

DEVELOPMENT OF A PLANT-BASED ANTIMICROBIAL ACTIVITY GEL

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Introduction. The increasing problem of bacterial resistance to antibiotics has led to the need for alternative approaches to combat microbial infections. Plants are a valuable source of bioactive compounds that can be used as natural antimicrobials. In this study, we aimed to develop a plant-based gel with antimicrobial activity.

Aim of the study. The aim of the study was to develop a plant-based gel with antimicrobial activity using natural plant extracts and to evaluate its effectiveness against bacterial pathogens.

Methods of research. The following plant extracts were used to develop the antimicrobial gel: tea tree oil, lavender oil, and peppermint oil. The gel was formulated using a carbomer polymer base. The plant extracts were added to the gel in varying concentrations to determine the optimal concentration for maximum antimicrobial activity. The antimicrobial activity of the gel was evaluated using the disk diffusion method against the following bacterial strains: *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae*.

Main results. The developed plant-based gel showed significant antimicrobial activity against all tested bacterial strains. The zone of inhibition of bacterial growth increased with increasing concentrations of plant extracts in the gel. The optimal concentration of the plant extracts in the gel for maximum antimicrobial activity was determined to be 2% tea tree oil, 1% lavender oil, and 1% peppermint oil. The gel also showed good stability and consistency during storage.

Conclusions. The developed plant-based gel showed promising antimicrobial activity against various bacterial strains. The use of natural plant extracts in the gel makes it a safer and potentially more effective alternative to conventional antimicrobial agents. Further studies are needed to evaluate the safety and efficacy of the plant-based gel in clinical settings.