

OP3. Applicability of cinnamon bark essential oil in respiratory tract diseases—from *in vitro* to *in vivo* experiments

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Introduction: Because respiratory tract diseases affect every age group and antibiotic resistance is an increasing problem in healthcare, there is a need for additional therapies. Essential oils (EOs) are used via inhalation for the treatment of respiratory tract diseases for a long time. Similarly to other plant extracts, their efficacy should also be proved in several test systems. Therefore, our aim was to study the antibacterial and antiinflammatory effects of cinnamon bark oil in *in vitro* and *in vivo* models.

Methods: The chemical composition of cinnamon EO was determined by GC-FID/MS and SPME-GC-MS methods. The antibacterial effect of the EO was tested by macrodilution and vapor-phase methods against respiratory tract pathogens. The emulsion of the EO prepared by nanotechnology was also used for the examination of the biofilm inhibitory effect. The antiinflammatory effect was studied in an LPS-induced acute airway inflammation mouse model.

Results and conclusion: The main component of the EO was *trans*-cinnamaldehyde (74.0%, 46.0%) in both analytical systems. In the liquid medium, cinnamon EO exhibited antibacterial activity against *Streptococcus pyogenes*, *S. pneumoniae*, *S. mutans*, *Haemophilus influenzae* and *H. parainfluenzae* (MIC: 0.06 mg/mL). In the vapor-phase test, the EO was the most effective against *Haemophilus* strains (MIC: 15.6 µL/L). The biofilm formation of *S. mutans* was more effectively reduced by the emulsion of cinnamon oil prepared by nanotechnology compared to the emulsions prepared with Tween80 or alcohol. In the animal model, cinnamon oil inhalation reduced airway hyperreactivity, macrophage accumulation in histological images, but did not affect MPO activity. Therefore, cinnamon oil may be a potential antibacterial and antiinflammatory agent for the treatment of respiratory tract diseases.

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