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COMPARATIVE STUDY ON ANTIBACTERIAL ACTIVITY OF CHAMOMILE OIL AND LEMONGRASS OIL ON ORAL PATHOGENS.

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ABSTRACT--*Chamomile essential oil is being used for a variety of ailments like indigestion, nausea, ulcers, gives relief from* ***anxiety****, helps in depression, helps in skin irritation.Lemon grass oil is another essential oil used for studies which shows properties like reducing bodily aches. This essential oil shows antibacterial activities and helps against skin infections, pneumonia, blood infection and intestinal infections.It also has antifungal properties and anti inflammatory properties against oral pathogens like , Streptococcus mutants, Actinomyces,lactobacillus, peptococcus,Enterococcus faecalis.The method used was disc- diffusion method . The essential oils were obtained commercially and the anti-bacterial activity was compared by adding the oils in different concentrations in25 µl , 50µl , 100 µl and 50µl of 0.2% of chlorhexidine. The oral pathogens used for the study are Streptococcus mutans , Enterococcus faecalis and Lacto bacillus.The results show that lemon grass oil shows a wide zone of inhibition on 100 µl of 26mm followed by chamomile oil which shows zone of inhibition for 24 mm on 100 µl. The zone of inhibition was compared to 0.2% of chlorhexidine which showed a zone of inhibition of 25mm on 50 µl. Both the oils inhibited Streptococcus mutans.From the study it can be concluded that lemon grass oil and chamomile oil can be used as mouthwashes or constituents of mouthwashes as they show high percentage of inhibition of bacteria growth in various concentrations. Also when compared to the standard 0.2% of chlorhexidine , the essential oils were effective in inhibiting for pathogens of the oral cavity.*

Keywords— *comparative study on antibacterial activity of chamomile oil and lemongrass oil on oral pathogens*

I. INTRODUCTION

Essential oils are concentrated extracts derived from plants or from the flower of the same.Since the middle ages, essential oils have been widely used for bactericidal, virucidal, fungicidal, antiparasitics, insecticidal, medicinal and cosmetic applications, especially nowadays in pharmaceutical, sanitary, cosmetic, agricultural and food industries[1]. They have become very popular for their potential health benefits. There are various essential oils available commercially like lavender oil , rosemary oil , clove oil , peppermint oil, tea tree and orange essential oil[2]. There are various studies done on the activities of these essential oils like anti- fungal , inhibition activity and anti - cancer activity[3].Chamomile essential oil is being used for a variety of ailments and conditions.The oil

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is extracted from the flowers of the chamomile plant.There are various benefits of using chamomile oil on a daily basis. It aids with indigestion, nausea, ulcers, gives relief from anxiety, helps in depression, helps in skin irritation like atopic dermatitis, helps in sleeping. It also shows anti-cancer properties[4]. It also shows great antibacterial on oral pathogens. According to a study it was found that gram positive bacteria were more sensitive to the actions of chamomile oil than gram negative. Also in certain concentrations the oil exerts selective inhibitory effect on gram positive microorganisms[5].

A study in 2016 revealed that chamomile oil shows no inhibitory activity on pseudonomous but shows great antioxidants activity[6].The components like isobutyl angelate (32.1%), 2-methylbutyl angelate (16.2%), isobutyl isobutyrate (5.3%), methyl 2-methylbutyrate (1.9%), prenyl acetate (1.4%), 2-methylbutyl 2-methylbutyrate (1.2%) and 2-methylbutyl acetate (1.2%), are found to show antimicrobial effects[7].Lemon grass oil is another essential oil used for studies which shows properties like reducing bodily aches. This essential oil shows antibacterial activities and helps against skin infections, pneumonia, blood infection and intestinal infections.Lemon grass oil was investigated for activity against Staphylococcus aureus, Escherichia coli, Bacillus cereus and Pseudomonas aeruginosa[8][9]. It also has antifungal properties and anti inflammatory properties against oral pathogens like , Streptococcus mutants, Actinomyces,lactobacillus, peptococcus,Enterococcus faecalis[10].

For the preset study, the oral pathogens used are Streptococcus mutans, Enterococcus faecalis and lacto bacillus. The above pathogens were chosen for the study because they are present in high percentage in the oral cavit and also these cause various oral manifestation like periodontal tissue inflammation, dental caries and also failure of root canal treatments[11]. Streptococcus mutans are gram positive, arranged in chains , facultative anaerobes and they mainly cause oral diseases in humans. These bacteria, in the dental plaque metabolises sugar and other carbohydrates into acids and leads to dissolution of the tooth and tooth enamel[12]. Enterococcus faecalis are gram positive bacteria arranged in chain and can cause urinary tract infection and in the oral cavity it can lead to endodontic infections and periodontal problems[13]. Lactobacillus are gram-positive bacteria which are facultative anaerobes and they have the ability to erode or dissolve the enamel of the tooth structure as it produces lactic acid which can later cause carious lesions[14].The standard used in thr current study is 0.2% Chlorhexidine. It is used widely in mouthwashes since it helps in reducing bacteria growth and also prescribed by dentists in case of gingivitis , swelling or bleeding of gums[15].

II. MATERIALS AND METHODS

The method used for the present study was the disc diffusion method. The essential oils used were chamomile oil and Lemon grass oil and these were obtained commercially. The standard used was 0.2% of chlorhexidine which is widely used in mouthwashes against gingivitis. Sterile culture plates were taken and wells were cut out as shown in figure 1. To the culture plate , Streptococcus mutants , Enterococcus faecalis and Lactobacillus samples were rubbed using a sterile cotton swab over the agar in a zigzag strokes. Now, into the wells different concentrations of the essential oils were added using micro pipette in 25µl , 50µl , 100 µl and 50µl of the 0.2% of chlorhexidine as shown in figure 2.After an incubation period of 24 hours at 37 degree Celsius, the zone of

inhibition between the two different essential oils were compared also at different concentrations. A final comparison was also made with the standard used.

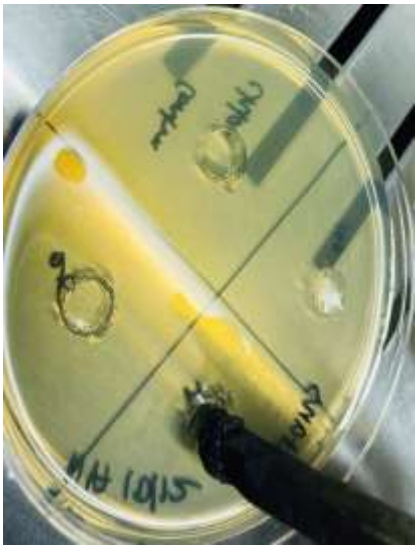

Figure 1:Cutting of wells on the culture plate. Figure 2: adding the essential oils in different concentrations .

III. RESULTS AND DISCUSSION

The results obtained showed that at 25µl , chamomile oil showed a zone of inhibition of 16mm , 12mm and 15mm against Streptococcus mutans, Enterococcus faecalis and Lactobacillus respectively. Lemon grass oil showed a zone of inhibition of 17mm, 13mm and 17mm against Streptococcus mutans, Enterococcus faecalis and Lactobacillus respectively.

The results obtained showed that at 50µl , chamomile oil showed a zone of inhibition of 19mm , 14mm and 18mm against Streptococcus mutans, Enterococcus faecalis and Lactobacillus respectively. Lemon grass oil showed a zone of inhibition of 22mm, 16mm and 19mm against Streptococcus mutans, Enterococcus faecalis and Lactobacillus respectively.The standard 0.2% of chlorhexidine showed a zone of inhibition of 25mm, 22mm and 20mm against Streptococcus mutans, Enterococcus faecalis and Lactobacillus respectively.The results obtained showed that at 100µl , chamomile oil showed a zone of inhibition of 24mm, 22mm and 19mm against Streptococcus mutans, Enterococcus faecalis and Lactobacillus respectively. Lemon grass oil showed a zone of inhibition of 26mm, 19mm and 20mm against Streptococcus mutans, Enterococcus faecalis and Lactobacillus respectively. The following is depicted in the table 1.1 below.

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Essential oil	Concentration	Streptococcus mutants	Enterococcus faecalis	Lacto bacillus
Chamomile oil	25 µl	16mm	12mm	15mm
	50 µl	19mm	14mm	18mm
	100 µl	24mm	22mm	19mm
Lemon grass oil	25 µl	17mm	13mm	17mm
	50 µl	22mm	16mm	19mm
	100 µl	26mm	19mm	20mm
0.2% chlorhexidine	50 µl	25mm	22mm	20mm

Table 1.1 depicting the zone of inhibition

IV. CONCLUSION

From the study it can be concluded that lemon grass oil at 100µl can be used as an effective mouth wash or a constituent of a mouth wash since it shows a wide range of zone of inhibition of 26mm against streptococcus mutans which is comparatively greater than the 25mm zone of inhibition showed by standard at 50 µL. Also chamomile oil can be used as an effective mouth wash against Streptococcus mutans as it also shows a good range of inhibition of 24mm. At 100µL chamomile oil shows a wide range of inhibition of 22mm against in Enterococcus faecalis which is as same as that of the standard which also shows zone-of inhibition of 22mm at 50µL. At 100µL, Lemon grass oil shows a zone of inhibition of 20mm against Lactobacillus which is as same as that of the standard which also shows zone-of inhibition of 20mm at 50µL.

Thus, it can be concluded that both the essential oils used for the study showed great effect in inhibiting the oral pathogens. Also when compared to the standard, the effect were found to be similar.

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