

COMPARISON OF ANTIMICROBIAL EFFECT OF *Ocimum tenuiflorum* Vs REXIDIN ON ALIGNERS

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ABSTRACT

Introduction - *Ocimum tenuiflorum* (tulsi) is a popular healing herb in ayurvedic medicine, it has antimicrobial properties. It belongs to the family Lamiaceae, it can be found all throughout Asia and tropical regions. Tulsi also has oral benefits in periodontal disease, toothache, oral infections, candidiasis, lichen planus, aphthous ulcers. It is also known for its wide range of biological activity and has been used as a medicine for more than 2000 years.

Aim - The aim of the study is to compare the antimicrobial effect of *Ocimum tenuiflorum* and REXIDIN on aligners.

Materials and methods - 10 sets of aligners including both maxilla and mandible were collected from the patients who are undergoing orthodontic treatment. 5 sets were placed in *Ocimum tenuiflorum* (tulsi) extract for evaluating antimicrobial effect and the other 5 sets were placed in REXIDIN for about 5-6 hours. Later, the antimicrobial activity was evaluated by microscopic examination.

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Result - The aligners placed in both tulsi extract and rexidin were equally effective and have equal antimicrobial activity but since tulasi extract is naturally obtained it is better than rexidin.

Conclusion - This study concludes that aligners placed in tulsi extract are better since it is naturally obtained and has more herbal benefits.

Keywords - Tulsi extract, Rexidin, Antimicrobial effect, aligners

INTRODUCTION

Ocimum tenuiflorum (tulsi) is a popular healing herb in ayurvedic medicine, it has antimicrobial properties. It belongs to the family Lamiaceae, it can be found all throughout Asia and tropical regions. Tulsi also has oral benefits in periodontal disease, toothache, oral infections, candidiasis, lichen planus, aphthous ulcers. It is also known for its wide range of biological activity and has been used as a medicine for more than 2000 years [1].

Ocimum tenuiflorum (tulsi) is a popular healing herb in ayurvedic medicine, it has antimicrobial properties. It belongs to the family Lamiaceae, it can be found all throughout Asia and tropical regions [2]. Tulsi also has oral benefits in periodontal disease, toothache, oral infections, candidiasis, lichen planus, aphthous ulcers. It is also known for its wide range of biological activity and has been used as a medicine for more than 2000 years.

Tulsi has been considered as an incomparable one of India and the “Queen of herbs“. It has antimicrobial activity against *Streptococcus mutans* [3]. The plant is utilized for antibacterial, antifungal, anticoagulant and anti ulcer properties. The most common bacteria found in the oral cavity are *Streptococcus mutans*, *Staphylococcus*, *Lactobacillus*, *Enterococcus*, *Staphylococcus* species and *Micrococcus*. These are the predominant bacteria which can cause dental caries and deep dentin cavities. Orthodontic appliances are known to increase the counts of *Streptococcus mutans* and *Lactobacillus* species [4].

The need for orthodontic treatments is being increased in upcoming years. Some use fixed appliances such as braces and some others use removable appliances such as aligners for aesthetic purposes. These appliances cause bacterial accumulation in patients' mouths since it causes

difficulty to brush. Aligners contain some bacteria like *Staphylococcus mutans*, *Enterococcus* and *Lactobacillus* [5].

Infected root canal has presence of gram positive bacteria, obligate anaerobes and polymicrobial infections. These bacteria and both organic and inorganic compounds cannot be mechanically removed, sometimes they persist after biochemical preparation [6]. By using antimicrobial solutions, only the CFUs (colony forming units) can be reduced.

Tulsi and rexinidin both are effective antimicrobial agents. Since ancient times, plant extracts have been used to treat a variety of wounds and inflammatory disorders [7]. India has a long history of employing plants for medical reasons including essential oils. The oral germs that produce tartar, inflamed gums, and poor breath are eradicated by using rexinidin. Both rexinidin and tulsi are equally effective in antimicrobial activity. Tulsi is naturally obtained, cheap and easily available [8]. The aim of the study is to compare the antimicrobial effect of *Ocimum tenuiflorum* and Rexidin on aligners.

MATERIALS AND METHODS

10 sets of aligners including both maxilla and mandible were collected from the patients of Saveetha dental college undergoing orthodontic treatment. 5 sets of aligners were placed in *Ocimum tenuiflorum* (tulsi) extract for evaluating antimicrobial effect and the other 5 sets were placed in Rexidin for about 5-6 hours in the interval gap of about 30 mins. Using a swab the microorganisms were collected from the aligners. The collected swabs were cultured using BHI culture plates and were observed after 24 hours. The CFUs of aligners under tulsi and rexinidin were compared. Later, the antimicrobial activity was evaluated by microscopic examination by comparing the CFUs.

RESULTS

20 sets of aligners including both maxilla and mandible were collected from the patients of Saveetha dental college undergoing orthodontic treatment. 5 sets of aligners were placed in *Ocimum tenuiflorum* (tulsi) extract for evaluating antimicrobial effect and the other 5 sets were placed in Rexidin for about 5-6 hours in the interval gap of about 30 mins. After evaluating the

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CFUs, the aligners placed in both tulsi extract and rexinidin were equally effective and has equal antimicrobial activity but since tulasi extract is naturally obtained it is better than rexinidin. Tulsi has few advantages over rexinidin since it is naturally obtained, cheap, contains herbal values, easily available and affordable. The samples, aligners placed in tulsi extract and in rexinidin and their colony forming unit per ml are shown below in the table 1.

Samples	Samples placed in Ocimum tenuiflorum	CFU /ml	Samples placed in rexinidin	CFU /ml
Sample 1	Streptococcus mutans	3000/ml	Enterococcus	2500/ml
Sample 2	Streptococcus mutans, Enterococcus	3500/ml	Streptococcus mutans	3000/ml
Sample 3	Enterococcus	4000/ml	Lactobacillus	4000/ml
Sample 4	Streptococcus mutans, Enterococcus	3500/ml	Enterococcus	4000/ml
Sample 5	Streptococcus mutans	5000/ml	Streptococcus mutans	4500/ml
Sample 6	Streptococcus mutans	5000/ml	Streptococcus mutans	5500/ml
Sample 7	Lactobacillus	6000/ml	Streptococcus mutans	7000/ml
Sample 8	Streptococcus mutans, Enterococcus	4000/ml	Enterococcus	4500/ml
Sample 9	Lactobacillus, Staphylococcus species	5000/ml	Streptococcus mutans	4000/ml

Sample 10	Micrococcus	5500/ml	Streptococcus mutans	5500/ml
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Table 1 The above table shows the amount of microorganism grown in CFU/ml in tulsi and rexinidin.

The table shows that microbes like streptococcus mutans, Enterococcus, were found in aligners of individuals. The colony forming units per ml were found to be almost equal in both the aligners placed in tulsi extract and as well as in rexinidin. The aligners placed in both tulsi extract and rexinidin were equally effective and have equal antimicrobial activity but since tulasi extract is naturally obtained it is better than rexinidin. Tulsi has few advantages over rexinidin since it is naturally obtained, cheap, contains herbal values, easily available and affordable.

DISCUSSION

The aligners used in this study were shown to be similarly effective and to have equal antibacterial activity, although tulasi extract is superior to rexinidin because it is naturally derived. Similar to this, it was discovered that the tulasi essential oil from fresh leaves exhibited greater antibacterial activities than that from dried leaves. The presence of greater eugenol, an antibacterial component in fresh leaves, and β -caryophyllene and caryophyllene oxide, which include antifungal components in dried leaves, is what causes the variation in antimicrobial action [9].

Additionally, tulsi extract showed antibacterial activity against Streptococcus mutans in a different study and has the most antimicrobial potential at 4% concentration levels [10]. The active ingredient found in Ocimum sanctum, eugenol (1-hydroxy-2-methoxy-4-allylbenzene), may be primarily to blame for the medicinal potential of tulsi [11]. In addition to this, chlorhexidine was found to be more effective when compared to Tulsi extract. However, the well-known side-effect of Chlorhexidine, i.e staining of teeth and restoration, alteration of taste sensation and development of resistant microorganisms, may limit the long-term use of chlorhexidine.

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The antimicrobial activity of tulsi extract at 6 and 8% concentrations, as well as 0.2% chlorhexidine against *Aggregatibacter actinomycetemcomitans*, showed statistically significant differences between the groups in an in vitro study examining the effectiveness of tulsi against *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis*. The highest antibacterial activity against *A. actinomycetemcomitans* and *P. gingivalis* was demonstrated by *O. sanctum* (tulsi) extract at an 8% concentration. As a result, it is suggested that this may be helpful as a mechanical therapy adjunct in the management of periodontal disorders [12].

CONCLUSION

This study concludes that aligners placed in tulsi extract are better since it is naturally obtained and has more herbal benefits in it whereas rexinidin is made by using chemical formulas but both are equally effective and have equal antimicrobial activity.

CONFLICT OF INTEREST:

The authors would like to declare no conflict of interest in the present study.

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