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## A review on pharmacological properties and phytoconstituents of indigenous carminative agents

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**Abstract**

Plants are the major source of medicine and have been used as a traditional therapeutic agent for various diseases since ages. In rural areas of the developing countries, about 80% of the people in use traditional medicines for their health care. Carminatives are agents used to relieve flatulence by preventing gas formation in the gastrointestinal tract and facilitating its expulsion. Carminatives have been shown to decrease lower oesophageal pressure, which on the other hand increases the risk of gastro-oesophageal reflux disease or heartburn. Ayurveda is a system of traditional Hindu medicine in which several plants have been used as the carminative agents. The herbal carminatives mainly include volatile oils usually extracted from the old-world ring i.e. cardamom, ginger, peppermint, cinnamon and cloves. The most commonly used plant parts as carminatives are leaves, flowers and fruits. This review highlights the chemical constituent of various herbal carminative agents along with their traditional uses.

**Keywords:** Ayurveda, herbal carminative, chemical constituents, traditional uses

**Introduction**

Medicinal plants continue to be an important therapeutic aid for alleviating the ailments of humankind. The search for perpetual health and prolonged existence for remedies to mitigate pain and discomfort drove an early man to explore his immediate natural surroundings and led to the use of many plants, animal products, minerals, etc. and the development of an array of therapeutic agents. Recently, there is a transformed interest of people in traditional medicine leading to increased demand for the plant-derived drug. This resurgence of interest in herbal drug is mainly due to current widespread belief that "green medicine" is safe and economic than the synthetic drugs, several of which may possess serious adverse effects<sup>[1]</sup>. In India, the use of different parts of several medicinal plants to cure specific ailments has been in trend from ancient times. Nature has bestowed upon us a very rich botanical affluence and a large number of diverse types of plants grow wild in different parts of our country<sup>[2]</sup>. India has tremendous medicinal plant biodiversity in all three levels *viz.* species, genetic as well as habitat diversity. Further, all known types of agro-climatic, ecology and edaphic condition met within this country<sup>[3]</sup>.

As per the estimate of the World Health Organization (WHO), presently more than 80 percent of the human population is dependent on herbal medicine for primary health care<sup>[4]</sup>. Medicinal plants exhibit diverse pharmacological activities which include, antimicrobial, antioxidant, anticancer, hypolipidemic, cardiovascular, central nervous, respiratory, immunological, anti-inflammatory, analgesic, antipyretic, carminative and many other<sup>[5]</sup>. Carminatives are food substances, which, when ingested, produce a sensation of intestinal warmth and are said to relieve the symptoms of postprandial bloating by producing eructation and flatulence<sup>[6,7]</sup>. The most commonly used herbal medicines as carminatives are the oils of spearmint/peppermint, garlic, and onion. Table 1 represents list of the various indigenous carminative agents with their part used, phytoconstituents and pharmacological actions.

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**Table 1:** Part used, Phytoconstituents and Pharmacological actions of some Carminative Herbs <sup>[8-10]</sup>.

Botanical Name	Common Name	Parts Used	Phytoconstituents	Pharmacological actions/ Uses
<i>Abelmoschus esculentus</i>	Bhenda	Fruit, roots, seeds, leaves, flower.	Gum, albumin, essential oil, odoriferous principle, resin, proteins, fatty edible oil,	Carminative, cooling, diuretic, stomachic, antispasmodic, tonic, cardial, astringent, emollient.
<i>Achyranthes aspera</i>	Agheda	Dried plant, crushed plant, seeds, leaves, roots.	Fruit: alkaline ash containing potash.	Carminative, Astringent, diuretic, stomachic, purgative, laxative, pungent, emetic, expectorant, constipating.
<i>Alianthus excelsa</i>	Adulsa	Leaf, steam bark.	Root bark: alkaloids, stem bark: ailantic acid. Several quasi noids.	Carminative, anthelmintic, Bitter, Tonic, febrifuge, expectorant, antispasmodic, appetiser, aromatic.
<i>Allium cepa</i>	Onion	Bulb, seed.	Bulb; acrid volatile oil, outer skin of bulb; yellow colouring matter. Dried bulb; albuminoids, woody fibre, ash, mucilage	Carminative, stimulant, diuretic, expectorant, emmenagogue, tonic, stomachic, appetiser, pectoral.
<i>Allium sativum</i>	Garlic	Bulb, Tuber, oil.	Bulb; acrid volatile oil, starch, mucilage, albumen, sugar, volatile oil. Seed; aromatic oil.	Anthelmintic, carminative, diuretic, digestive, gastric stimulant, antiseptic, antispasmodic, antiseptic essential oil.
<i>Aloe vera</i>	Korphad	Plant, Dried juice of leaf, pulp, root.	Aloin, emodin, chrysophanic acid, pentosides- barbolin, isobarbolin, beta barbolin, resin, volatile oil, ash, chrysamic acid.	Carminative, emmenagogue, purgative, stomachic, digestive, tonic, anthelmintic.
<i>Alpinia alanga</i>	Koshtulinjan	Rhizome, seeds, tuber.	Campheride, galangin, alpinin, cinnamate, cincole, camphor, d-pinene.	Carminative, stomachic, aromatic, expectorant, tonic diuretic, improving appetite.
<i>Alstonia scholaris</i>	Ankoli	Leaves, Bark, Milky juice.	Bark; alkaloid, dilamine, ecbiretin, ditain, alkaloid picirine.	Carminative, astringent, appetiser, laxative, stimulant, anthelmintic, powerful tonic, antiperiodic, febrifuge.
<i>Amorphophallus campanulatus Blume</i>	Suran	Root, Tuber, seed.	Albuminoids starchy reserves calcium oxalate.	Carminative, emmenagogue, restorative, acrid stimulant, expectorant.
<i>Anethum graveolens</i>	Shopa, shepu	Seeds, fruit.	Volatile oil and fixed oil, anethine, phellandrene, d-limolene.	Carminative, stomachic, antipyretic, anthelmintic, diuretic, laxative, emmenagogue.
<i>Artocarpus heterophyllus</i>	Phanas	Fruit, seeds, leaves, roots, and milk juice of plant.	Gyanomaclain, starch, ash fiber.	Carminative, tonic, abscesses, used in snakebite.
<i>Azadirachta indica</i>	Neem	Leaf, Root, Seed, Root bark, Gum, Fruits, Flowers, oil.	Margosine, bitter oil, azadirachtin.	Carminative, anthelmintic, expectorant, refrigerant, stimulant, stomachic, purgative, stimulant.
<i>Bauhinia purpurea</i>	Rakta Chandan	Bark, root, buds, leaves, seeds and flower.	Tannin, glucose, and gum.	Carminative, astringent, anthelmintic.
<i>Bata vulgaris</i>	Beet	Root and leaves.	Betin.	Carminative, emmenagogue, diuretic, expectorant.
<i>Bombex ceiba</i>	Saur, silk cotton.	-	Stable oil, tannic acid gallic acid.	Carminative, laxative, expectorant, emetic, anthelmintic, stomachic.
<i>Boswellia serrata</i>	Slaphali	Gum, Resin, oil	Gum, resin, essential oil, sugar, olibene, arabinose, xylose, galactose.	Carminative, diuretic, emetic, astringent, antiglycuretic, expectorant, antidysenteric.
<i>Bryophyllum calycinum salisb.</i>	Panfutti	Leaf-juice, Bark.	Leaf- malic, isocitric and citric acid.	Carminative, tonic, styptic, antiseptic, analgesic, astringent.
<i>Butea monosperma</i>	Palas	Seed, Flower, Steam bark, Leaf, Gum.	Gallic acid, glucose, resin, oleic and linoleic acid, yellow dye, ash.	Carminative, astringent, diuretic laxative, anthelmintic, appetiser.
<i>Cannabis sativa</i>	Bhang	Leaves, seeds, flower, resinous exudation.	Volatile oil, cannabene, canabidiolic acid, cannabidiol.	Carminative, antispasmodic, stimulant, sedative, stomachic, astringent, tonic.
<i>Capparis decidua</i>	Karli	Plant, Root bark, fruit.	Capric acid, glucoside, beta-sitosterol, gluco-capparin, l. Stachydrine.	Carminative, laxative, stimulant, emmenagogue, aphrodisiac, tonic.
<i>Capsicum annum</i>	Lalmirch	Fruit resin	Capsacin, crystalline acid, volatile oil, fixed oil, fatty acid, resin, ash.	Carminative, stomachic, rubefacient, stimulant, local irritant, vesicant.
<i>Carum copticum</i>	Ajmoda	Root, seeds.	Thymol, apiin, malonic acid, caffeic acid, chlorogenic acid, fatty acid, sesilin.	Carminative, diuretic, tonic, antispasmodic, emmenagogue, tranquilizer.
<i>Cedrus deodara</i>	Devadaru	Wood, bark, leaves.	Oleo-resin, turpentine, altantone, sequiterpenes like himachalol.	Carminative, diuretic, astringent, analgesic, expectorant.
<i>Centella asiatica</i>	Karinga	Plant, leaf.	Resin, glucoside, asiaticoide, essential oil, fatty oil, tannin.	Carminative, stomachic, diuretic, cardi tonic, tonic.
<i>Chenopodium ambrosioides</i>	Maxican tea	Plant	Essential oil, saponin, albuminoids.	Carminative, stimulant, antispasmodic, laxative, stomachic.
<i>Citrullus colocynthis</i>	Indraphal	Root, bark, leaf, fruit, seed oil,	Glucoside, colocynthetin, saponin, alpha eleaterin	Carminative, antipyretic, purgative, anthelmintic, bitter tonic.
<i>Citrus limon</i>	Idalimbu	Fruit, seeds.	Ascorbic acid, essential oil.	Oil of lemon used as carminative.

<i>Coriandrum sativum</i>	Dhania	Leaf, bark, Flower, Kernel, Mucilage of fruit.	Albuminoids, tannin, mallic acid, ash, mucilage, sugar, gum, ash	Carminative, diuretic, stomachic, tonic, stimulant, refrigerant.
<i>Cuminum cminum</i>	Jeera	Seed, fruit, oil, flower.	Thymine, oil, resin, gum.	Carminative, stimulant, astringent, galactagogue, stomachic, aromatic.
<i>Cymbopogon citratus</i>	Aginghas, Olecha	Plant, Essential oil.	Volatile oil, lemon-grass oil.	Carminative, stimulant, antispasmodic, appetiser, anthelmintic.
<i>Curcuma longa</i>	Haldi	Tuber, Rhizome	Essential oil, alkaloid, curcumin, turmeric oil, turpenoids.	Carminative, cooling, stomachic, astringent, anti-inflammatory, antihistamine, antibacterial, laxative, anthelmintic, diuretic.
<i>Daucus carota</i>	Gajar, carrot	Roots, seeds.	Carotene, glucose, starch, pectin, mallic acid, lignine, salts, albumin, terpine, iron.	Carminative, digestive, anthelmintic, stomachic, constipating, cardiotoxic, expectorant, diuretic, stimulant.
<i>Desmodium gangeticum</i>	Sarivan	Roots	Resin, oil, kshar. Ash	Carminative, constipating, diuretic, cardiotoxic, anti-inflammatory, dysentery, expectorant, tonic.
<i>Diospyros melanoxylon</i>	Tendu	Leaves, bark, fruits, flowers.	Not reported	Carminative, laxative, styptic, diuretic.
<i>Elettaria cardomomum</i>	Choti elachi	Seeds, roots, fruits.	4- terpineol.	Carminative, diuretic, laxative, stomachic.
<i>Emblica officinalis</i>	Amla	Root, bark, leaves, fruits.	Linoleic acid. Ellagic acid lupeol	Carminative, digestive, stomachic, anodyne, laxative, diuretic, antipyretic, tonic alexiteric.
<i>Embelia ribes</i>	vavdinga	Roots, leaves, fruits.	Acid-2.5%, volatile oil, stable oil, tannin, resin, cristebin, kshar.	Carminative stomachic, anthelmintic, diuretic, astringent, brain tonic, digestive, thermogenic, demulcent.
<i>Encostema littorale</i>	Kadavinayi	Whole plant	Alkaloids, gentiocrucine present.	Carminative, laxative, stomachic, anthelmintic, anthelmintic, anti-inflammatory, liver tonic, astringent.
<i>Ficus racemose</i>	Umbar	Roots, bark, leaves, fruits, latex.	Tannin	Carminative, refrigerant, stomachic, antidiabetic, astringent.
<i>Foeniculum vulgare</i>	Saumph	Fruits, root, seeds, leaves.	Caffeic acid, ascorbic-acid, beta-phellandrene, ferulic-acid, genticis-acid, d- limonene, quercetin, scopoletin.	Carminative, anthelmintic, galactagogue, stimulant, anticonvulsant, anticataract, antibacterial, antioxidant, antispasmodic, antiviral.
<i>Garuga pinnata</i>	Kakhad	Roots, stem, leaves, fruits, galls.	Not reported	Carminative, digestive, vermifuge, antiscorbutic.
<i>Hemidesmus indicus</i>	Anantmulah	Roots, leaves, stem	Alpha- amyryn, beta-amyryn, beta-amyryn-acetate, beta-sitosterol, hyperoside, lupeol, rutin, saponin	Carminative, Antiviral, anti-inflammatory, antioxidant, antibacterial, anticataract, Diuretic, Hypotensive, Anticonvulsant.
<i>Inula racemosa Hook</i>	Pohakarmul	Roots.	Not reported	Carminative, Expectorant, anodyne, anti-inflammatory, cardiotoxic, stomachic, thermogenic.
<i>Kalanchoe pinnata</i>	Jakh me hayat	Leaves	Alpha-amyryn, beta-amyryn, beta-sitosterol, caffeic acid, citric acid, ferulic acid, friedelin, fumaric acid, kaempferol	Carminative, anti-inflammatory, disinfectant, constipating, haemostatic, depurative.
<i>Lantana camara</i>	Ghaneri	Whole plant	Alpha-amyryn, alpha-pinene, beta-sitosterol, cadinene, calcium, lantanine, magnesium, manganese, phosphrous, potassium, sodium, tannin.	Carminative, antispasmodic, tonic, diaphoretic, tonic, Vulnery.
<i>Leucas aspera</i>	Dronpuspi	Leaves, flowers.	Not reported	Carminative, emmenagogue, anthelmintic, expectorant, digestive, thermogenic, anti-pyretic.
<i>Merremia gangetica</i>	Undirkani	Whole plant	Not reported	Carminative, laxative, diuretic, anthelmintic, pungent.
<i>Michelia champaca</i>	Sona champa	Whole plant	Not reported	Carminative, stimulant, digestive, astringent, expectorant, stimulant, haemostatic, diuretic, purgative, anthelmintic.
<i>Momordica charantia</i>	Karle	Whole plant	Alkaloids, beta-carotene, beta-sitosterol, diosgenin, linoleic-acid, liutein, lycopene.	Carminative, anti-inflammatory, antipyretic, emetic, astringent, appetizing, antidiabetic, emmenagogue, stomachic, digestive, emetic, antidiabetic.
<i>Moringa oleifera</i>	Shevgi	Roots, bark, leaves, seeds.	Ascorbic acid, beta-carotene, beta-sitosterol, choline, moringinine, myristic-acid.	Carminative, haematinitic, diuretic, anti-inflammatory, anthelmintic, digestive, Haematinitic, expectorant, emmenagogue, cardiac.
<i>Nigella sativa</i>	Kalajira	Seeds	Alpha-spinasterol, ascorbic -acid, beta-sitosterol, d-limonene, linoleic-acid, tannin, stearic-acid, myristic-acid.	Carminative, emmenagogue, digestive, appetizing, stimulant, constipating, diuretic, anti-inflammatory, stimulant, Expectorant, galactagogue.
<i>Nyctanthes arbortristis</i>	Parijat	Leaves, flowers, seeds.	Not reported	Carminative, digestive, anodyne, tonic, anti-inflammatory, stomachic, laxative, diuretic, expectorant, antibacterial.
<i>Ocimum basilicum</i>	Babul	Whole plant	Acetic acid, ascorbic acid, aspartic acid, apigenin, arginine.	Carminative, cardiotoxic, digestive, expectorant, stomachic, emmenagogue, antipyretic, appetising, galactagogue, spasmotic.
<i>Oroxylum indicum</i>	Tetu	Roots, leaves, fruits, seeds.	Oroxylin, fats, wax, citric acid.	Carminative, digestive, anodyne, appetizing, anti-inflammatory, digestive, astringent, Expectorant
<i>Oxalis corniculata</i>	Ambuti, anjati	Whole plant	Potassium, oxalic acid.	Carminative, digestive, anti-inflammatory, antiseptic, antibacterial, anodyne, diuretic, liver tonic, astringent, emmenagogue.
<i>Peucedanum grande</i>	Baphali	Whole plant,	Columbianadin, imperatorin.	Carminative, diuretic, stimulant, tonic.

		fruits.		
<i>Pinus longifolia</i> Roxb.	Chil, Sarala	Whole plant, gum, resin.	Friedelin, ceryl alcohol, b-sitosterol, hexacosyl ferulate.	Carminative, antiseptic, anthelmintic, analgesic, emmenagogue, expectorant.
<i>Piper betel</i>	Nagarvel	Leaves, fruit	B-sitosterol.	Carminative, stomachic, tonic, laxative, aphrodisiac.
<i>Piper longum</i>	Pimpli	Roots, fruits.	Piperlongumine, piperlonguminine, piperine, sesamin.	Carminative, anthelmintic, stomachic, laxative, antidiarrheal, antidyseritic.
<i>Piper nigrum</i>	Kalimire	Fruits	Not reported	Carminative, anthelmintic, antiperiodic, deobstruant, diuretic, digestive, emmenagogue, stimulant, stomachic.
<i>Plumbago zeylaanica</i>	Chitraka	Root, root bark, leaves	Plumbagin, 3- chloroplumbagin, chitranone, zeylinone, isozeylinone, droserone.	Carminative, astringent, anthelmintic, tonic, stomachic, appetizer, laxative.
<i>Plumeria rubra</i>	Lal champa	Roots, bark, leaves, latex	Not reported	Carminative, astringent, thermogenic, laxative.
<i>Ricinus communis</i>	Erandi	Roots, leaves, flower, seeds, oil.	Sugar, white juice, slimy substance, salt 10%, ricin.	Carminative, thermogenic, purgative, anthelmintic, emollient, diuretic, galactagogue, expectorant, depurative, astringent.
<i>Rubia cordifolia</i>	Manjesthta	Roots	Starch, sugar, gum, colouring matter, common salts.	Carminative, diuretic, thermogenic, digestive, constipating, emmenagogue, anthelmintic, astringent, anti-septic, anodyne.
<i>Ruta graveolens</i>	Satapa, Garden rue	Whole plant, oil.	Methyl nonyl ketone, Coumarins, methyl heptyl ketone, essential oil	Carminative, thermogenic, diuretic, laxative, aphrodisiac, digestive, emmenagogue, tonic.
<i>Semecarpus anacardium</i>	Bhilava	Fruits	32% vesicating oil	Carminative, expectorant, anthelmintic, digestive, emollient, astringent, anticarcinomic, cardiotoxic, stimulant, anti-inflammatory, arthritic.
<i>Syzygium caryophyllata</i>	Lavang	Dried flower buds, oil	Essential oil, eugenol, caryophyllene, naphthalene	Carminative, emollient, anthelmintic, sialogogue, stomachic, stimulant, spasmodic, antibacterial, ophthalmic, diuretic.
<i>Terminalia chebula</i>	Hirda	Mature and immature fruits.	Ascorbic acid, gallic acid, ellagic acid, chebulic acid.	Carminative, digestive, purgative, laxative, stomachic, cardiotoxic, antiseptic, diuretic, hepatopathy, gastropathy.
<i>Tinospora cordifolia</i>	Gulvel	Stem	Alkaloids, starch	Carminative, anodyne, astringent, constipating, cardiotoxic, expectorant, antiemetic, digestive, appetiser, stomachic.
<i>Ventilago denticulate</i>	Kanvel	Bark	Not reported	Carminative, astringent, thermogenic, digestive, stomachic, alexiteric, depurative, stimulant, tonic.
<i>Vetevaria Zizanioides</i>	Khas-khas	Roots	Beta-vetivene, limonene, zizanol, zizanollic acid.	Carminative, digestive, aromatic, stomachic, antiemetic, constipating, haematinic, anthelmintic, emmenagogue, anti spasmodic, tonic.
<i>Vitex negundo</i>	Nirgundi	Whole plant	Volatile essential oil, resin.	Carminative, anti-inflammatory, digestive, stomachic, anodyne, antiseptic, thermogenic, anthelmintic.
<i>Wrightia tinctorial</i>	Kala kuda	Leaves, bark, seeds.	Not reported	Carminative, astringent, acrid, digestive, stomachic, thermogenic, hypotensive, constipating, anthelmintic, febrifuge.
<i>Zingiber officinale</i>	Adrak, Adu	Rhizome	Camphene, beta-philandrene, zingiberine, citral, gingerol shogaol, borneol.	Carminative, digestive, stomachic, astringent, anti-inflammatory, expectorant, emollient, appetizer, thermogenic, anodyne, rubefacient.

## Conclusion

Medicinal plants are one of the most important sources of medicines. Since ancient times, the plants have been used to treat different ailments due to their accessibility, availability, inherited practice, economic feasibility, and perceived efficacy. The present article revealed that all herbs and spices being discussed possess carminative property. These herbal products are not only carminative agents but also provide other health benefits. Therefore, this review suggests that these herbs and spices can be used for primary health care.

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