

Research Article

In vitro Antimicrobial Activity of Dandelion Against Oro dental Pathogens

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ABSTRACT

Objective: To evaluate the anticariogenic effect of dandelion extract against different oral pathogenic clinical isolates. **Methods:** In the present study, we evaluated the antimicrobial effect of dandelion against oral pathogens by the minimum inhibitory concentration and minimum bactericidal concentration. Clinical isolates such as *Enterococcus faecalis*, *Streptococcus mutans*, *Streptococcus salivarius*, *Lactobacillus acidophilus* were used to evaluate the antimicrobial effect of dandelion. **Results:** In this study, dandelion showed antibacterial activity against most of the oral microbes tested. In particular, dandelion shows high sensitivity against cariogenic microbes such as *Enterococcus faecalis* and *Streptococcus salivarius*. **Conclusion:** *Taraxacum officinale* suggested as a useful herb in order to control dental caries and endodontic infections. It can be better drug candidates to combine with regular antimicrobial agents. However, further studies are warranted on these lines to explore their exact mechanism of action against oral pathogens.

Keywords: dandelion, *Taraxacum officinale*, Oral infections, oral pathogens

INTRODUCTION

Oral microbiota is implicated with many systemic diseases, including cancer, diabetes mellitus, rheumatoid arthritis, cardiovascular diseases, and preterm birth. Oral microbiota has also been considered as a potential biomarker of human diseases¹. Dental plaque is an important etiologic factor in dental caries². Several strains of oral streptococci, lactobacilli are capable of initiating the formation of dental plaque, which plays an important role in the development of dental plaque and caries and also of periodontal disease in humans³. Increasing resistance of these microorganisms against present antimicrobial agents and adverse effects of these drugs is of major cause of concern⁴. Therefore, there is a need to develop alternative antimicrobial drugs for the treatment of infections obtained from medicinal plants to counteract the resistance and to minimize the adverse effects. In this connection, several plant derived compounds have been investigated as promising agents to prevent oral diseases, especially plaque-related diseases such as dental caries^{5,6}. Several studies were also reported the antiviral, antibacterial, antifungal, antihelminthic, antimolluscal and anti-inflammatory properties of plants⁷. *Taraxacum officinale*, known as dandelion, has been used in folk medicine in the treatment of myriad pathological effects⁸. Several flavonoids including caffeic acid, chlorogenic acid, luteolin, and luteolin 7-glucoside have been isolated from the dandelion⁹. In Traditional Chinese medicine, dandelion is also acclaimed as a nontoxic herb with exceptional values for its hepatoprotective, antioxidative, diuretic, anti-rheumatic and anti-inflammatory

properties⁸. However, relatively less has been studied regarding the antimicrobial effect of dandelion leaf extract on oral microbiota. Hence, in the present study we evaluated the potential inhibitory effect of dandelion against oral cariogenic bacteria *in vitro*.

MATERIALS AND METHODS

Extract

The *Taraxacum officinale* ethanolic leaves extract was obtained from Green Chem. Herbal Extracts and Formulations, Bengaluru as gratis.

Clinical isolates

Enterococcus faecalis, *Streptococcus mutans*, *Streptococcus salivarius*, *Lactobacillus acidophilus*
Determination of Minimal Inhibitory Concentration/minimum bactericidal concentration (MIC/MBC)

Antimicrobial activity determined by the microdilution assay. A volume of 100 μ L of 10% BHI medium was added to each well of a 96-good microplate and 100 μ L of the test product was used to do a twofold serial dilution giving concentrations of 6, 12, 25, 50, 100, 200, 400 mg/mL. Next, 100 μ L of the bacterial suspension was added to all wells except the negative control or blank. The negative control contained 100 μ L of 10% BHI medium and 100 μ L of test product. Meanwhile, the positive control contained the bacterial or yeast suspension and 10% BHI. The plates were placed in an incubator for 24 h at 37° C. The assays were done in triplicate. MIC was defined as the lowest concentration at which no growth was observed in accordance with NCCLS, 2005.

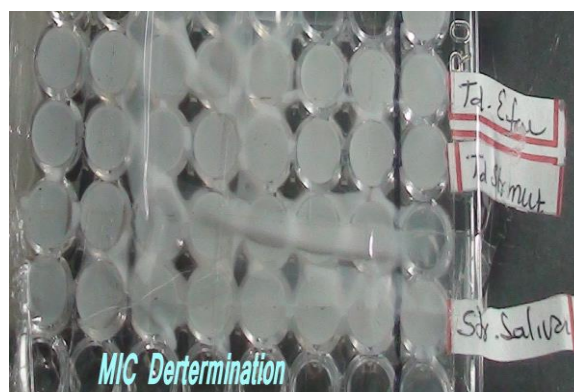


Figure 1: Experimentation of MIC/MBC

Table 1: Antibacterial effect of dandelion against orodental Pathogens

S. No	Organism	MIC/MBC (mg) of Dandelion
1	<i>Enterococcus faecalis</i>	200
2	<i>Streptococcus mutans</i>	> 400*
3	<i>Streptococcus salivarius</i>	200
4	<i>Lactobacillus acidophilus</i>	> 400*

*No inhibition at 400 mg

RESULTS AND DISCUSSION

We evaluated the MIC/MBC of dandelion against different clinical isolates. In this study, the clinical isolates such as *Enterococcus faecalis*, *Streptococcus salivarius*, shows inhibitory efficacy against dandelion (Figure 1). Among the isolates tested dandelion has the MIC/MBC is 200 mg/ml against *E. faecalis*, *S. salivarius*. While *Streptococcus mutans*, *Lactobacillus acidophilus* did not show any significant change in the maximum concentration tested i.e., 400 mg/ml (Table 1). Dental caries is one of the most prevalent diseases in the world that causes demineralization and destruction of the hard tissues of teeth. It is a well know fact that orodental pathogens play pivotal role in the development of caries. The dental profession has, of course, been aware of this for many years and consequently has developed preventive and therapeutic regimens for these diseases based on mechanical removal of the biofilms. However, there has always been some interest in the possibility of using chemicals to replace or augment mechanical preventive and therapeutic procedures¹⁰. The World Health Organization estimates that about 80% of the population still depends upon herbal medicines for the treatment of various diseases due to easy availability, economic reasons and lesser side effects¹¹. This report shows that plants remain important source for the development of new chemotherapeutic agents. The first step towards this goal is the *in vitro* antibacterial activity. Several plants have been investigated previously for their antimicrobial efficacy and came with promising results. Medicinal plants include *Cassia fistula*, *Allium sativum*, rosemary extract etc.¹²⁻¹⁴. In this study, we found the inhibitory effect of dandelion against *E. faecalis*, *S. salivarius*. Dental caries is reported to predominantly cause by these microbes¹⁵. In a previous study, dandelion

has been tested for its antibacterial efficacy against *P. aeruginosa*, *E. coli*, *S. aureus*, *Bacillus Subtilis* and *Micrococcus luteus*. Their study indicates the fact that the dandelion can be potential against the above bacterial strains and they suggested that presence of secondary metabolites like alkaloids, tannins, and flavonoids implicated for dandelion antibacterial efficacy¹⁶. In this study we evaluated dandelion efficacy in orodental pathogens, the results show growth inhibitory effect of dandelion on orodental pathogens and our current results are in agreement with this report. In conclusion, the present study shows the antimicrobial effect of dandelion against orodental pathogens. Hence, it is suggested that the antibacterial efficacy of *Taraxacum officinale* ethanolic leaves extract should be watched for its beneficial effects against dental caries. However, further studies are warranted on these lines.

CONFLICT OF INTERESTS

None to declare

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