

IN VITRO ISPITIVANJE ANTIMIKROBNOG I ANTIADHEZIVNOG DEJSTVA PROBIOTIKA U LEČENJU ACNE VULGARIS

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Akne su jedan od najčešćih kožnih poremećaja sa estetskim i psihološkim posledicama. Iako su probiotici poznati po koristima u gastrointestinalnom traktu, sve češće se razmatra njihova primena u dermatologiji. Cilj rada je bio *in vitro* procena antimikrobnog i antiadhezivnog dejstva paraprobiotičkih derivata laktobacila protiv *Cutibacterium acnes*.

U radu su korišćeni *C. acnes* i sojevi laktobacila *Lactobacillus salivarius* BGHO1 i *Lactobacillus paracasei* BGSJ2-8. Paraprobiotici su dobijeni termičkom inaktivacijom 30 min na 95 °C (*heat killed* - HK). Agar difuzija: meki BHI 0,7% inokulisan sa 20 µl prekonoćne kulture *C. acnes*; bunarići sa 50 µl preparata laktobacila 1×10⁸ CFU/mL; inkubacija 24 h na 37 °C anaerobno; merenje zona u ImageJ. Antiadhezija: HaCaT 10⁶ ćelija po bunariću koinkubirane 1 h sa 50 µl *C. acnes* 5×10⁶ CFU/mL i 50 µl HK 5×10⁶ CFU/mL; pranje tri puta PBS, tripsinizacija, zasejavanje na BHI, inkubacija 24 h na 37 °C; brojanje adherentnih CFU u odnosu na kontrolu.

U agar difuzionom testu na podlozi inokulisanoj *C. acnes*, termički inaktivisani *L. salivarius* BGHO1 i *L. paracasei* BGSJ2-8 formirali su zone inhibicije. U testu adhezije na HaCaT ćelijama broj adherentnih *C. acnes* smanjen je na 15 CFU/mL uz HK *L. salivarius* BGHO1 i na 25 CFU/mL uz HK *L. paracasei* BGSJ2-8, što odgovara smanjenju adhezije za 85% i 75% u odnosu na netretiranu kontrolu.

Ispitivani paraprobiotici ispoljavaju difuziono antimikrobno i antiadhezivno dejstvo prema *C. acnes*, što ukazuje na potencijal inovativnih, održivijih, neantibiotskih topikalnih strategija, ali i potrebu za daljim istraživanjima u cilju identifikacije aktivnih komponenti.

IN VITRO EVALUATION OF THE ANTIMICROBIAL AND ANTIADHESIVE EFFECTS OF PROBIOTICS IN THE TREATMENT OF ACNE VULGARIS

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Acne is among the most common skin disorders with aesthetic and psychological consequences. Although probiotics are known for benefits in the gastrointestinal tract, their dermatologic use is increasingly explored. The aim was to assess *in vitro* the antimicrobial and antiadhesive activity of paraprobiotic derivatives of two lactobacillus strains against *Cutibacterium acnes*.

We used *C. acnes* and the strains *Lactobacillus salivarius* BGH01 and *Lactobacillus paracasei* BGSJ2-8. Paraprobiotics were obtained by thermal inactivation for 30 min at 95 °C. Agar diffusion: soft BHI 0.7% inoculated with 20 µL *C. acnes*; wells with 50 µL lactobacillus preparations at 1×10^8 CFU/mL; incubation 24 h at 37 °C anaerobically; zones measured in ImageJ. Antiadhesion: HaCaT 10^6 cells per well coincubated 1 h with 50 µL *C. acnes* 5×10^6 CFU/mL and 50 µL heat killed paraprobiotics 5×10^6 CFU/mL; washed three times PBS, trypsinized, plated on BHI, incubated 24 h at 37 °C; adherent CFU counted vs control.

In agar diffusion on *C. acnes* lawns, heat killed *L. salivarius* BGH01 and *L. paracasei* BGSJ2-8 formed inhibition zones. In HaCaT adhesion assays, adherent *C. acnes* decreased to 15 CFU/mL with *L. salivarius* BGH01 and to 25 CFU/mL with *L. paracasei* BGSJ2-8, corresponding to 85% and 75% reductions versus untreated control.

The investigated paraprobiotics exhibit diffusional antimicrobial and antiadhesive effects against *C. acnes*, indicating the potential for innovative, more sustainable, nonantibiotic topical strategies, as well as the need for further research to identify the active components.