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Title: Histopathological and biochemical study of the effects of *Lactobacillus Limosilactobacillus reuteri* and *Pediococcus acidilactici* medium extracts on the healing of infected wound with *Pseudomonas aeruginosa* in rats.

Abstract

In this study, the effect of *Limosilactobacillus reuteri* and *Pediococcus acidilactici* culture supernatant on the healing of wounds infected with *Pseudomonas aeruginosa* in rats was investigated. Thirty male Wistar rats were randomly divided into six groups. Using an 8 mm skin punch, full-thickness wounds were created on both sides of the dorsal thoracic region following general anesthesia and preparation of the area. All wounds except in the Wound group were infected with *P.aeruginosa* bacteria. The wounds were treated topically with 1% silver sulfadiazine ointment for 7 days in the Positive control group and the treatment groups, pseudo-gels containing probiotic bacteria *Limosilactobacillus reuteri* and *Pediococcus acidilactici* were used. Tissue samples were collected on days 7, 14, and 21 for histopathological and biochemical evaluations. In histopathological assessment, a significant decrease in the infiltration of inflammatory cells, especially neutrophils, was observed in the probiotic treatment groups compared to the Negative control group during the study. Also, complete regrowth of the epithelium was observed in the probiotic treatment groups compared to the Negative control group on day 21 of sampling. A significant increase in angiogenesis was observed in the *Pediococcus acidilactici* treatment group compared to the Negative control group on days 7 and 14. A significant increase in the total antioxidant capacity and SOD enzyme and, conversely, a significant decrease in MDA values were observed in the probiotic treatment groups compared to the infected control group in the biochemical results. The amount of type I collagen was higher in the treatment groups, especially *Pediococcus acidilactici*, compared to the other study groups. In general, probiotic treatments, especially with *Pediococcus acidilactici*, facilitated the healing of *P.aeruginosa* infected wounds by reducing inflammation, increasing antioxidant capacity, and enhancing collagen synthesis. These findings suggest potential therapeutic applications of probiotics in the management of infected wounds.

Keywords: *Pseudomonas aeruginosa*-infected wound, *Limosilactobacillus reuteri*, *Pediococcus acidilactici*, rat, wound healing.