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PP20. Preparation and *in vitro* diffusion study of essential oil Pickering emulsions stabilized by silica nanoparticles for *Streptococcus mutans* biofilm inhibition

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A long-standing problem in patient care is the ability of bacteria to form biofilms, including *Streptococcus mutans* biofilm on teeth or dental implants [1]. The essential oils have a proven ability for biofilm inhibition [2], but their direct use is limited due to their physical-chemical properties, such as the hydrophobicity and low water solubility. EOs are used as active ingredients in mouth care products, but the solvent components, e.g. DMSO or ethanol and surfactant as SDS or polysorbates in the case of emulsions, may influence the role and effect of EOs. To avoid the use of solvents and surfactants, we could use Pickering emulsions (PE), which are solid particle stabilized emulsions [3]. For this purpose, biologically inert solid particles are used, and this emulsion can be used for EO formulations. Besides emulsion stabilization, the solid particles may interact with biofilm [4] and targeted EO transportation can be also achieved. The aim of our work was to prepare silica nanoparticle stabilized PEs with thyme, clove, peppermint, and cinnamon EO, in order to enhance their bioavailability for potential biofilm inhibition. The droplet size and stability of PEs were determined by dynamic light scattering measurements. *In vitro* diffusion experiments have been performed on a model agar gel membrane with the PEs, conventional emulsions, and ethanolic EO solutions. EOs were used in the MIC/2 concentration against *S. mutans*. The results from diffusion experiments clearly show that EOs in PE form are more effective regarding the cumulative amount of EOs passed through the model membrane. Biofilm inhibition test has been also performed, where we have determined, that the EOs in PE form have a better biofilm inhibition effect then the solutions or conventional emulsions.

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