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PP69. The nanotechnological formulation and anti-biofilm activity of thyme essential oil against *Streptococcus pneumoniae*

Viktória L. Balázs[1]*, Barbara Horváth[2], Erika Kerekes[3], Aleksander Széchenyi[2], Adorján Varga[4], Béla Kocsis[4], *Kamilla Ács*[1], Judit Krisch[5], Györgyi Horváth[1]*

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Bacterial biofilm is a structured community of bacterial cells enclosed in a self-produced polymeric matrix and adherent to an inert or living surface, which allows a protected mode of growth and survival in a hostile environment. Infections associated with biofilm growth usually are challenging to eradicate. It is mostly due to the fact that mature biofilms display tolerance towards antibiotics and the immune response. For example, bacterial biofilms can be formed in the human respiratory tract. The essential oil of thyme (*Thymus vulgaris* L., Lamiaceae) is well-known in the therapy of respiratory tract infections, but there is no information about the anti-biofilm activity of its hydrophilic formulation against respiratory tract pathogens.

The aim of the study was to investigate the anti-biofilm effect of a thyme oil (Aromax Ltd., Hungary) formulated with nanotechnology against *Streptococcus pneumoniae* (DSM 20566). The oil was analyzed by GC-FID/MS. The Pickering emulsion of the oil was produced via the Stöber synthesis and stabilized with silica-nanoparticles. The bacterial biofilm (10^8 CFU/mL) was created in 96-well microtiter plates. After incubation (4 h, 37 °C), the Pickering emulsion and the Tween 80 solution of the thyme oil were added to the biofilm in MIC/2 concentration (0.05 mg/mL). After a second incubation (24 h), the adherent cells were fixed with methanol and stained with 0.1% crystal violet and dissolved in 33% acetic acid. The absorbance (A) was measured at 590 nm with a plate reader (BMG Labtech).

Our results showed that the thyme oil had anti-biofilm activity against *S. pneumoniae*, because it reduced the biomass of the biofilms. It is important to highlight that the Pickering emulsion of the oil was more effective (A = 0.53) than the Tween 80 solution (A = 0.84) compared to the control (A = 3.71). This confirms that the Pickering emulsion of thyme oil can prevent the *S. pneumoniae* biofilm formation more effectively than the Tween 80 solution.

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[1]Department of Pharmacognosy, Faculty of Pharmacy, University of Pécs, Hungary; [2]Institute of Pharmaceutical Technology and Biopharmacy, Faculty of Pharmacy, University of Pécs, Hungary; [3]Department of Microbiology, Faculty of Science and Informatics, University of Szeged, Hungary; [4]Department of Medical Microbiology and Immunology, Medical School, University of Pécs, Hungary; [5]Institute of Food Engineering, Faculty of Engineering, University of Szeged, Hungary.
**Corresponding author*: balazsviktorialilla@gmail.com, gyorgyi.horvath@aok.pte.hu