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Introduction

The internal surface of removable dentures has many irregularities and microporosities which promote colonization and penetration of bacteria and yeasts into the base of the acrylic resin (1). Denture biofilm is a real microbial reservoir which can be responsible for prosthetic stomatitis or aspiration pneumonia, a potentially fatal infection, especially in geriatric patients (2). Chewing sticks may play a role in the promotion of oral hygiene, and further evaluation of their effectiveness is warranted, as stated in the Consensus Report on Oral Hygiene (3). Thus, this study aimed at investigating the antibacterial activity of extracts from the two chewing sticks on the growth of oral bacteria, in their planktonic forms and in denture biofilms.

Materials and methods

• Antibacterial activity

Bacterial cells were grown in brain heart infusion broth and the two methanolic plant extract materials were formulated in dimethyl sulfoxide and taken into different concentrations.

Minimum inhibitory concentrations (MIC) were determined by the microtiter broth method in sterile 96-well plates. Serial dilution techniques were used to determine the MIC₅₀ and MIC₉₀ of extracts.

Optical density of each well was measured at 490nm and the mean % inhibition of replicate tests was used to determine the final MIC values.

A microtiter plate test was used to test the effect of plant extracts on biofilms already established in sterile 96-well plates.

• Bacterial attachment on resin

Uniformly sized sterile acrylic resin plates were incubated in bacterial suspension for 48h at 37°C under aerobic condition.

Plates were treated for 4h with the two plant extracts.

Electronic microscopy was carried out to observe the effect of extract on *Streptococcus gordonii* adhesion to resin using an environmental scanning electron microscope (XL 30 ESEM Philips, Netherlands).

Results

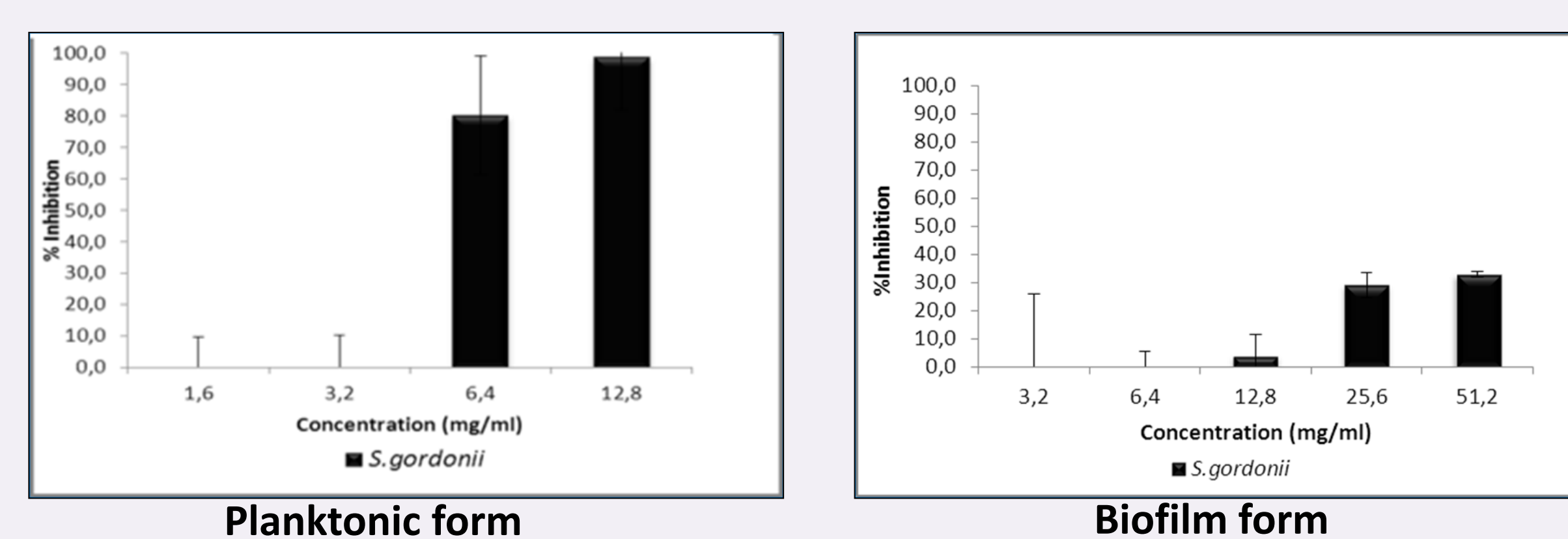


Figure 1. The percent inhibition of *Salvadora persica* extract

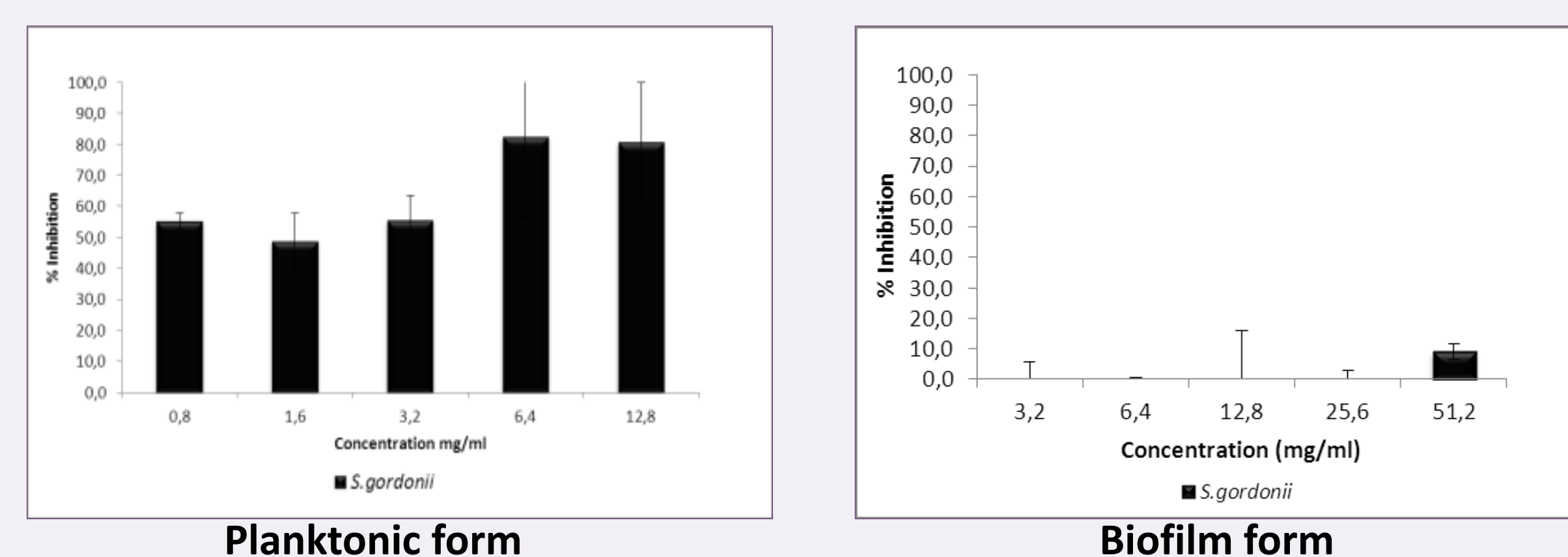


Figure 2. The percent inhibition of *Juglans regia* extract

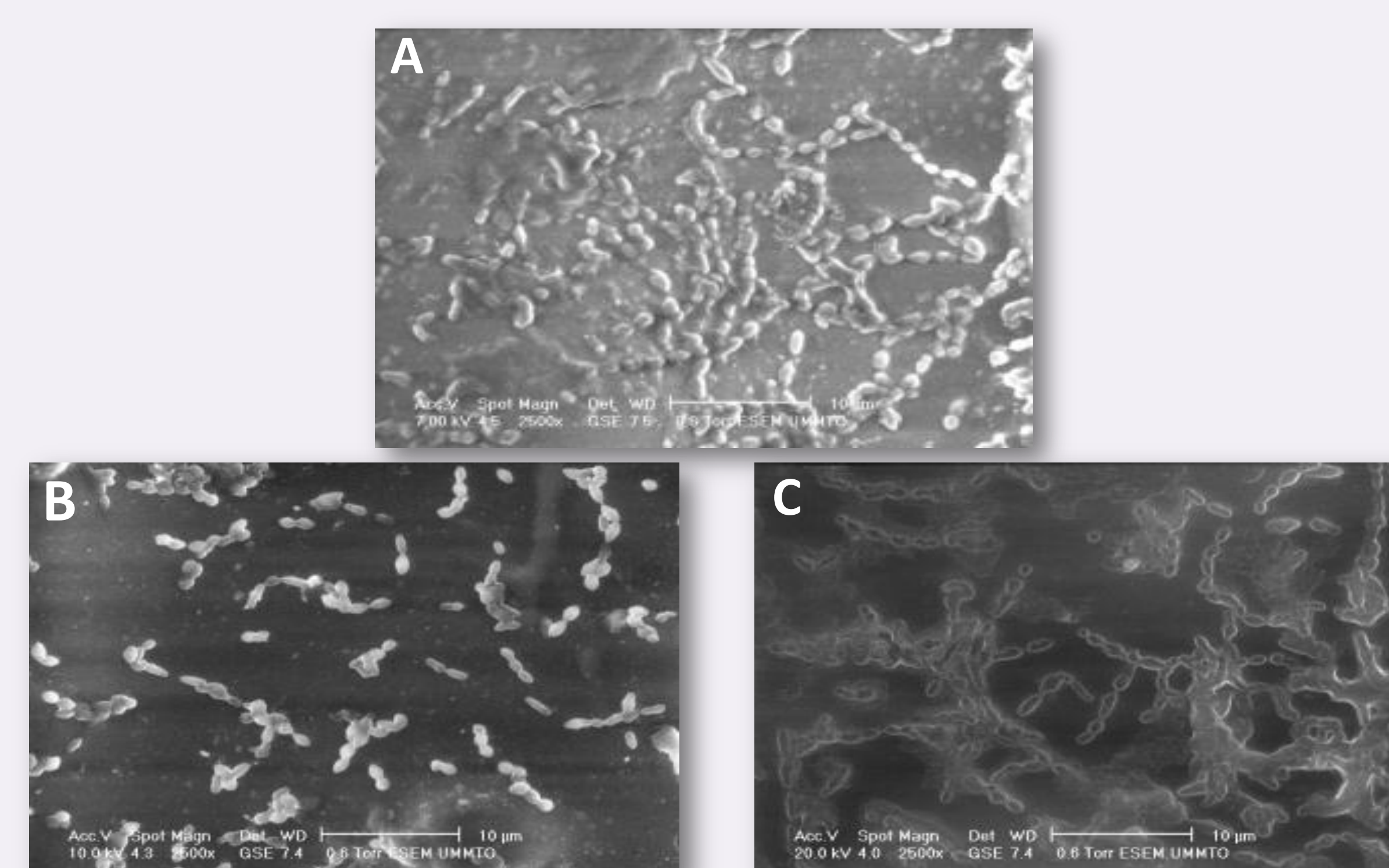


Figure 3. Environmental scanning electron microscope (ESEM) images showing the effect of extracts on *Streptococcus gordonii* biofilm formed on acrylic resin (scale bars = 10 µm). (A) *S. gordonii* biofilm formed on resin before antimicrobial treatment. (B) *Salvadora persica* extract effect. (C) *Juglans regia* extract effect

Conclusion

The *S. persica* and *J. regia* extracts are highly potent as antibacterial and biofilm removal agents. These findings highlighted that the bioactive components of the two plants showed useful alternatives to improve denture hygiene and oral health.

- References
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