



Republic of Iraq
Ministry of Higher Education
University of Baghdad
College of Dentistry



**ANTIMICROBIAL EFFECT OF AQUEOUS
EXTRACTS OF *MORINGA OLEIFERA L.* AND
RED POMEGRANATE AGAINST CLINICALLY
ISOLATED *PORPHYROMONAS GINGIVALIS*: IN
VITRO STUDY**

A Thesis

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Baghdad, in partial fulfillment of the requirements for the Degree of
Master of Science in Periodontics

Ali Faisal Madhloom Hussein

B.D.S.

Supervised by

Assist. Prof. Dr. Firas Bashir Hashim Al-Taweel

B.D.S., M.Sc., Ph.D. (UK) (Periodontics)

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Abstract

Introduction

Moringa oleifera L. (Mo) and red pomegranate (Rp) extracts have been reported to inhibit Gram positive facultative anaerobe growth and inhibit formation of biofilm on tooth surfaces. Mo and Rp have shown to exert antimicrobial effects against primary colonizers of dental plaque such as *S. salivarius*, *S. mutans*, *S. mitis* and *S. anginosus*. However, the antimicrobial effect of various extracts and/or combination of Rp (seeds and albedo) and Mo (leaves and seeds) against anaerobic periodontal pathogens including *P.gingivalis* was not well determined. The aim of this study is to assess the antibacterial and antibiofilm effect of Mo, Rp extracts and their combinations against clinically isolated *P. gingivalis*.

Materials and Methods

The aqueous extracts prepared by maceration method, the antimicrobial sensitivity test, minimum inhibition concentrations (MIC), and minimum bactericidal concentrations (MBC) of the aqueous extracts of Mo, Rp, and their combination against clinically isolated *P. gingivalis* were determined using agar well diffusion method and two-fold serial dilution method and confirmation of MIC by spectrophotometer. The anti - biofilm activity of the extracts and their combination was evaluated using the tube adhesion method. The phytochemical analysis was carried out using gas chromatography–mass spectrometry (GC-MS) and preliminary screening of alkaloids, flavonoids, tannins and other bioactive components was evaluated using various detecting reagents. The identification of *P. gingivalis* was verified depends pigment production on the agar plates,

gram-staining followed by microscopic examination for morphologic identification, and DNA analysis using polymerase chain reaction (PCR) assay.

Results

P. gingivalis was sensitive to aqueous extract of Mo seeds and Rp albedo, while not to Mo leaves and Rp seeds. MIC of Mo seeds, Rp albedo, and their combination were 6.25 mg/ml, 3.12 mg/ml and 1.56 mg/ml against *P. gingivalis* respectively. The extract combination had the highest anti-biofilm effect than Mo seeds and Rp albedo aqueous extracts at minimum concentrations of 3.12 mg/ml, 12.5 mg/ml and 6.25 mg/ml respectively.

Conclusion

The combination of Rp albedo and Mo seeds showed superior anti-bacterial and anti-biofilm effects against *P. gingivalis*, followed by Rp albedo, then Mo seeds. This may highlight a promising alternative to the traditional chemicals that used as an adjunct in the treatment of periodontal diseases.



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