

The use of essential oils in marinade to extend the microbial shelf life of fish and meat

Van Haute S.^{a*}, Raes K.^a, Van der Meeren P.^b, Sampers I.^a.

^a Laboratory of Food Microbiology and Biotechnology, Department of Industrial Biological Sciences, Faculty of Bioscience Engineering, Ghent University Campus Kortrijk, Graaf Karel de Goedelaan 5, 8500 Kortrijk, Belgium

^b Particle and Interfacial Technology Group, Faculty of Bioscience Engineering, Ghent University, Coupure Links 653, 9000 Ghent, Belgium

Fresh and minimally processed fish and meat are easy targets for microbial spoilage. Due to green consumerism the demand for natural alternatives to synthetic additives increases and a considerable amount of research concerning the antimicrobial properties of essential oils (EO) has and is being done. In this study EOs in marinades were used on fish and meat and the effect on the microbial growth during storage was assessed. EOs from *Oreganum compactum* (oregano), *Cinnamomum zeylanicum* (cinnamon), and *Thymus zygis* ct. Thymol (red thyme) were chosen. The marinade was composed of water, lactic acid (2 m%), NaCl (10 m%), EO (1 - 10 m%) emulsified with Tween 80 and the pH adjusted to 4.5. The treatment consisted of immersion of meat (pork mignonette, pork bacon, chicken filets, chicken skin, minced chicken meat (EOs were mixed in meat)), salmon or scampi for 2 min in marinade solution. The samples were stored at 4°C in air. Samples were analyzed for microbial counts (dependent on matrix: total coliforms, *Escherichia coli*, lactic acid bacteria, total psychrotrophic aerobic counts). Immersion in the marinade (containing 1% EO) resulted in an estimated uptake of EO by the food matrix ranging from 9 ± 6 mg/100 g scampi to 90 ± 41 mg/100 g chicken skin. The growth of yeasts and molds was inhibited by 1 m% cinnamon EO on all food matrices. Considering all studied microbial parameters, cinnamon EO had a broader antimicrobial spectrum than the other EOs. When using 10% EO instead of 1%, the growth inhibiting potential of all EOs increased. Cinnamon EO shows promise as natural antimicrobial in foods, applied *via* marinades, at low concentrations than thyme and oregano, and especially against yeasts and molds.