

“Role of Priyangavadichurna in Dentistry”

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ABSTRACT:

The use of herbal medicines for the betterment of mankind is well practiced from centuries. In the recent years there has been rapid growth in the field of herbal medicine most of the tradition systems of medicine are accepted universally after standardization only. Ayurveda mainly focus on health care of man and his illness. Western medicinal drugs provide effective antimicrobial and antibiotic therapy for bacterial infections, but there is an increasing problem with resistance to antibiotics and also they have their own side effects with long term use. Herbal medicines are a useful and effective source of treatment for various diseases processes. ‘Priyangavadichurna’ is a powdered preparation and it consists of equal parts of the Callicarpamacrophylla, Cyperusrotundus, Emblicaofficinalis, Terminalia chebula, Terminalia bellirica. Currently all this drugs is being extensively researched for their various therapeutics effects including reducing inflammation, as antimicrobial plaque agents, for preventing release of histamine and as antiseptics, antioxidants, antimicrobials, antifungal, antibacterial, antivirals and analgesics. It also aid in healing and are effective in controlling microbial plaque in gingivitis and periodontitis. The present review will focus on the comprehensive appraisal of Priyangavadichurna and its several applications in dentistry.

Keywords: Priyangavadichurna, Dentistry, Antiseptic, Antibacterials, dental caries, periodontics.

I. INTRODUCTION:

The knowledge on the medicinal plants has been accumulated in the course of many centuries, based on different medicinal systems such as Ayurveda, Unani and Siddha. During the last few decades, there has been an increasing interest in the study of medicinal formulations and their traditional use in different part of world.^[1, 2] According to World Health Organization (WHO), as many as 80% of the world’s people depend on herbal medicine for their primary health care

needs. The development of herbal medicines and their use carry considerable economic benefits in the treatment of various diseases.^[1] Herbal medicines were in great demand in the developed as well as in developing countries for primary health care because of their wide biological and medicinal activities, higher safety margin, and lower costs.^[1] Conventional drugs usually provide effective antibiotic and antimicrobials therapy for bacterial infections, but there is increasing problem of antibiotic resistance and a continuing need for new solutions. Hence, now a days, herbal drugs are preferred to synthetic antibiotics.^[1]

‘Priyangavadichurna’ is a powdered preparation which is mentioned in Sushrutasamhitachikitsasthana and it consists of equal parts of the Callicarpamacrophylla, Cyperusrotundus, Emblicaofficinalis, Terminalia chebula, Terminalia bellirica.^[1]

Ingredient-wise main chemical constituents of Priyangavadichurna:

Tannins:

It is general descriptive name for a group of polymeric phenolic substances which possess property known as astringency which means capable of the precipitating gelatin from solution. This group of compounds has received a great deal of attention in recent years since they can cure and prevent many variety of diseases. It performs many physiological activities, such as stimulation of phagocytic cells, host mediated tumor activity and wide range of anti-infective actions, have been assigned to tannins. One of their molecular actions is to complex with proteins through hydrogen bonding and hydrophobic effects as well as by covalent bond formation. Thus, their mode of antimicrobial action may be related to their ability to inactivate microbial adhesions, enzymes and cell envelop transport proteins.

Quinones:

Quinones are aromatic aromatic rings with two ketone substitutions. They are omnipresent in nature and are characteristically highly reactive. The individual redox potential of the particular

quinine-hydroquinone pair is very important in many biological systems. Vitamin K is a complex naphthoquinone with anti-haemorrhagic activity in addition to providing a source of stable free radicals, quinones are known to complex irreversibly with nucleophilic amino acids in proteins, often leading to inactivation of the protein and loss of function. For that reason the potential range of quinone anti-microbial effects is great. Probable targets in the microbial cell are surface exposed adhesions, cellwall polypeptides and membrane bound enzymes. Quinones may also render substrates unavailable to the microorganism.

Flavones, flavonoids and flavonols:

Flavones are phenolic structures containing one carbonyl group (as opposed to the two carbonyls in quinones). The addition of a 3-hydroxyl group yields a flavonol. Flavonoids are also hydroxylated phenolic substances, but occur as a C6-C3 unit linked to an aromatic ring. Since they are known to be synthesized by plants in response to microbial infection, it should not be surprising that they have been found in vitro to be effective anti-microbial substances against a wide array of microorganisms. Their activity is probably due to their ability to complex with extracellular and soluble proteins and to complex with bacterial cell walls. More lipophilic flavonoids may also disrupt microbial membranes. These compounds have been shown to inhibit *Vibrio cholera* O1, *Shigella*, *Streptococcus mutans* in vitro. Inhibition of isolated bacterial glucosyltransferases in *S. mutans*, and reduction of fissure caries by about 40% has also been demonstrated.

Gallic acid:

Gallic acid is common phyto-constituent present in all five herbs used in Priyangavadi Churna. It is reported to possess antioxidant and anti-inflammatory activity. It also suppresses growth of cancer cells.

Vitamin C:

Fruit juice of Amalaki contains highest vitamin C (478.56 mg/100ml) content. Vitamin C in Amalaki accounts for approximately 45-70% of the antioxidant activity. Evidences have been reported for the relation between Vitamin C and periodontal disease. Significant gum bleeding can occur in vitamin C deficiency. Vitamin C along with bioflavonoid helps to speed up the healing process.

Terminalia chebula (Haritaki or Black myrobalan):

The dried ripe fruit of *T. Chebula* is an important herb used extensively in the indigenous system of medicine for its homeostatic, antitussive,

laxative, wound healing property. The observed health benefits of this fruit may be credited to the presence of various phytochemicals like tannin, polyphenols, terpenes, anthocyanins, flavonoids, alkaloids and glycosides. *Terminalia Chebula* exhibited antibacterial activity against a number of bacterial species. Antibacterial activity of *Terminalia Chebula* against both gram positive and gram negative human pathogenic bacteria has also been reported. Gallic acid (3,4,5-trihydroxybenzoic acid) and its ethyl ester isolated from ethanolic extract of *Terminalia Chebula* showed antimicrobial activity against *Fusobacterium nucleatum* and *Prevotella intermedia* which is most commonly involved in gingivitis. Gallic acid also possesses antioxidant, antimutagenic, anti-inflammatory activities. Methyl gallic acid has been reported to be the major metabolite of gallic acid. Other minor metabolites such as High performance liquid chromatography (HPLC) analysis confirmed that the fruit of *Terminalia* extract contains phenolic compounds. Local administration of an alcoholic extract of *Terminalia Chebula* leaves.

Terminalia Belerica (Bibhitaki)

T. belerica is also referred to as *Belerica Myrobalan* in English, *Bibhitaki* in Sanskrit and *Bahera* locally in India. Its principle phytoconstituents are beta-sitosterol, gallic acid, ellagic acid, ethyl gallate, galloyl glucose, chebulagic acid. Fruit contains terpenoids (*belleric acid* and *chebulagic acid*), saponin (*bellericoside* and *bellericanin*) and tannins which are composed of *chebulinic acid*, *chebulagic acid*, 1,3,6-trigalloylglucose and 1,2,3,4,6-pentagalloylglucose, *corilagin* and *glucogallin* etc. *T. belerica* has been reported to possess potent antioxidant action. A comparative study on radical scavenging activity of ethanolic and aqueous extract of *T. belerica* fruit suggested that aqueous extract has comparatively better scavenging action against superoxide anion, nitric oxide and ABTS radicals. *T. belerica* has shown potent action against infectious agents in vitro. Fruit extract contains phenol, tannins, alkaloid and flavonoids. Alkaloid could be responsible for inhibiting the microorganism by impairing the enzymes involved in energy production, interfering the integrity of cell membrane and structural component synthesis. Tannins could be implicated in preventing the development of microorganisms by precipitating the microbial protein and making nutritional proteins unavailable for them.

Emblicofficinalis(Amalaki):

Amalaki or Indian gooseberry is known for its medicinal and therapeutic properties from the ancient time in India. It is the best tissue rejuvenating herb. It is potent herb rich with Anti-oxidant, Vitamin C, Tannin and Gallic acid. Amalaki possess key properties like adaptogenic, Anti-ageing, prolonged cell life, improves cell migration and cell binding. The contents like tannins, alkaloids, phenolic compounds, amino acids and carbohydrates are proved to be having anti-inflammatory and analgesic effect. As *E. officinalis* fruit is rich source of vitamin C and lower molecular weight hydrolysable tannins. Because of this content Amalaki becomes great source of antioxidant. Tannins like embelicanin A (37%), embalicanin B (33%). Punigluconin and pedunculagin conjointly give protection against oxygen radicals. It has been demonstrated that extracts of *E. officinalis* fruit have significant immunomodulatory action. Amalaki shown immunostimulant activity and moderate cytoprotective activity. It has specific cytoprotective action due to the ability to inhibit free radical production and maintain higher antioxidant levels in the cells even during oxidative stress.

Callicarpamacrophylla: (Priyangu)

Callicarpamacrophylla Vahl. belonging to family Verbenaceae. As a folk medicine the plant is useful in the treatment of various disorders viz. tumor, diabetes, etc.. It possesses various pharmacological properties viz. analgesic, digestive, antiemetic, blood purifier and anti-burning. The ethanolic and aqueous extracts of leaves possess anti-inflammatory action. Aqueous extract of leaves showed significant analgesic activity. Also possess anti-bacterial against *P. mirabilis*, *B. anthracis* and *S. aureus*. Its fruit powder mainly possesses blood purifying properties.

Cyperusrotundus: (Musta)

Essential oils present possess good anti-inflammatory due to the presence of beta-sitosterol and flavonoids. Alcoholic extracts of tuber parts of *C. Rotundus* possess wound healing properties. Ethanolic extract of Rhizome possess high anti-microbial activity. It possesses efficient capacity to reduce harmful effect free ions, especially against DPPH and super oxide anions. Its root extract has a potent superoxide radical scavenging effects. The anti-bacterial activity of *Cyperus* oil was studied for various microorganisms (*S. Aureus*, *Klebsiella pneumoniae*, *Proteus vulgaris*, *Streptococcus pyogenes*, *E. coli* and *P. aeruginosa*) using

inhibition zone method. Due to its all these properties it can be widely used in Periodontal diseases mainly gingivitis and loose teeth.

Priyangavadi Churna in Dentistry:

Anti-carries activity:

Although many anti-plaque agents are available in the market, search for any cost effective and drugs with high efficacy still continues. Search for alternate agents is stimulated due to several undesirable sideeffects of available drugs. Plants or their extracts used in folk dental practices or mentioned in the classics are now gaining attention in the view of their acclaimed medicinal properties.

Terminalia *Chebula*, *Callicarpamacrophylla* and *Cyperusrotundus* are valuable in the prevention and treatment of several diseases of the mouth such as dental caries, spongy gums, bleeding gums, stomatitis, OSMF, gingivitis. Their extract or powdered form could successfully prevent plaque formation on the surface of the tooth. This occurs as it inhibits the sucrose induced adherence and the glucan-induced aggregation; these process fosters the colonization of the bacterial organisms on the surface of tooth. This in turn prevents the accumulation of acids on the surface of the tooth, and thus further demineralization and breakdown of the tooth enamel occurs.

Root canal irrigant:

Primarily all endodontic infections are caused by oral microorganisms, which are usually opportunistic pathogens which may invade a root canal containing necrotic tissues and establish an infectious process. If root canal remains infected for longer duration growth of anaerobic bacteria increases. Most common organism cultured is *enterococcus faecalis* (gram -ve). Sodium hypochlorite is an efficient irrigant used in eliminating this organism biofilm but the main disadvantage is its unpleasant taste and its inability to remove the smear layer. *Triphala* in *Priyangavadi Churna* has shown significant anti-bacterial activity against three to six week biofilm. The use of herbal alternative for irrigation of root canal might prove to be advantageous.

Mouth rinse:

Since ancient times oral rinses made from these drugs are used in periodontal diseases. *Triphala* in addition to *Priyangu* and *Musta* possess wide spectrum of activity. According to Acharya Sushruta these drugs can be used as a gargling agent in dental diseases. It is proven in clinical indices in terms of reduction in tooth mobility,

pocket depth, bleeding gums, hypersensitivity, and calculus formation.

Anti-microbial and Anti-oxidant:

The anti-plaque effect probably may be due to tannic acid present in the formulation which is absorbed well to the groups on the surface of the bacterial cells, which results in protein denaturation and ultimately to bacterial cell death. The strong antioxidant activity of Priyangavadi Churna may be attributed to Cyperus rotundus, E. officinalis and T. Chebula. The presence of other active ingredients i.e. ellagic acid and gallic acid and some gallic acid derivatives including epigallocatechingallate of phenolic nature may be responsible to scavenge the free radicals.

Anti-collagenase activity:

Matrix metalloproteinases play a main role in periodontal destruction. Triphala in this combination has strong inhibitory activity against PMN-type collagenase, especially MMP-9 at a 1500 mg/ml, which is within the safety profile of toxicological studies.

II. CONCLUSION:

Priyangavadi Churna is a novel drug with an array of therapeutic activities gifted by Ayurveda to the world. It has potential to treat a variety of dental disorders with no side effects. Dentistry is still in search of a drug for diseases affecting hard and soft tissues of oral cavity. This formulation seems to fulfil most of these requirements without any adverse effect on oral tissues and at very minimal cost as compared to commercially available products today. Hence, further research exploring various therapeutic actions of Priyangavadi Churna should be encouraged in dentistry.

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