

# Triphala: The Mystical Herb and Its Role in Dentistry

Ummey Salma<sup>1</sup>, Antara Sinha<sup>2</sup>, Neelu Farhath Abdulla Basha<sup>3</sup>, Atiqulla Shariff<sup>4</sup>

## ABSTRACT

Ayurveda is well-thought-out as the science of life, for the reason that the ancient Indian system of health care aimed on the views of man and his ailment. From prehistoric times traditional herbal remedies have been commonly adapted in India. Herbal extracts are economical with less adverse effects as they interact with special chemical receptors within the body. There is a folk saying in India which says, “No Mother? Do not worry so long as you have Triphala”. As it safeguards internal organs, just like a mother shields her offspring. Triphala is made by equal parts of three fruits namely amalaki (*Emblica officinalis*), haritaki (*Terminalia chebula*), and bibhitaki (*Terminalia bellerica*). This herb contains antioxidants, gallic acid and ascorbic acid. It has beneficial effects in treating various ailments and thus has acquired importance in clinical research for its anticaries, antioxidant, anticollagenase and antimicrobial activities. The objective of the present article is to provide a brief overview of Triphala and its various applications in dentistry.

**Keywords:** Triphala, Dentistry, Anticaries, Nutraceutical.

## INTRODUCTION

Dental health is fundamental for general well-being. In present time, dental practice has increased the use of drugs that has risk of adverse effects which may impair individuals' general health. Ayurveda endeavours to generate balance between the body's natural protection mechanism counter to the ailments.<sup>1</sup> Age-old heritage of traditional herbal therapy is commonly found in India. It has been applied for treating most of the diseases because of their wide acceptance, reliability and being less expensive.<sup>2-4</sup> Advent of new era of medicine has gradually pushed herbal therapy from its plinth. However, several factors like drug resistance and safety of drugs has raised the need for newer research, concerns on the safety profile and rising costs has entailed us to look over the herbal way.<sup>5</sup> Triphala is a dried powder of three assorted fruits namely, Indian gooseberry (*Emblica officinalis*) also known as amalaki or amla, black myrobalan (*Terminalia chebula*) also known as haritaki or harada, and belleric myrobalan (*Terminalia bellerica*) also known as bibhitaki or bahera, hence it is named as Tri (Three) Phala (Fruit). The combination of these three herbs in defined proportion results in a wonder formulation.<sup>6</sup> Therefore, it is widely used in traditional medicines and home remedies for centuries. As it is nontoxic and has variety of therapeutic properties, it has gained popularity in modern medicine as well as in dentistry. It can be used as nutraceutical agent in dentistry for treating caries, periodontal diseases in the form of mouthwash, root canal irrigant, pit and fissure sealant.<sup>7</sup>

## HISTORY OF TRIPHALA

Triphala is used in Ayurveda over 2,000 years. References to the use of Triphala can be found in the Sushruta Samhita, which is dated to 1500 BC. Sushruta Samhita contains 184 chapters that comprise of description of 1120 illnesses and 700 medicinal plants including Triphala. Therefore, the use of Triphala has an ancient background with ancestral history to it.<sup>7</sup>

## INGREDIENTS OF TRIPHALA

**AMLA (*Emblica officinalis*):** It is a fruit which grows on a small tree that is habitually found in India. Along with harada, amla triggers gastric emptying. It has a broad spectrum of antimicrobial activity. Besides amla has astringent, mild laxative and antipyretic properties as well. It is used to treat ulcers, inflammation of the stomach and intestines, constipation, diarrhoea, liver congestion, infections and burning sensations all over the body. It is the highest known natural source of vitamin C (478.56mg/100 mL), with 20 times more content of vitamin C than an orange. Vitamin C acts as a co-factor in the conversion of proline into hydroxyproline which is one of the essential constituent of connective tissue.<sup>8</sup>

**HARADA (*Terminalia chebula*):** *Terminalia chebula* is commonly known as black myrobalans in English, harada in Hindi, and samorthai in Thai. The full-grown fruit is a hard glabrous drupe, 3-5 cm long, ellipsoid to oval in shape with yellowish orange brown, and containing a single seed, usually 2 cm long and 1 cm in diameter. Harada is bitter in taste and it has laxative, astringent, lubricant, antiparasitic and antispasmodic properties. Thus, it is used in conditions

<sup>1</sup>Research Scholar (PhD), Department of Pediatric & Preventive Dentistry, M. S. Ramaiah University of Applied Sciences, Bengaluru, Karnataka, India, <sup>2</sup>Postgraduate Student, Department of Pediatric & Preventive Dentistry, Bangalore Institute of Dental Sciences & Hospital, India, <sup>3</sup>Undergraduate Student, Department of Clinical Pharmacy & Pharmacology, RAK College of Pharmaceutical Sciences, Ras Al Khaimah, United Arab Emirates, <sup>4</sup>Head, Clinical Content, CliniRex, Tychee Innivations Pvt. Ltd., Vijayawada, Andhra Pradesh, India

**Corresponding author:** Dr. Ummey Salma, Research Scholar (PhD), Department of Pediatric & Preventive Dentistry, M. S. Ramaiah University of Applied Sciences, Bengaluru, Karnataka 560054, India

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like acute and chronic constipation, nervousness, anxiety and feelings of physical heaviness.<sup>9</sup>

**BAHERA (*Terminalia bellerica*):** It has significant quantity of proteins and oils, moreover it is rich in the omega 3 essential fatty acid and linoleic acid. Triphala contains several compounds that have been proposed to be responsible for its claimed health benefits including gallic acid, chebulagic acid, and chebulinic acid. Bahera has astringent, digestive and antispasmodic properties. It purifies and removes excess mucus, treats asthma and other respiratory disorders.<sup>7</sup> According to Ayurvedic theory, the body is composed of three doshas or humours namely, vata (wind), pitta (fire or bile) and kapha (water or mucus) and these three fruits of Triphala relate themselves to the three humours of Ayurvedic medicine.<sup>10</sup>

### PREPARATIONS AND DOSAGE OF TRIPHALA

There are two formulations of Triphala; powder (churna) and decoction.

**Triphala tablet / Triphala churna:** This is a dry fine powder form of the drug churna, which can be used both internally and externally. Preparation: The drug selected is washed cleaned and dried. It is crushed to a fine powder using a pulveriser. The fineness of the powder improves the therapeutic efficacy. In case of compound churna, each drug should be powdered separately, and finally all individual drug powders are mixed together. The chuna should be fine of at least 80 mesh sieve.<sup>11</sup>

**Triphala decoction:** This form can be used as an eyewash or mouthwash. Preparation: After cleaning the dried fruits and removing seeds, the powder is made separately from the three dried fruits. Three powders are mixed together in equal amounts to form a uniform mixture. This mixture is added to 16 times water for an hour and then boiled till half of the water remains. The decoction is filtered through fine cotton cloth and stored in a clean bowl or jug. Slightly warm decoction should be used for washing eyes at the earliest after its preparation.<sup>11</sup>

Clinically Triphala is used in two concentrations. One is equal proportions of *Emblica officinalis*, *Terminalia chebula* and *Terminalia bellerica* (1:1:1 ratio). Another is one proportion of *Terminalia bellerica*, two proportions of *Terminalia chebula* and four proportions of *Emblica officinalis* (1:2:4 ratio).<sup>6,12</sup>

The maximum daily dose for an individual is 2000 mg. Commercially Triphala is available as 500 mg to 750 mg tablets. Generally, the dose is from two tablets 1-3 times daily or four to six tablets once daily. Children may only require one or two tablets per day. The larger dose is more laxative while the smaller dose tends to be more gradually blood purifying. A smaller dose might be one or two tablets three times daily. One should increase or decrease the dose according to one's bowel movements. Although it is a natural herb and considerably safe, patients might experience adverse effects like loose stools diarrhoea, abdominal pain and cramps. Triphala is contraindicated in individuals

with malnutrition, fasting or dieting, severe weight loss, excessive dryness of skin, abdominal tenderness, heartburn or hyperacidity, gastritis and ulcers, inflammatory bowel disease, pregnancy as it may cause uterine stimulation and result in contractions leading to miscarriage.<sup>10</sup>

### APPLICATIONS OF TRIPHALA IN DENTISTRY

**Triphala as a mouth rinse:** Dental professionals and patients are encountered by a wide range of mouth washes out of which chlorhexidine is considered as gold standard as it can effectively lessen the oral microbial load.<sup>13</sup> However due to its adverse effects like staining of teeth and composite restorations, altered taste perception and in few cases allergy has led to poor patient compliance over a long term use.<sup>12</sup> This led to search for new alternates that are more appropriate for use in paediatric patients.<sup>14</sup>

Triphala is one of the ayurvedic medicament with wide spectrum of antimicrobial activity. Triphala can be used as a gargling agent and has been mentioned in ancient literatures.<sup>15</sup> According to literature 0.6% Triphala mouthwash has shown to have significant anticaries activity, along with no staining of teeth unlike chlorhexidine which produces extrinsic stains and altered taste perception.<sup>16</sup> Triphala mouth rinse along with scaling and root planing showed considerable reduction in the plaque, gingival, and oral hygiene indices of teeth at 7, 30, and 45 days when compared to chlorhexidine mouth wash.<sup>14,17-19</sup>

Triphala in combination with metronidazole (400 mg) proved that there was improvement in clinical indices in terms of reduction in tooth mobility, pocket depth, bleeding gums, sensitivity to hot and cold and calculus formation with minimal recurrence in all the clinical parameters.<sup>20</sup> A study was conducted to compare the efficacy of Triphala with Chlorhexidine as mouthwash. The study showed that, Triphala (0.6%) when used twice a day showed 17% and 44% reductions in oral streptococci on second and seventh day respectively compared to chlorhexidine (0.2%) that showed 16% and 45% reductions in the organism over the same period. Authors concluded antistreptococcal efficacy of Triphala is comparable to Chlorhexidine.<sup>21</sup>

**Triphala as an antioxidant:** Oxidative stress has been accounted as a predisposing factor in various oral diseases. Disruption of balance between the production of oxygen free radical species and inactivation of the same results in diseases. Phenolic compounds present in Triphala extracts attributed to its antioxidant property. Concentration of phenolic compounds in Triphala is around 33-44%. Therefore, *Emblica officinalis* exhibits remarkable lipid peroxidation properties whereas *Terminalia chebula* has excellent radical scavenging property. This synergistic effects makes Triphala a better antioxidant.<sup>22,23</sup>

**Triphala as an oral antimicrobial:** Triphala has notable antimicrobial action against gram positive and gram negative bacteria namely *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Bacillus subtilis*, *Escherichia coli* and *Pseudomonas aeruginosa*. This is due to presence of various

chemical constituents like flavonoids, terpenes and alkaloids. It possesses excellent bacteriostatic and bactericidal activities at a very low concentration of 50µg/ml. About 5% solution of Triphala inhibits 83.7% *Streptococcus mutans*.<sup>24</sup> It is probably due to the tannic acid in Triphala which gets adsorbed onto the surface of the bacterial cell leading to protein denaturation and ultimately to cell death. Triphala also helps in controlling dental plaque, microbial growth and gingival inflammation caused by the *Lactobacillus* and *Streptococcus mutans*.<sup>7</sup> Triphala inhibits growth of Enterococci which causes nosocomial bacteraemia, surgical wounds and urinary tract infections. Triphala exhibited a large zone of inhibition against Enterococci.<sup>25</sup> In addition, one of the constituent of Triphala, *Terminalia chebula* has shown significant inhibitory effect on Candida and is probably due to the gallic acid components.<sup>23</sup>

In a study conducted by Srikumar et al. it was observed that Triphala had antibacterial activity against the bacterial isolates (*Klebsiella pneumoniae*) of Human immunodeficiency virus (HIV) infected patients.<sup>26</sup> Apart from its excellent antibacterial and antifungal action Triphala is also noted to possess antiviral action against Herpes simplex virus 1 (HSV-1) and Cytomegalovirus and HIV. In a study it has been stated that *Terminalia chebula*, an active ingredient in Triphala inhibits hepatitis B virus (HBV) DNA polymerase and elevate the level of Interferon gamma (IFN-γ) and Interleukin-2 (IL-2) in peripheral blood thereby its action against HBV.<sup>27</sup>

**Triphala as collagenase inhibitor:** Matrix metalloproteinase (MMPs) are calcium dependent zinc containing endopeptidases which play a major role in tissue remodelling. It also plays central role in physiological and pathological remodelling of periodontium. Any imbalance in the synthesis of these MMPs and production of endogenous inhibitors result in periodontal diseases. Researchers thus focus on MMP inhibitors that act as therapeutic agents and allow restoration of this imbalance.<sup>28</sup> Tetracyclines are known for its effective inhibition of MMP mediated connective tissue destruction. However prolonged use of this broad spectrum antibiotic can result in microbial resistance so it is avoided in routine treatment. Triphala preparations have a dose dependent collagenase inhibition action. Although all three components are collagenase inhibitors the most potent is *Terminalia chebula*. Various studies have proved that 0.15 mg/mL of water extracts of Triphala decoction causes complete collagenase inhibition.<sup>29</sup>

**Anticaries activity of Triphala:** Various species of streptococci namely *Streptococcus mutans*, *Streptococcus salivarius* and *Streptococcus mitis* are known to cause dental caries. Complex interaction between the streptococcal species and the dental biofilm results in dental plaque formation. *Streptococcus mutans* metabolizes sucrose into dextran. This insoluble sticky glucan promotes the adherence of the microbial species on the tooth surface, thus forming dental plaque. Prolonged accumulation of dental plaque on the tooth surface results in decalcification of enamel thereby

initiating dental caries.<sup>30</sup>

Many antiplaque preparations are available but due to their undesirable adverse effects have led researchers to explore ayurvedic preparations with very minimal side effects. Studies have shown that *Terminalia chebula* prevents plaque formation on the surface of the tooth by inhibiting sucrose induced adherence and glucan induced aggregation. It inhibits the growth and accumulation of *Streptococcus mutans* on the surface of the tooth. This in turn prevents the build-up of acids on the tooth surface and thus prevents further demineralization.<sup>31,32</sup> Rinsing of mouth with aqueous extracts of Triphala has shown to reduce total bacterial load and total streptococcal count in saliva samples for up to 3 hours.<sup>31</sup> Triphala mouthwash (0.6%) has shown to have significant anticaries activity, which is comparable to that of chlorhexidine without causing staining of teeth.<sup>16</sup>

**Triphala as root canal irrigant:** Root canal infections are polymicrobial in nature especially gram negative anaerobic rods. However, *Enterococcus faecalis* is commonly found in high percentage of root canal failures and plays a major role in etiology of persistent periradicular lesions.<sup>33</sup> Sodium hypochlorite (NaOCl) has been effectively used as a root canal irrigant due to its excellent antimicrobial property, however ineffective removal of smear layer, unpleasant taste, high toxicity and deleterious effects on dentine like reduction of its elastic modulus and flexural strength limits its use. Triphala has a potent antimicrobial activity against enteric pathogens and has shown significant inhibitory activity against biofilm. This may be attributed to the presence of tannic acid which is its major constituent.<sup>34</sup> Triphala also have an added advantage of being an antioxidant and anti-inflammatory agent over traditional root canal irrigant, thereby proving to be an excellent herbal alternative without undesirable side effects of NaOCl.<sup>35</sup>

**Triphala as an analgesic and antipyretic agent:** Triphala has both analgesic and antipyretic action by blocking release of the endogenous substances that produce pain by stimulating nerve endings which is similar to non-steroidal anti-inflammatory drugs.<sup>12,36</sup>

**Anticancer properties of Triphala:** Gallic acid in Triphala is thought to suppresses the growth of cancer cells. Thus it can be prescribed for oral mucosal lesions. Triphala acts against 1, 2-Dimethylhydrazine dihydrochloride that induce cancer, by decreasing lipid peroxidation activity of lactate dehydrogenase (LDH), increasing the level of reduced glutathione (GSH) and by preventing peroxidative damage.<sup>37-40</sup>

## CONCLUSION

Triphala is a blend of three plants which has been recognised for its beneficial role in both medical and dental field. This naturally derived mixture not only improves the general health but also has a wide spectrum of uses in dentistry. A minimal side effect of this natural powder has made it a popular alternate to routinely used synthetic compounds. Besides, it is being less expensive and longer shelf life

enhances its advantages. Triphala is a gift from ancient Ayurveda, in addition to its enormous clinical benefits it also possesses antimicrobial and antiplaque properties that are highly useful in dentistry. Ayurveda is not a replacement for contemporary dentistry but can be used in combination with it. The role of Triphala in dentistry certainly has beneficial effects and thus it needs further exploration on a larger population to get accurate results.

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