Antimicrobial Effects of Chamomile Extract and Essential Oil on Clinically Isolated *Porphyromonas gingivalis* from Periodontitis

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Abstract

It has been demonstrated that advanced periodontitis is an opportunistic infection caused by various endogenous bacteria, including *Actinobacillus actinomycetemcomitance, Porphyromonas gingivalis* and *Prevotella intermedius*. The present study evaluated the antimicrobial effects of extract and essential oil of Chamomile (*Anthemis nobilis*, Compositae) flower head against *P. gingivalis*. Thirty-five clinical strains of *P. gingivalis* were isolated from sixty-two patients. The anti-microbial effects were evaluated by disk diffusion method on supplemented Brucella agar. The growth inhibition zones were measured and compared. The results showed that the means of inhibition zone for Chamomile extract and essential oil were 13.33±3.4 and 20.5±0.5 respectively. Results provide evidence for potential use of Chamomile as mouthwash for treatment and prophylaxis of periodontitis.

INTRODUCTION

Advanced periodontitis is an opportunistic infection caused by indigenous bacteria. Mechanical plaque removal, both surgical and non-surgical, combined with proper oral hygiene measures is able to prevent further periodontal breakdown (Kleinfelder et al., 1999). Inflammatory periodontal disease is caused by diverse groups of microorganisms, including *Porphyromonas gingivalis* (Dahlen et al., 1990). The purpose of the present study was to evaluate antimicrobial effect of Chamomile (*Anthemis nobilis*, Compositae) extract and essential oil against clinical strains of *P. gingivalis* isolated from periodontitis.

MATERIAL AND METHODS

Patients

Sixty-two subjects were selected from the Department of Periodontics, Tehran Medical Sciences University. The subjects were generally in good health; individuals with diabetes, autoimmune disorders or other conditions potentially influencing their periodontal condition were not included. Majority of subjects were untreated periodontally, and none had received scaling or antibiotic therapy within 2 months prior to participation in the study (Wolff et al., 1993).

Microbiological Procedures

Microbiological sampling was done after careful debridment of supragingival plaque by sterile cotton swab and samples taken by sterile curret from the depth of periodontal pockets (Wolff et al., 1993). One sample was taken from each patient. Subgingival plaque samples were transported to the Anaerobic Laboratory in Shahed University in reduced transport fluid (Goene et al., 1990). The samples were plated onto Supplemented Brucella Agar. Inoculated plates were placed in anaerobic condition. After 72 h of incubation in 35°C, black-pigmented colonies were subcultured. Pure cultures of the isolated strains were characterized by microbiological methods (Baron and Finegold, 1999).

Determination of Antibacterial Activity of Chamomile

Fresh Chamomile extract and essential oil donated by Zardband Company (Tehran, Iran) were tested. Agar diffusion method by cutting wells from seeded agar and then filling with extract or essential oil of Chamomile was used for determination of antibacterial activity (Acar and Goldstein, 1996). The supplemented Brucella agar was prepared and wells created with 6 mm diameters. 35 strains of *P. gingivalis* were examined. The microbial suspension was streaked over the surface of the medium using a sterile cotton swab. 30 µL of extract or essential oil [1 mL of essential oil diluted in 9 mL Tween 80 (5% in water (v/v)] of Chamomile placed in well and inoculated plates incubated for 72 h in anaerobic condition at 35°C. The hallo of inhibition growth was measured after incubation. Tween 80 (5% in water (v/v)) and Chlorhexidin were used as control.

RESULT AND DISCUSSION

Results showed that the mean of hallo zone of Chamomile extract was 13.3 ± 2.5 and for essential oil was 20 ± 1.8 mm and for Chlorhexidin 29 ±1 mm. WHO monographs on selected plants, report that Chamomile extracts inhibit the growth of *Staphylococcus aureus, Streptococcus mutans,* group B *Streptococcus salivarius* and bactericidal effect in vitro on *Bacillus megaterium* and *Leptospira icterohaemorrhagiae*. In vitro, the volatile of Chamomile also inhibited *Staphylococcus aureus* and *Bacillus subtilis* (WHO, 1999). Present study showed that Chamomile extract and essential oil have antibacterial activity against *P. gingivalis*, but the efficacy of essential oil is more than the extract, and both are less from Cholorhexidin. Results suggest the potential use of Chamomile in natural mouthwash to control of *P. gingivalis* periodontitis.

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