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Can herbal mouthwash reduce bacterial load in your oral cavity during COVID -19: A Systemic review

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ABSTRACT:
Due to **COVID -19** pandemic majority of the population is facing difficulties in their day to day activities, be it financial crisis or lack of food supplements or mental health issues such as depression.
Also, due to the fear of getting infected by the **coronavirus** and also due to the large time period spend at home during lockdown, the frequency of attending a doctor or dentists has decreased.
People of all age groups from children to adolescents to adults and even old age are being affected from one or the other ill effects of **COVID 19.**
Bacterial load in the oral cavity is mainly due to commonly found bacteria such as streptococci mutans, streptococcus sobrinus and lactobacillus, etc.
Thus through the medium of this paper we are concising different types of mouthwashes so that people mainly in the rural areas of the country who are devoid of sufficient facilities to buy company made costly mouthwashes can easily keep their oral cavity clean and germ free and also can protect themselves from the deadly corona virus by preparing herbal mouthwashes at home.
Mouthwashes have a particularly important role to play in keeping the oral cavity healthy. Apart from regular brushing and flossing mouthwash can be a useful addition to the oral hygiene routine.
A patient with oral diseases has a high risk of COVID 19 because of an open wound in oral cavity especially when considering the ocular airway, and mouth mucosa are the main port of entry of this pathogen.

I. INTRODUCTION:

COVID -19's first case was inferred on 31 December 2019 in wuhan,china.[1] Within a very short span of time it has spread across the globe and is causing devastating effects on the human population.

Talking about its structure it is spherical or pleomorphic enveloped particles containing single-stranded (positive-sense) RNA associated with a nucleoprotein within a caused comprised of matrix protein. The envelope bears club-shaped glycoprotein projections. The virus enters the host cell, and the uncoated genome is transcribed and translated. The mRNAs form a unique "nested set" sharing a common 3′ end. New virons form by budding from host cell membranes.

Transmission is usually via airborne droplets to the nasal mucosa. Virus replicates locally in cells of the ciliated epithelium, causing cell damage and inflammation.[2]

Turmeric (Curcuma longa) rhizome, yashtimadhu or liquorice (Glycyrrhiza glabra) stem, neem (Azadiracta indica) and catechu (Acacia arabica) barks, and natural salt may be used to prepare medicated water/solutions for gargles/mouth rinse. Glycyrrhizin, an active component in liquorice was found to be more effective than common antivirals in inhibiting the replication of SARS virus and inhibited its adsorption and penetration.[3]

Thus, through this paper we are introducing different types of mouthwashes containing **turmeric, baking soda, tulsi, cloves, celtic sea salt, honey, ginger, spearmint oil, and cinnamon oil**, **triphala,propolis, flavenoid, ashwagandha, giloy.**

Benefits of turmeric -turmeric has anti-inflammatory effects, anti-bacterial properties, anti-fungal actions, anti-oxidant properties, hepatoprotective effects, improves immunity and has positive influence on liver which helps to treat liver conditions such as hepatitis, cirrhosis and jaundice.It also acts as an anti-cancer agent and prevents plaque formation and gingivitis .[4]

Benefits of clove- eugenol an aromatic molecule found in clove have been used as a topical treatment for pain in phenolic dental procedures. In nervous system, eugenol is neuroprotective against excitotoxicity, ischemia, and amyloid peptide. It is also used in treatment of epilepsy and cephalic pain. [5]

Benefits of ginger- it is used since ages for its anti-inflammatory properties, antioxidant activity, anticancer activity, anti-microbial activity (to control periodontal infections such as prevotella intermedia, porphyromonas gingivalis, and porphyromonas endodontali), anti-diabetic activity, and other effects such as being neuroprotective in transient global ischemia, prevention of gastric ulcers, and anti-serotonergic effect.[6]

Benefits of honey-honey has been shown to have anti-bacterial, anti-inflammatory, anti-oxidant-and healing properties. In dentistry it is specifically used to for treating periodontal diseases and it is found to prevent bone destruction in an established lesion.[7]

Benefits of basil (tulsi)- holy basil is commonly known for its anti-oxidant activity , it renders protection from radiation poisioning and can repair cells damaged by exposure to radiation. It also modulates immunity, thus promotes immune system function.

The essential oil of holy basil significantly posseses antiulcer activity. Among all properties of holy basil described, its anti-inflammatory action, bacteriostatic effect, antioxidant and immune modulatory property makes its use as a therapeutic agent for gingival and periodontal disease an appealing proposition.[8]

According to P Shree et al (2020), best docked compounds obtained from Ayurvedic medicinal plants W. somnifera (Ashwagandha), T. cordifolia (Giloy) and O. sanctum (Tulsi) could be predicted to serve as potential inhibitors of SARSCoV-2 M^{pro}, with their significant binding affinity, stable MD runs, ADMET prediction and drug-likeness properties. These phytoconstituents not only impede the interaction of viral protein to the host cell to transmit and propagate inside the human body but they are also safe to repurpose against COVID-19 without any toxicity.[9]

Benefits of celtic sea salt- is acts as an disinfectant, helps in improving circulation, and skin conditions and providing relief from fatigue and gives an effective detoxification effect to eliminate toxins. It also possesses anti-bacterial properties and also promotes tooth remineralisation. [10]

Triphala: It is a dried powder of three fruits, namely, Indian gooseberry, black myrobalan,and belleric myrobalan. According to Srikumar et al. It possesses
antimicrobial activity against HSV-1, cytomegalovirus, and HIV. However, further investigations have been needed for its action against corona virus.

Flavonoids: shows biological actions, primarily because of its antioxidant potential and capacity to control numerous cell receptorsor enzymes. Similar to triphala. They also show antiviral, antibacterial, and anti-inflammatory activities. Some flavonoids (Isobavachalcone, herbacetin, helichrysetin, quercetin, and 3-β-d-glucoside) can impede the enzyme activity of MERS-CoV/3CLpro. [11]

Propolis: is a resin produced by bees. It shows antiviral, anti-inflammatory, immunoregulating and antioxidant properties. Now standardized product of propolis is available in market which can be used for various dental purposes like root canal irrigant, mouth wash etc.

According to Silveira et al (2021), propolis can be used in cases of covid-19 patients as it can affect the various disease mechanisms that are relevant to SARS-CoV-2.[12]

Ashwagandha: Ashwagandha may be effective in improving host immunity through the modulation of key targets relevant to COVID-19. According to Tillu G et al (2020) Ashwagandha containing Ayurvedic formulation to be equivalent to HCQ (hydroxychloroquine sulphate) in a RCT (randomized controlled trials) for treating rheumatoid arthritis.[3]

Rationale behind its use: Owing to its immune-modulatory, anti stress, antiviral efficacy

properties. Insilico studies have shown its high binding affinity to ACE2–RBD interface which will stop SARS COV 2 entry into cell.[13]

Yashtimadhu: Glycyrrhiza glabra (family Fabaceae), commonly known as Mulethi or licorice, is one of the important, Ayurvedic medicine also globally used for its medicinal value and as a flavoring agent in foods.

Glycyrrhiza glabra, has long been employed against coughs and colds as well as to settle disturbed digestion, while one of its compound diammonium glycyrrhizinate has anti-inflammatory activity and is used to treat liver damage caused by hepatitis B184. Professor Hong Ding of Wuhan University has proposed a combination of diammonium glycyrrhizinate and vitamin C as a COVID-19 therapy.

The plant Glycyrrhiza glabra is also a major constituent in different poly herbal formulations/ therapeutic effect used in preliminary clinical trials in management of corona virus disease (COVID-19).[13]

Guduchi (Giloy): Immuno-modulator, Anti inflammatory, Antiviral activities. Significant increase in the IFN-γ, IL-2, IL-4, and IL-1 levels and significant reduction in mortality rate. It has shown good antipyretic, anti-inflammatory, antioxidant, anti-allergic, anti-stress, anti-malarial, hepato-protective, and immuno-modulatory activities. Clinical studies have indicated its immune modulating functions and have been effectively used in HIV and chikungunya. Diterpenoid, tinosporin found in TC has shown activity against HIV, HTLV and other viral diseases. In in-silico studies Tinospora cordifolia showed high binding efficacy against SARS-CoV-2.[13]

II. OBSERVATIONS:

As observed in clinical practice in different clinics on variety of patients:

HERBAL MOUTHWASH (containing turmeric, clove , ginger, garlic, basil, honey,sea salts,Triphala, Flavonoids,Propolis)	**CHEMICAL BASED MOUTHWASH** (containing chlorhexidine gluconate, alcohol,chlorine dioxide,cetylpyredinium, floride ,hydrogen peroxide,methyl salicylate.)
No risk of cancer due to absence of carcinogenic substances as it is purely herbal.	Risk of oral cancer that may radiate upto head and neck.
Heals OMM and has soothing effects	Can act harsh on OMM and cause irritation.
Does not harm, if ingested	Dangerous if ingested
Can be used by people of all age group	Cannot be used by children below age of 6
No alcohol content, making it safe for children	Due to high alcohol content this is not safe for children.
No alcohol content, making it safer for people suffering from oral diseases.	High alcohol content may cause burning sensation especially in people suffering from mouth blisters and ulcers.
Does not harm the colour and texture of teeth	Can cause stain and discoloration of teeth

III. DISCUSSION:

1. TURMERIC:

Sharmeela Devi deva raj and Prasanna Neelakantan* have studied that turmeric has anti-inflammatory, anti-carcinogenic, photodynamic, anti-hyperalegesic effect and can be used as a pit and fissure sealant. [14]

It can also be used as a mouth wash in place of cholrhexidine (10mg in 100ml distilled water, pH 4)

In the year 2010, Santosh Pandit et al separated a fraction showing anti-biofilm activity from turmeric. The separated fraction and curcuminoids, which are main components of turmeric, had inhibitory effects on virulence properties of S.mutans biofilms, such as bacterial adherence, acidogenicity and aciduricity.[15]
In the year 2011, PF Waghmare et al. observed that for treating plaque both turmeric and chlorhexidine can be effectively used where turmeric works without any side effects.[16]
In the year 2015, Udaynandkishor soni et al. observed that turmeric can be effecticely used in mouthwashes against chlorhexidine with equal quality of effectiveness.[17]
Also in the year 2016, Dr. Amita Sharma et al found that turmeric and cholrhexide are effective in controlling plaque and gingivitis.[18]

2. **CLOVE-**

In the year 1998, JL Keene et al.came to the conclusion that clove oil appears to meet seven of the eight criterias used to define an ideal anaesthetic (marking and meyer 1985)[19]
In the year 2010 Kamal raj Aneja et al. found that clove oil emerged as the potent agent exhibiting even much higher antibacterial and anti-fungal activity than the standard anti-bacterial and anti-fungal drugs ciproflaxin and amphotericin –B respectively.[20]
In the year 2017 Md. Azir Uddin et al. found that clove oil has components which show wide range of medicinal values such as anti-septic and anaesthetic, analgesic, and antioxidants, anti – inflammatory and antimicrobial activities.[21]

3. **GINGER-**

In the year 2010 Fayhaa AM al et al. found that as chronic and unexplained nausea and vomiting can be a challenge for dentist, ginger is effective an promising prophylactic antiemetic which may be especially useful for dental patients.[22]

In the year 2013 K Premkishore et al. discussed that ginger indicated a considerable anti-bacterial activity against streptococcus mutans. Thus this study strongly suggests use of ginger extract as additives in dentifrices and mouthwashes for prevention of dental caries.[23]

In the year 2017,Homeira Mardani et al. found that ginger herbal spray can be used in patients with type II diabetes to treat dry mouth.[24]

In the year 2018 Hendrastuti Handayani et al. found that red ginger extract is more effective as an anti-bacterial compared with white ginger extract. The higher concentration of ginger extract the higher the antibacterial effect of ginger in inhibiting streptococcus mutans.[25]

4. **HONEY –**

In the year 2011, dr. Neelam Gupta et al.found that honey possess antibacterial potential, osmotic effect, acidic ph which inhibits growth of most animal pathogens. [26]

In the year 2014 AL- Dany A. Atawa et al. found that honey can be used as an alternative to traditional remedies for the prevention of dental caries and gingivitis following orthodontic treatments.[27]
In the year 2019 Dr.Arsalan Ansari et al. found that there was a significant decrease in inflammation, hyperemia, and mucosal edges that resulted in reduction of pain and discomfort to patient. There was no side effect so honey can be used as an alternative for management of dry socket.[28]

5. **SEA SALT-**

In the year 1962,Shaw J,H et al. proposed that serious considerations should be given to the role of sea salt as an important source of dietary fluoride for the prevention of dental caries .[29]
In the year 2016 Cantore S et al. claimed efficacy of a combined sea salt based oral rinse with xylitol against dental plague, gingivitis and salivary streptoccuc mutans load.[30]

6**. BASIL –**

In the year 2014, Manasa Hosamane et al. found that basil containing mouthwash was comparable with cholhexidine with respect to its anti-plaque actin with no statistically significant difference between the two.[31]
In the year 2014 Venisha Pandita et al. found that tulsi has an antimicrobial property against a variety of microbes like C. albican , staphylococcus aureus, Escherichia coli. And thus prevent dental cavities, plague, tartar bad breath, etc. It is an excellent mouth freshener and oral disinfectant. It destroys most of the germs and bacteria in mouth and its effects last long. [32]

In the year 2016 Eswar P et al. said that:. Given the high prevalence of periodontal diseases in developing countries like India, the undesirable effects due to prolonged use of currently used anti-bacterial agents and financial considerations there is a need for alternate preventive and treatment strategies that are safe, effective and economical when compared to existing treatment methods. In

this direction, natural medicinal plants like tulsi serve as a good alternative.[33]

IV. RESULT:

Thus in this pandemic situation we found that the patients who are using herbal mouthwashes have reduced the of chances of soreness in throat, gingivitis, bad breath and periodontal diseases and also mucormycosis which is main Post Covid complication.

Also there is no change in oral structure neither patient is complaining of burning sensation or alteration of taste.

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