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Effect of trehalose as substrate and inactivation methods on antimicrobial activity of probiotic-based parabiotics

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No doubt that probiotics have many beneficial advantages, however these effects in most cases are due to the cellular substances and/or fragments that can be synthesised separately by fermentation and generally do not need the presence of alive cells. This study investigated the effect of trehalose and inactivation methods on antimicrobial properties of probiotic-based parabiotics. Four probiotic LAB strains were grown on MRS medium and different physical and chemical cell inactivation methods were used. Antimicrobial activity was checked by agar diffusion method using 5 different test microorganisms. Our results showed that substitution of glucose in MRS culture medium by trehalose increased the antimicrobial activity of parabiotics while slightly reducing growth rates of bacterial cells. Meanwhile, heat treatment at 100°C for 15 minutes was the most effective physical method, CTAB was the best chemical method for inactivating probiotic LAB cells for the antimicrobial activity of parabiotics. Sonication showed low antimicrobial activity of some investigated LAB strains, while freeze-thaw cycle, triton-x, and SDS did not provide detectable results. All probiotic-based parabiotics showed antimicrobial activity against Gram-negative and Gram-positive foodborne pathogenic bacteria. This result is new and very promising making parabiotics excellent candidates in food preservation application. This work was supported by the Flagship Programme of MATE and TKP2021-NVA-22 projects