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TRIPHLA: A REVIEW

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Abstract: Triphala (tri = three and phala = natural products), is an ayurvedic formulation made out of three equivalent extents of natural organic products local to the Indian subcontinent: viz. Terminalia chebula, Phyllanthus emblica, and Terminalia belerica. Triphala is a tridoshic rasayana having an adjusting and reviving impact on the three established components that administer the human existence.

Introduction: Herbs and spices are the main important piece of human diet. Not just boosting flavor, herbs and spices are also known for their preservative and therapeutic worth which forms one of the oldest sciences. [1] Various therapeutic plants are available in a collection of herbal preparations of the Indian traditional health care system. [2]

Triphala is one of the significant and traditional formulations of the Ayurveda and Unani arrangement of medication since ages. It is a combination of three organic products which is made out of dried products of restorative plants namely Emblica officinalis Gaertn (Euphorbiaceae), Terminalia belerica Linn (Combertaceae) and Terminalia chebula (Combertaceae) in equivalent extents (1:1:1) as depicted in Ayurvedic Model. [3] It is used to deal with a huge range of medical as well as dental ailment and disease, it has impactful immune stimulatory results on cell immune response, particularly on natural killer cells and cytotoxic T cells.1 and is also used to restrore energy, strength, and vitality.[4] Triphla applications incorporate injury mending, hepatoprotective movement, anti-arthritis, anti-oxidant, anti-viral, against bacterial, anti-protozoal, anti-venom, against disease just as cardioprotective impacts. It assumes an astounding function in reviving the whole human body frameworks. [5]

Keywords: Triphla, Harad, Emblica officinalis, Bahera, Tannin, Rasayana.

Taxonomy and Characterstics of various ingredients of Triphla:

1. ***Terminalia chebula:*** Terminalia chebula is one of the most regularly utilized plants in traditional frameworks of medication in Indian sub-continent. Terminalia chebula is known as the 'king of Medicine' in Tibet and also called as “Wonder Herb” and is consistently recorded at the first spot on the list in Ayurvedic Materia Medica because of its phenomenal healing properties**.** [6]

Classification:
Kingdom: Plantae
Phylum: Spermatophyta
Subphylum: Angiospermae
Class: Dicotyledona
Order: Myrtales
Family: Combretaceae
Genus: Termin
Species: Terminalia chebula

fig.1 *Terminalia chebula*

Vernacular names of *Terminalia chebula*	
English Names	Indian Walnut, Indian Hog Plum
Sanskrit Names	Haritaki, Pathya, Abhaya, Avyatha, Vyashtha, Haimavati, Shiva
Hindi Names	Harre, Harad
Telugu	Karakkaya
Gujrati	Hardi, Harara, Harade
Arabian	Haleelaz
Farsi	Hallel
Asam	Shilikha
Kannada	Arale, Alale
Konkani	Ordo, Hardi
Malyalam	Kudukka
Marathi	Hirda
Persian	Halela
Cambodia	Sa mao tchet
Filipino	Chebulic myrobalam
French	Myrobalan noir
Malay	Manja puteri
Thai	Samo thai
Vietnamese	Chieu lieu xanh

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Botanical Description:

Terminalia chebula is a mdium sized deciduous tree having variable appearance which grows upto 25 - 30 m in height with a generally short cylindric bole of 5-10 m length, and is 60-80 cm in distance across at bosom tallness. Its crown is adjusted, and have spreading branches. Bark is dim earthy in color, and is normally longitudinally cracked with the woody scales. The branchlets of the tree are corroded villous or are baldheaded. Leaves are alternate or inverse, slim coriaceous, applaud or elliptic-obovate, 7-12 cm x 4-6.5 cm, and adjusted at base, obtuse to subacute at zenith, whole, pubescent underneath. The petiole is up to 2 cm long, furnished with 2 organs at the base of the leaf cutting edge. flowers in axillary 5-7 cm long spikes, simple or at some point expanded, around 4 mm over, yellowish-white and disagreeably scented; calyx 5-lobed, corolla missing; stamens 10, exserted; ovar is inferior, 1-celled. fruit an obovoid or on the other hand oval ellipsoid drupe, 2.5-5 cm long, faintly 5-precise, yellow to orange-earthy colored when get riped, glabrous. [7]

Habitat: it is found in India, Bangladesh, Myanmar, Nepal, Pakistan, Sri Lanka, Cambodia, Indonesia, Malaysia, Vietnam, and southwestern China. [8]

2. ***Emblica officinalis***: Emblica officinalis, regularly known as Indian gooseberry or Amla, family Euphorbiaceae, is a primary natural medication used in unani (Graceo-arab) and ayurvedic frameworks of medication. It is highly valued in traditional Indian medicine. As per have faith in old Indian folk, it is the first tree to be made known to mankind. It is also nown as "Amrit Phal". Amla is profoundly nutritious and is the most extra source of nutrient C, amino acids and minerals. It contains a few compound constituents like tannins, alkaloids and phenols. Among every hydrolysable tannin, Emblicanin A also, B; gallic acid, ellagic acid are reported for to have biological properties. [9]

Classification:
Kingdom: Plantae
Phylum: Tracheophyta
Class: Magnoliopsida
Order: Malpighiales
Family: Phyllanthaceae
Genus: Phyllanthus L.
Species: Phyllanthus emblica L.
(Emblica officinalis Geartn.) [10]

fig. 2 Emblica officinalis

Vernacular names of Emblica officinalis	
1. Sanskrit:	Dhatriphala, Amla, Amaliki, Amalakan, Sriphalam, Vayastha
2. Hindi:	Amla
3. English	Emblica myroblan
4. Italian	Mirabolano emblico
5. German	Amla
6. French	Phyllanthe emblica
7. Nepalese	Amba
8. Chinese	An Mole
9. Tibetan	Skyu-ru-ra
10. Malaysian	Popok Melaka
11. Portuguese	Mirabolano emblico
12. Kannada	Nelli Kayi
13. Marathi	Amla Gujarati
14. Gujarati	Ambla Malayalam
15. Malayalam	Nelli Kayi
16.Tamil	Nelli
17. Telugu	Usirikaya
18. Kashmir	Aonla

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Botanical Description: Emblica officinalis (Amla) is a little to medium measured deciduous tree. It becomes around 8-18m tall with dainty light dark bark, leaves are straightforward, light green, sub-sessile, firmly set along the branchlets looks like pinnate leaves; flowers are greenish yellow; fruits are globose, meaty, light yellow with six dark vertical wrinkles encasing six trigonous seeds in two cultivated three crustaceous cocci. [11]

Habitat: Plant of Amla is discovered wherever in India up to the height of 5000 feet. Found in India, Pakistan, Uzbekistan, Srilanka, South East Asia, China and Malaysia. [12]

3. ***Terminalia bellerica:*** Terminalia bellerica Roxb belongs to the family combretaceae commonly known as Belliric Myrobalan is an important therapeutic plant. It is utilized in the conventional medication systems like Ayurveda, Siddha, Unani and Chinese medication. The plant is comprised of Glucoside, Tannins, Gallic corrosive, Ethyl Gallate, Chebulinic corrosive which fills in as an cancer prevention, cancer prevention agent, antimicrobial, antidiarrheal, anticancer, antihypertensive, hepatoprotective & antipyretic specialist. [13]

Classification:

Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida
Order: Myrtales
Family: Combretaceae
Genus: Terminalia L.
Species: Terminalia bellirica

Fig. 3 Terminalia bellirica

Verancular Names	
Common Names	Bastard myrobalan, Beach almond, Bedda nut free
Hindi Name	Bahera, Karshphal
English Name	Beleric Myrobalan
Sanskrit Names	Vibhita, Aksa, Aksaka, Bibhitaki
Oriya	Bahada
Kannada	Taari, Taare, Taarekaayi
Bengali	Baheda
Tamil	Thanakkai, Tanri, tanrikkai, Tani
Telugu	Tannikkaya, Vibhitakami, Tani
Assamese	Bauri, Bhomora, Bhomra, Bhaira
Gujrati	Bahedam, Beheda

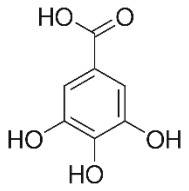
Malyalam	Tanni, Tannika
Urdu	Bahera
Nepali	Barro
Manipuri	Bahera
Marathi	Behada, Vehala, Bibhitaka [14]

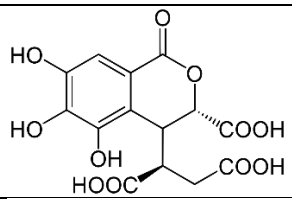
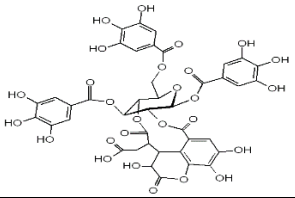
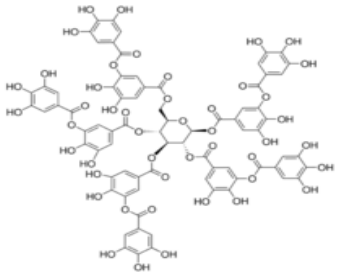
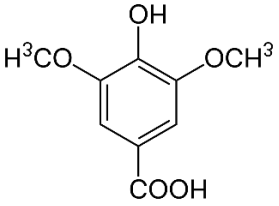
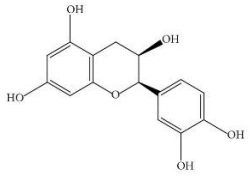
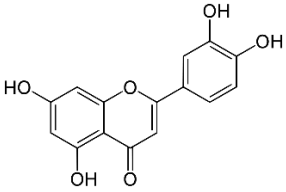
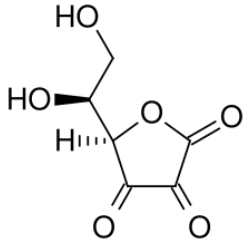
Botanical Description:
Terminalia bellerica is an enormous deciduous tree to 50 m tall and a breadth of 3 m with a adjusted crown. The regularly buttressed bole at the base is branchless up to 20 m. The bark is pale blue or ashy-dark covered with various fine longitudinal breaks, the internal bark yellowish. Leaves huge, glabrous, substitute, comprehensively elliptic to obovate-curved, 4-24 cm x 2-11 cm, base adjusted to cuneate, rufous-sericeous but soon glabrescent, with 6-9 sets of optional veins. Auxiliary and tertiary venation easily seen on the two surfaces, grouped towards the finishes of branchlets. Petiole 2.5-9 cm long. Young leaves are 1st copper-red then become parrot green in color and lastly become parrot green dull green. Flowers are lone, little, 3-15 cm long, greenish white, smooth, axillary spikes; calyx tube thickly lustrous; flowers show up alongside new leaves and have a solid nectar like smell. fruits sub-globular to comprehensively ellipsoid, 2-4 x 1.8-2.2 cm, thickly frizzy or lustrous, light-yellow, unclearly 5- angled and minutely earthy colored tomentosa. The conventional name 'Terminalia' comes from Latin word 'terminus' or 'terminalis' (finishing), which means leaves being packed or borne on the tips of the shoots. [15]

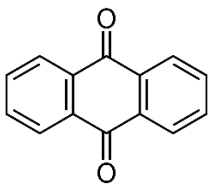
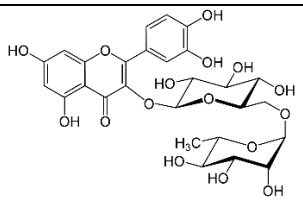
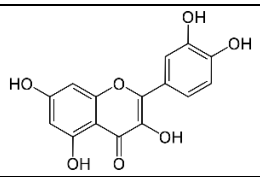
Habitat: It is a tree regularly found in semi-evergreen and clammy deciduous forests, and sometimes in the plains too. It is found through out the decidous forests of India except Jammu and Kashmir, Himachal Pradesh, Sikkim, Arunachal Pradesh. And found in Burma, Ceylon besides in the dryand parched area of Sind and Rajaputana. [16]

Phytochemicals present in Triphla:

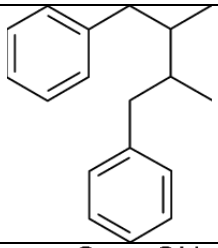
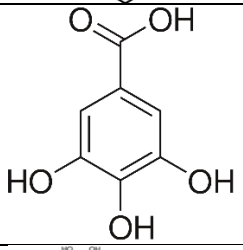
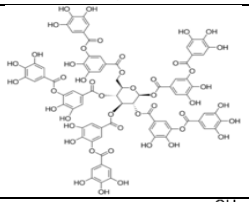
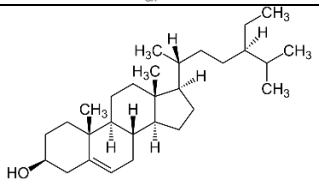
1. **Terminalia chebula**

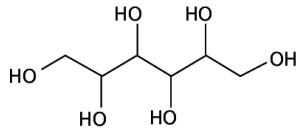
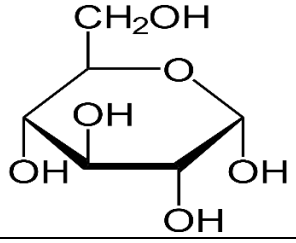
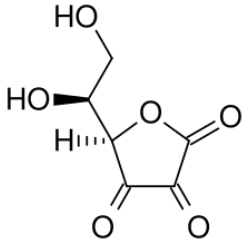
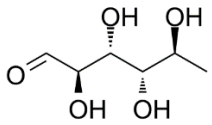
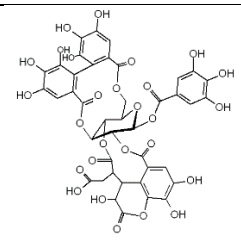
Name	Property	Chemical Structure
Gallic Acid	Prevents Cellular mutation and neuronal death, and acts as an anti-cancer agent. [17]	

Chebulic Acid	Anti-diabetic, Anti-oxidant agent.	
Chebulinic acid	Anti-infammatory agent, Natural inhibitor of vascular endothelial growth factor-a mediated angiogenesis. [18]	
Tannic acid	Acts as an astringent. [19]	
Syringic acid	Antibacterial and antioxidant effect	
Epicatechin	It is good for maintaining the heart health, mimics Insullin, and acts an Anti-oxidant. [20]	
Luteolin	Anti- oxidant, Anti-inflammatory, also possess' anti-cancer properties	
Ascorbic Acid	Anti-oxidant agent	

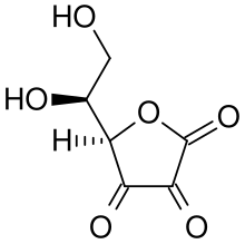
Anthraquinone	Immunomodulatory effect and Anti-bacterial	
Rutin	Anti-oxidant Agent	
Quercetin	Anti-cancer and Anti-oxidant agent. [21]	

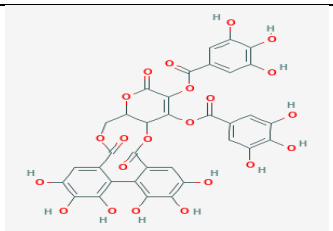
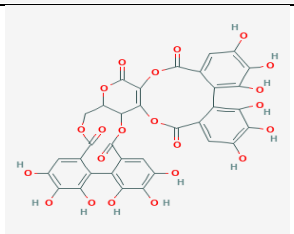
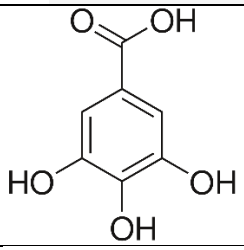
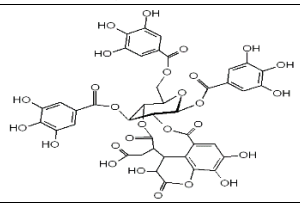
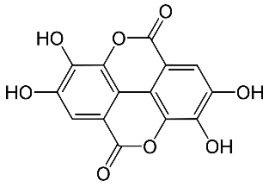
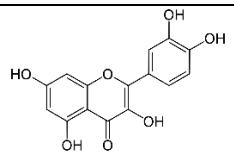
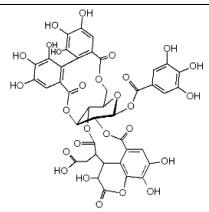
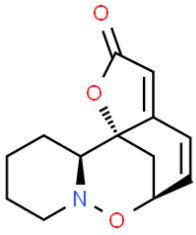
2. Terminalia bellerica:

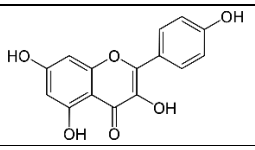
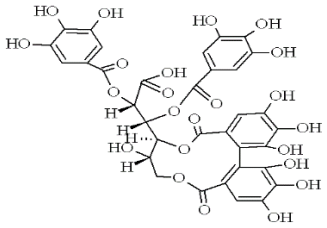
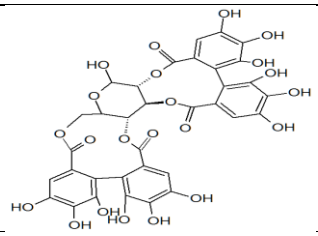
Name	**Property**	**Chemical Structure**
Lignans	Anti-oxidant, Anti-cancer, Improves heart health	
Gallic acid	Effective against cough, asthma, arthritis. [22]	
Tannic acid	Cough, asthma, anorexia, vomiting, arthritis, fever, epilepsy, splenomegaly, piles, diarrhea, leprosy, brain tonic and laxative	
β-sitosterol	Lowers the cholesterol level.	

Mannitol	Diuretic properties	
Glucose	Provides energy. [23]	
Ascorbic acid	Cough, asthma, anorexia, vomiting, arthritis, fever, epilepsy, splenomegaly, piles, diarrhea, leprosy, brain tonic and laxative	
Rhamnose	Anti-inflammatory properties	
Chebulagic acid	Anti-oxidant, hepatoprotective. [24]	

3. **Emblica officinalis:**

Name	Property	Chemical Structure
Ascorbic acid	Diabetes, hysteria, jaundice, eczema, piles, diarrhea, menorrhagia, scurvy, rebuilds and maintains new tissues and increases red blood count. [25]	

Emblicanin A	Known to possess' Anti-oxidant properties.	
Emblicanin B	Known to possess' Anti-oxidant properties. [26]	
Gallic acid	Radioprotective effect, chemopreventive effect, anti-carcinogenic, antioxidative, antimutagenic, antiallergic and anti-inflammatory activities.	
Chebulinic acid	Antioxidant activity, Antisecretory and cryo-protective activity.	
Ellagic acid	Radioprotective and chemopreventive effect, antityrosinase Activity, antioxidant, antiproliferative, and antiatherogenic Properties, estrogenic/antiestrogenic Activity.	
Quercetin	Radioprotective, chemopreventive, hepato protective effect. [27]	
Chebulagic acid	Antispasmodic action. [28]	
Phyllantidine	Neuropharmacological activity	

Kaempferol	Antioxidant activity	
Punigluconin	Antioxidant activity	
Pedunculagin	Antitumor activity, Antioxidant activity. [29]	

Traditional Use of Triphala:

In Indian medicine system, Triphala is used for mostly in stomach problem like digestion, ingestion, food assimilation, purifying of colon, constipation and reliever of gastrointestinal tract. Conventionally it is also considering for cardiovascular problems, high blood pressure, cholesterol problem, liver dysfunction, inflammation or complication of large intestine. In India Triphala is also considered as mother of all the medicine because the Triphala takes care of every part of the body internally just like a mother cares for her son. [30]

Triphala in Ayureveda :

Natural cures represent as one of the most antiquated medicines in healthcare and are historically terms as the most remarkable methods for maintaining health of human and homeostasis. Ayurveda, a Sanskrit word that mean the knowledge of life or the science of good and perfect health, is the conventional system of personalized medicine from India, which emphasizes disease prevention and health promotion. Triphala has been defined as the antiquated Ayurvedic test as a Tridoshic Rasayana, a remedial specialist with balancing and reviving effects for the three established components in Ayurveda - vata, pitta and kapha.[31] Triphala, being a blend of all three, is therefore balanced, making it valuable as an internal purification, detoxifying equation. It is viewed as a significant Rasayana and great laxative in Ayurvedic medication. Three plants commonly in equivalent extents and has been utilized in conventional medication in India for more than 1000 years as per the writings of the incredible physician Charak in an essential content of Ayurveda called the Charaka Samhita just as in another key content called the Sushruta Samhita. Triphala speaks to a basic recipe as it maintained the digestion, ingestion, disposal, and revival. Various

references in very much regarded Ayurvedic clinical writings clarify that Triphala is worshipped as a multiuse medication and historical panacea. [32]

Rasa Panchak of Triphala

Hindi/ Sanskrit	
Virya	Sita
Vipaka	Madhura
Guna	Sara, Ruksha
Rasa	Kasaya

English	
Potency	Bitter
Metabolic Property	Sweet
Physical Property	Heavy and Dry
Taste	Astringent [33]

Triphala has a prabhav, which means extraordinary activity or trophism, for all doshas (energetics and mind–body types) and subsequently is adjusting for all doshas and constitutions. The fruit is the prominent herbal drug commonly and widely used in the Indian system of medicine and is a frequent addition in a large number of formulations. It is useful in asthma, sore throat, thirst, vomiting, eye diseases, heart and bladder diseases, strangury, urinary discharges, ascites, inflammation, bleeding piles, typhoid, constipation, anaemia, elephantiasis and delirium. Triphala utilized in treatment of normal cold, pharyngitis and constipation. The bark is midly diuretic and is valuable in paleness and leukoderma. The Fruits are Astringent, harsh, Digestive, Anthelmintic, Aperient, Expectorant, Sweet, Anodyne, Stypic, Narcotic, Ophthalmic, Antipyretic, Antiemetic and Rejuvenating. Unripe organic product is a gentle diuretic and ready natural product is an astringent. Seeds are utilized as aphrodisiac. Oil separate from the seed mash is utilized in leukoderma and alopecia. Modern examinations have demonstrated the laxative action of the oil. [34]

Triphala in Modern Medicine System:

Triphla for a long time is known for its different therapeutic properties, for example, cancer prevention agent, anti-stress and anti-inflammatory. In recent time chemical investigation of Triphala, it was discovered to be pressed with polyphenols. Researchers tried its activity on particles that guide the advancement of neurodegenerative issues, for example, Parkinson. In test-tube study, Triphala is helpful to stop formation of fibril of alpha-syn in the brain. Thus, specialists feel that more clinical trial are needed to demonstrate its function in the cerebrum at the intracellular level as it is additionally not satisfactory how these polyphenols will arrive at the mind. Triphala having many constituents which is mentioned above and all that are advantageous for other therapeutical use. But the modern processesof formulating the herbal drugs somehow alter the qualities of the phytochemicals present in them.

Examples of modern products having Triphla as an ingredient

Modern Products [35]	
• **Livol**	
• **Vimliv**	
• **Livosin**	
• **Neolive**	
• **Livomap**	
• **Tefroli**	

Various Uses of Triphla	
• **Anti-cancer**	The hydro-alcoholic extract of triphla powder is known have anticancer properties. This extract is effective against melanoma skin cancer. Triphla extract is a preventive measure in skin cancer. It activates the healing process, and prevents the development of cancerous growth. [36]
• **Anti-oxidant**	Triphla is one of the most used anti-oxidant agent from ancient times. The polyphenolic activity of the polyphenol content present in the Triphla is known to possess Anti-oxidant properties. It helps in reducing oxidative stress by producing non reactive products from the reactive oxygen free radicals.
• **Radio-protector**	The polyphenolic extract of Triphla is effective against radtiation induced damage. [37]
• **Hepato-protective**	The phenolic and polyphenolic extracts of the Triphla as a whole or the constituents of the triphla are well known for their hepato-protective properties. They provide a great protection to liver

	against the damage induced by the various drugs and chemicals. [38]
• **Wound healing**	The triphala extract treatments shows remarkable wound healing in light of the fact that the granulation tissue shows increment in collagen fibres, hexosamine, uronic corrosive and furthermore decline in bacterial number. Collagen wipes fused with triphla shows excessive thermal stability, water take-up capacity, faster wound healing and improved tissue recovery. The fast injury recuperating is because of collaboration of Epigallocatechin gallate with collagen. [39]
• **Anti-cariogenic**	Terminalia chebula helps in the anticipation and treatment of different illnesses affecting the oral cavity, for example, dental caries, spongy and bleeding gums, gum disease, and stomatitis. Extract from the plant t.chebula can be utilized to forestall plaque arrangement on the surface of the tooth, by repressing the sucrose-incited adherence and the glucan-initiated aggregation, which is responsible for the colonization of the creature on tooth surface. Consequently, the extract go about as an powerful agent in the treatment of carious teeth with its capacity to restrain the development and gathering of S. mutans on tooth surface which further forestalls the aggregation of acids on the tooth surface, and subsequently no more demineralization and the breakdown of the tooth veneer can happen. [40]
• **Anti-pyritic**	Triphla is an excellent Anti-pyritic agent without producing any side effect or harm to the body. [41]
• **Anti-bacterial**	Triphla shows remarkable anti-bacterial properties against many varieties of bacteria. [42]
• **Anti-diabetic**	Triphla is known as one of the best anti-diabetic agents. The Triphla extract administration helps to reduce the blood-glucose level. [43]
• **Anti-Inflammatory**	Triphla has been proven to have great anti-inflammatory activities. [44]
• **Anti-ulcerogenic**	The ethanolic extract of E. officinalis are known to possess anti-ulcerogenic properties. [45]
• **Laxative**	Triphla also possess' laxative properties.
• **Immunomodulator**	The presence of various dynamic compounds in Triphla as a whole or its constituents, for example, gallic acid, chebulagic acid, ellagic acid, flavonoids, tannins and phenols, which are responsible for its viable immunostimulatory and immunosuppressant property making it a solid competitor as a plant based Ayurvedic immunomodulator. [46]
• **Anti-obesity**	Triphla have been accounted for containing gallic acid. Gallic acid is a bioactive marker because of its simple accessibility,furthermore, as hostile to Anti-obesity property. [47]
• **Anti-stress**	Triphla acts as an Anti-stress agent. Oral administration of Triphla has a protective impact on the stress induced behavior. [48]

• **Anti-diarrhoeal**	Triphla has remarkable anti-diarrhoeal effects due to the presence of some anti-diarrhoeal phytochemicals in its constituents. [49]
• **Anti-hyperacidity**	Triphla helps in the management of the hyperacidity conditions and also helps in maintaining and improving the appetite. [50]
• **Menstural health**	Oral administration of Triphla has proven to a significant medical herb in menstural irregularities. It helps in reducing the increased blood flow and other irregularities in the cycle. [51]

Conclusion:

We have come to know from the study that each constituent of triphala possess' great variety of important phytochemicals and each phytochemical has its own significant property and thus make the triphla a unique herbal formulation. It is an an antiquated Indian herb as a long history as a restorative plant with different remedial applications.
It has numerous utilizations and no doubt, the nature's favoring to humanity.

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