

## عنوان مقاله:

Antimicrobial effects of Glycyrrhiza glabra extract, iron oxide nanoparticles, and Lactobacillus rhamnosus on a biofilm composed of Pseudomonas aeruginosa in glass, wood, and polysteel

## محل انتشار:

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## خلاصه مقاله:

Biofilm formation is a pathogenicity factor of *Pseudomonas aeruginosa*, which causes inherent resistance to a wide range of antibiotics in the strains. The present study aimed to compare the inhibitory effects of *Glycyrrhiza glabra* (licorice) extract, iron oxide nanoparticles, and *Lactobacillus rhamnosus* suspension on a biofilm composed of *P. aeruginosa* in various levels of glass, wood, and polysteel. This descriptive, cross-sectional study assessed the effects of *Glycyrrhiza glabra* extract, iron oxide nanoparticles, and *Lactobacillus rhamnosus* suspension on the standard biofilm of *P. aeruginosa* ۱۶۰۱PTCC on glass, steel, and wood surfaces. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were also calculated. The obtained results showed that each antimicrobial agent had different effects on *P. aeruginosa*, and the MIC and MBC exerted inhibitory properties. In addition, the largest inhibition zone diameter was ۲۸ mL due to the effect of the *Glycyrrhiza glabra* extract on free bacteria in the volume of ۱۸۰ microliters, and the highest inhibitory level was observed on the polysteel and glass surfaces with the inhibition zone diameter of ۲۰-۲۰.۶۶ millimeters in the volume of ۱۸۰ microliters. The highest inhibition in the bacterial biofilm was observed on the polysteel surface, and a significant difference was also denoted in this regard with the glass and wood surfaces ( $p < 0.05$ ). Therefore, it could be concluded that licorice (*Glycyrrhiza glabra* L.) had more significant antimicrobial properties compared to the iron oxide nanoparticles and *Lactobacillus rhamnosus* suspension.

## کلمات کلیدی:

*Pseudomonas Aeruginosa*, Biofilm, Iron Oxide Nanoparticles, *Glycyrrhiza glabra* extract, *Lactobacillus rhamnosus*

## لینک ثابت مقاله در پایگاه سیویلیکا:

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