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Antibacterial Effect of Propolis Extracts Against Anaerobic Periodontal Pathogens

(An *in vitro* study)

A Thesis

Submitted to the council of college of dentistry / university of Baghdad in partial fulfillment of the requirement for the award of the degree of Master of Science in Periodontics

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Abstract

Background: The need for a new form of remedies for the treatment of the oral cavity diseases becomes of a great interest, as the administration of systemic antimicrobial has been reported to cause multi-resistant microorganism, interbacterial transfer of resistance determinant and various side effects, so plants extract have evoked interest as alternates for bacterial infections. Propolis has received great interest because of wide range antimicrobial activity. Propolis also called (bee glue) due to its collection by (*Apis mellifera*) honeybees from various plants resinous substance.

Aim of study: to evaluate the antibacterial effects of different concentrations of aqueous and alcoholic propolis extract on dental plaque anaerobic bacteria (*porphyromonas gingivalis* and *Aggregatibacter actinomycetemcomitance*), and comparing it with the effect of 0.2% concentration of chlorhexidine gluconate mouth wash as positive control and distilled water as negative control (in vitro).

Material and methods: *Aggregatibacte*r *actinomycetemcomitans* and *Porphyromonas gingivalis* strains were isolated from periodontal pockets of patients suffering from chronic periodontitis by collecting of subgingival plaque carefully to be cultured under anaerobic conditions for 48 hours in suitable culture media using anaerobic jar in the incubator. Presence of the target microorganism is confirmed using Gram's stain and biochemical tests. Propolis was extracted by using water and alcohol. Agar well diffusion technique was used to study the sensitivity of *Aggregatibacte*r *actinomycetemcomitans* and *Porphyromonas gingivalis* to different concentrations of propolis extracts and other control agents (chlorhexidine gluconate and distilled water). The second experiment involved determination of the minimum inhibitory concentration of the extracts that inhibits the bacterial growth and then determination of the minimum bactericidal concentration of the extracts that was required for killing the bacteria.

Result: Both bacteria were sensitive to propolis extracts, alcoholic extract was more effective than aqueous extract. *Porphyromonas gingivalis* was more sensitive than *Aggregatibacte*r *actinomycetemcomitans* for both extracts. All concentrations of propolis extracts showed smaller inhibition zones than 0.2% chlorhexidine except 150g/ml concentration of aqueous extract, 125g/ml and 150g/ml concentrations of alcoholic extract showed larger inhibition zones than 0.2% chlorhexidine. Minimum inhibitory concentration of alcoholic extract was 41.6 g/ml concentration for *Aggregatibacte*r *actinomycetemcomitans* and 33.3 g/ml concentration for *Porphyromonas gingivalis*. Minimum inhibitory concentration of aqueous extract was 50 g/ml concentration for *Aggregatibacte*r *actinomycetemcomitans* and 41.6 g/ml concentration for *Porphyromonas gingivalis*. Minimum bactericidal concentration of alcoholic extract was 50 g/ml concentration for *Aggregatibacte*r *actinomycetemcomitans* and 41.6 g/ml concentration for *Porphyromonas gingivalis*. Minimum bactericidal concentration of aqueous extract was 51.6 g/ml concentration for *Aggregatibacte*r *actinomycetemcomitans* and 50 g/ml concentration for *Porphyromonas gingivalis*.

Conclusion: Propolis extracts were effective against anaerobic periodontal pathogens (*Aggregatibacter actinomycetemcomitans and Porphyromonas gingivalis*). Both extracts had bacteriostatic action at low concentrations and bactericidal action at high concentrations against both bacteria.