*
3	*Dhanwantri Nighantu*[7]	*Shatpushpadi Varga*
4	*Madanapal Nighantu*[8]	*Shunthyadi varga*
5	*Bhavprakash Nighantu*[1]	*Haritakyadi varga*
6	*Priya Nighantu*[9]	*Haritakyadi varga*

Table No. 8: Indications of *Vidanga* as per Different Acharyas.

Authors	Indications
R N[5]	*Agnimandhya, Aruchi, Bhranti, Krimidosha*
K N[6]	*Dipana, Rucya, Krimi, Vistambha, Adhmana, Shula, Ama, Meda, Meha, Udara*
D N[7]	*Vishahara, Kriminashana*
M.P. N[8]	*Vahnikrit, Gulma, Adhmana, Udara, Krimi, Vibandha*
B N[1]	*Vahnikrit, Shula, Adhmana, Udara, Krimi, Vibandha*
P N[9]	*Dipana, Shula, Adhmana, Vibandha*

Table No. 9: Vernacular Names of *Vidanga.*[10]

Language	Name
Hindi	Vayavidanga, Bhabhiranga, Baberang
English	Embelia fruit
Gujarat	Vavding, Vavading, Vayavadang
Bengal	Vidang
Assam	Vidang
Kannada	Vayuvilanga, Vayuvidanga
Kashmir	Babading
Tamil	Vayuvilangam
Telugu	Vayuvidangalu
Malayalam	Vizhalari, Vizalari
Marathi	Vavading, Vavding
Orisa	Bidanga, Vidanga
Punjab	Bidanga, Vidanga
Urdu	Baobarang, Babrang

Table No. 10: Taxonomy of *E.ribes.*[11]

Kingdom	Plantae
Phylum	Streptophyta
Subphylum	Equisetopsida
Class	Magnoliidae
Order	Ericales
Family	Myrsinaceae
Genus	Embelia
Species	Ribes

Morphology of *E.ribes*[12]

A large scandent shrub, branches long, slender, flexible, with long inter nodes, the bark studded with lenticels. Leaves-5 to 9 cm long,2 to 4 cm wide, elliptic or elliptic lanceolate, coriaceous, shortly and obtusely acuminate, entire, glabrous on both the sides, shining above, paler and silvery beneath, whole surface covered with scattered minute reddish sunken gland. Base is rounded or acute, main nerves are numerous. Petiole 0.5 to 1.5 cm long. Inflorescence-Laxed terminal or axillary panicled raceme. Branches are 7.5 to 10 cm long. Numerous, small, greenish yellow colored. Pedicels are 1.5 to 2 mm long. Glandular pubescent bracts are minute. Sepals 1.25 mm long, ciliate, petals are 5 in number, free, 4 mm long, stamens are 5, shorter than the petals.

Microscopic characters of *E.ribes*[13]

Transverse section of fruit shows epicarp consisting of single row of tabular cells of epidermis, usually obliterated, in surface view cells rounded with wrinkled cuticle, mesocarp consists of a number of layers of reddish-brown colored cells and numerous fibrovascular bundles and rarely a few prismatic crystals of calcium oxalate, inner part of mesocarp and endodermis composed of stone cells, endodermis consisting of single layered, thick-walled, large, palisade-like stone cells, seed coat composed of 2-3 layered reddish-brown colored cells, endosperm cells irregular in shape, thick-walled, containing fixed oil and proteinaceous masses, embryo small when present otherwise most of the seeds sterile.

Distribution and Cultivation[14]

This species grows best in tropical to subtropical climates, particularly within moist deciduous to semi-evergreen forests. It prefers well-drained red loamy soil rich in organic matter, with a neutral to slightly acidic pH, and is naturally found up to about 1,500 meters in regions such as the Western Ghats, Eastern Himalayas, and parts of Central and Eastern India. Young plants require moderate but regular watering and can tolerate partial shade. Propagation is mainly done through seeds, which typically germinate within 25-40 days, and germination rates improve with pre-sowing treatments like scarification or soaking. Although vegetative propagation through stem cuttings, root cuttings, or air layering is possible, these methods are used less frequently. Harvesting is carried out when the fruits fully ripen and turn black and wrinkled, usually in winter, after which they are dried and stored carefully to prevent insect damage.

Botanical varieties: Morphological Differences[15]

Features	*Emblia ribes*	*Emblia robusta*
Habit	Slender woody climber	Larger, more robust, shrub.
Fruits	Small, thin, elliptic-lanceolate	Larger, thicker, broadly elliptic.
Leaves	Small berries (3-4 mm), black, wrinkled	Bigger berries (6-8 mm), darker, rough.

Phytochemistry of *E.ribes*[16]

The plant contains a wide range of active constituents, with embelin—a golden-yellow, needle-shaped compound (2,5-dihydroxy-3-undecyl-2,5-cyclohexadiene-1,4-dione) that is insoluble in water but soluble in alcohol, chloroform, and benzene- being the most prominent; it can also dye silk and wool when dissolved in alcohol. Another notable compound is christembine, which forms crystalline salts of embolic acid with soda, potash, and ammonia. Several related derivatives are also present, including embelin dimers, embelin disalts, embelinol, embeliaribyl ester, embeliol, gomphilactone derivatives, homoembelin, homorapanone, and onopotassium embelate. The plant additionally contains newly identified compounds, such as nitrogen-containing alkyl and 3-alkyl benzoquinone derivatives, including N-(3-carboxylpropyl)-5-amino-2-hydroxy-3-tridecyl-1,4-benzoquinone. Other constituents include quarvital, quercitol, rapanone, various resins, oleic acid, linoleic acid, sitosterol, stable oils, tannins, daucosterol, and the alkaloids vidangin and vilangine, all of which contribute to the plant's diverse chemical profile.

Reported extracts of *Embelia ribes* and its use

Various extracts of *Embelia ribes* have been evaluated for diverse pharmacological properties. The methanolic root extract has demonstrated significant acetylcholinesterase inhibitory activity.[17] Aqueous-ethanol extracts prepared from the fruits (berries) exhibit notable anthelmintic effects[18], while methanol extracts of the berries have shown the ability to prevent pregnancy by approximately 75%.[17] Ethanol extracts of the fruits possess hepatoprotective and antifertility properties, along with measurable effects on uterine weight levels.[19] Butanol extracts also display antifertility activity, and both butanol and benzene extracts have been reported to exert similar activity, with the benzene extract alone showing about 51% antifertility effect.[17] Additionally, benzene and n-hexane extracts exhibit anthelmintic effects, further supporting their antiparasitic potential.[18] Petroleum ether extract is effective specifically against tapeworms (but not roundworms or hookworms) and also demonstrates 75% antifertility activity.[17] Conversely, another study found that an aqueous-ethanol extract did not produce antifertility effects, though it did exhibit about 37% anthelmintic activity.[19]

PHARMACOLOGICAL ACTIONS AND SCIENTIFIC EVIDENCE OF CLASSICAL USES OF *VIDANGA*

Embeila ribes Burm f. is having antibacterial, antifertility, antiprotozoal, abdominal disorders, lung diseases, constipation, indigestion, fungus infections, mouth ulcer, sore throat, antidiabetic, anticonvulsant, anticancer, anti-hyper lipidemic, wound healing, pneumonia, heart disease and obesity.

Analgesic Activity

Embelin exhibits a centrally acting, non-narcotic analgesic effect when taken orally. Its mechanism involves a distinct central site of action that is not blocked by naloxone. Compared to morphine, embelin is considered more favourable because it works effectively by mouth, has a wider therapeutic margin, and does not produce withdrawal symptoms.[20]

Anthelmintic Activity

Seed oil of *E. ribes* at doses of 10, 50, and 100 mg/ml caused death of *Pheretima posthuma*, with higher doses producing faster worm paralysis compared with piperazine citrate (10 mg/ml). A fruit extract of *E. ribes*, when combined with *Veronica anthelmintica* seed extract at 1 g/kg, significantly reduced faecal egg counts in goats with mixed gastrointestinal nematode infections.[21]

Antibacterial Activity

At 500 mg/50 ml, *E. ribes* produced a 12-mm inhibition zone against *Bacillus subtilis*, although this was smaller than nitrofurazone's 22-mm zone. No antimicrobial effect was observed against *Pseudomonas aeruginosa*, *Staphylococcus aureus*, or *Escherichia coli*.[22]

At 100 mg/disc, embelin showed stronger inhibition than kanamycin (39 mg/disc) against *S. aureus*, *Shigella flexneri*, and *S. sonnei*. Embelin also exceeded ciprofloxacin (5 mg/disc) in activity against *P. aeruginosa* at high doses and demonstrated appreciable activity against *Streptococcus pyogenes*, *Salmonella typhi*, *Shigella boydii*, and *Proteus mirabilis*, but only mild activity toward *Streptococcus faecalis* and *Vibrio cholerae*.[23]

Antioxidant Property

Oral administration of aqueous *E. ribes* extract (100 and 200 mg/kg) significantly lowered pancreatic oxidative stress markers-superoxide dismutase, catalase, and glutathione-in streptozotocin (40 mg/kg, IV) induced diabetic rats, helping protect pancreatic β-cells from damage.[24]

Antidiabetic Activity

Aqueous fruit extract (100 and 200 mg/kg for 40 days) significantly reduced blood glucose, glycosylated haemoglobin, heart rate, systolic blood pressure, LDH, and creatine kinase while elevating glutathione in streptozotocin-induced diabetic rats; gliclazide served as the reference drug.Ethanolic extract also significantly lowered pancreatic TBARS levels in diabetic animals Further studies showed that ethanolic berry extract (100 and 200 mg/kg for six weeks) similarly reduced glucose, heart rate, and systolic BP, performing comparably to gliclazide (25 mg/day).[25,26]

Anticonvulsant Activity

Intraperitoneal administration of embelin (2.5-10 mg/kg) markedly inhibited seizures induced by electroshock and pentylenetetrazole in a dose-dependent fashion. Its efficacy was comparable to phenytoin and diazepam, and reduced locomotor activity indicated CNS depressant effects, suggesting usefulness against both grand mal and petit mal seizures.[27]

Anticancer Activity

Embelin reduced tumour size and suppressed elevations in serum enzymes (acid phosphatase, γ-GT, LDH, aldose) in fibrosarcoma-bearing rats, indicating interference with tumour metabolism. Combined administration of embelin (50 mg/kg/day) and curcumin (100 mg/kg/day) prevented hepatic nodule formation and biochemical alterations induced by N-nitrosodiethylamine. Embelin inhibited XIAP and blocked inflammatory pathways, suppressing RANKL-induced osteoclast genesis and NF-κB activation, suggesting potential in osteoporosis and cancer associated bone loss. It also downregulated genes involved in tumour survival and invasion while enhancing apoptosis, supporting its role as an NF-κB inhibitor and antitumor agent. In vitro, increasing doses of embelin reduced thymidine incorporation, lipid peroxides, and glutathione levels in fibrosarcoma cells, indicating dose-dependent cytotoxicity.[28-31]

Antihyperlipidemic Activity

Ethanolic extract (200 mg/kg for 20 days) significantly decreased blood glucose, total cholesterol, triglycerides, and TBARS values in liver and pancreas, while raising HDL-cholesterol in streptozotocin-induced diabetic rats.[32]

Antifungal Activity

Using the NCCLS M27-A2 protocol, methanol extract and embelin showed the lowest MIC_{50} (120 mg/L) against *Candida albicans* (MTCC 183). Embelin showed MIC_{50} values below 700 mg/L for other *Candida* species. Petroleum ether and solvent ether extracts showed moderate activity (300-700 mg/L), with petroleum ether extract exhibiting the lowest MIC_{50} (250-360 mg/L) against *C. parapsilosis* and *C. laurintis*. Water extracts were least effective.[33]

Antihyperhomocysteinemic Activity

Aqueous extract of *E. ribes* (100 and 200 mg/kg for 30 days) significantly lowered serum homocysteine, LDH, total cholesterol, triglycerides, LDL-C and VLDL-C, while increasing HDL-C in methionine-induced hyperhomocysteinemic rats. The results were comparable to folic acid therapy.[34]

Molluscicidal Activity

Fruit powder of *E. ribes*, combined with *Azadirachta indica*, *Cedrus deodara* oils, and synergists such as MGK-264 and piperonyl butoxide, displayed strong, dose and timedependent toxicity against *Lymnaea acuminata*. Tertiary mixtures were more potent than individual agents, with the most toxic combination being *Lawsonia inermis* seed + *Cedrus deodara* + *E. ribes* (24-hr LC_{50} = 14.80 mg/L.[35,36]

Wound-Healing Property

Ethanolic extract (30 mg/ml) and embelin formulated in 0.2% sodium alginate gel (4 mg/ml) enhanced wound healing, increasing wound contraction, tensile strength, and granulation tissue formation. Histology showed denser collagen cross-linking and absence of monocytes. Effects were compared with framycetin ointment.[37]

Antihyperglycemic Activity

Decoctions of *E. ribes* showed antihyperglycemic activity in traditional use. In an experimental study, ethanolic extract (200 mg/kg for 20 days) significantly lowered blood

glucose, cholesterol, triglycerides, and TBARS levels while increasing HDL-C in streptozotocin-induced diabetic rats, performing similarly to gliclazide (25 mg/kg.[38]

Antinematodal Activity

A mixture of *Veronia anthelmintica* seeds and *E. ribes* fruits (0.5-2 g/kg) and equivalent water/methanol extracts significantly reduced EPG counts in goats with natural gastrointestinal nematode infections, with 2 g/kg dose comparable to morantel tartrate.[39]

Antiproliferative Activity

Benzoquinone derivatives 5-O-ethylembelin and 5-O-methylembelin inhibited proliferation of human tumour cell lines, induced G_0/G_1 arrest in HL-60 cells, disrupted microtubules in HeLa cells, and triggered apoptosis, demonstrating potential anticancer and antimitotic properties.[40]

Antifertility Activity

Embelin administered s.c. at 0.3-0.5 mg/kg for 35 days altered testicular histology, reduced gametogenic activity, glycogen content, and accessory gland fructose, suggesting anti-androgenic action. Oral embelin (75 mg/kg) for 15-30 days increased absorption of glucose, amino acids, and calcium, and elevated brush-border enzymes, indicating altered reproductive and digestive physiology.[41]

Antispermatogenic Activity

Subcutaneous embelin (20 mg/kg for 15-30 days) reduced sperm motility, fertility indices, and glycolytic enzyme activity in male rats; these effects were reversible. In vitro exposure caused morphological sperm defects including head decapitation and membrane discontinuity, confirming embelin's antispermatogenic potential.[42]

Antitumor and Anti-inflammatory Activity

Embelin showed strong antitumor action in methylcholanthrene-induced fibrosarcoma in rats, improving survival and reducing pain and inflammation. It also caused notable changes in DNA, RNA, and protein levels in tumour-bearing rats.[43]

Acetylcholinesterase Inhibitory Activity

Among 76 plant extracts screened, methanolic extracts including *E. ribes* root showed potent AChE inhibition. *E. ribes* root extract exhibited an IC_{50} of 23.04 µg/ml, indicating strong neuropharmacological potential.[44]

DISCUSSION

Embelia ribes Burm. f., known as *Vidanga*, is a climber widely revered in *Ayurveda* for its *Krimighna* (anthelmintic) and multipurpose medicinal properties. Classical Ayurvedic texts consistently highlight *Vidanga's* efficacy against intestinal parasites, digestive disorders, and various systemic ailments, demonstrating its long-standing therapeutic relevance. Its inclusion in multiple formulations such as *Vidangadi Churna*, *Vidangadi Ghrita*, and *Vidangarishta* further reinforces its significance in traditional medicine.

Phytochemical analysis reveals a diverse spectrum of bioactive constituents, with embelin being the primary compound responsible for the majority of its pharmacological actions. Embelin and related derivatives exhibit potent antimicrobial, anthelmintic, antioxidant, antidiabetic, anticancer, and neuroprotective effects, confirming the classical claims of *Vidanga's* broad-spectrum therapeutic potential. The presence of other compounds, such as christembine, alkaloids (vidangin, vilangine), and essential oils, enhances the plant's pharmacological versatility, suggesting a synergistic effect between multiple constituents.

Experimental studies support the traditional uses of Vidanga. Methanolic root extracts demonstrate acetylcholinesterase inhibitory activity, indicating potential in neurodegenerative disorders. Its anthelmintic activityvalidated against *Pheretima posthuma* and gastrointestinal nematodes, aligns with classical *Krimighna* indications. The plant also shows significant antibacterial and antifungal effects, particularly against *Staphylococcus aureus*, *Bacillus subtilis*, and *Candida* species, supporting its application in infectious conditions. Moreover, embelin exhibits central analgesic activity without the side effects commonly associated with opioids, highlighting a safer alternative for pain management.

Vidanga's metabolic effects are noteworthy. It exhibits antihyperglycemic, antidiabetic, and antihyperlipidemic properties, confirmed in streptozotocin-induced diabetic models. Its hepatoprotective, antifertility, and antitumor actions further expand its therapeutic spectrum, providing evidence for its role in endocrine modulation, reproductive health, and oncology. The ability of embelin to modulate oxidative stress markers, inhibit tumour progression, and induce apoptosis suggests potential for future drug development targeting chronic diseases.

The morphological and botanical characterization of *Vidanga* provides essential identification parameters, ensuring correct plant selection and quality control. The plant grows well in subtropical forests, with propagation mainly through seeds, emphasizing the importance of

conservation and sustainable harvesting for continued medicinal use. Classical references in *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and various Nighantus underscore *Vidanga's* historical significance and the consistency of its documented properties across centuries.

CONCULUSION

Embelia ribes embodies the convergence of traditional knowledge and modern pharmacology. Its wide range of bioactivities validates Ayurvedic claims, while contemporary studies provide mechanistic insights into its therapeutic actions. Continued research on *Vidanga's* bioactive compounds, standardization of extracts, and clinical trials could pave the way for developing novel phytopharmaceuticals for gastrointestinal, metabolic, neurodegenerative, and infectious diseases. Its broad-spectrum pharmacological profile, combined with minimal reported toxicity, makes *Vidanga* a valuable candidate for future integrative medicine approaches.

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