

Title Antimicrobial activity of zein film containing herb extracts against food microorganisms
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Abstract

Introduction: The antimicrobial efficacy of zein film containing herb extracts against foodborne pathogens was investigated. **Material and Methods:** Zein films, using glycerol and propylene glycol as a plasticizer, was prepared by adding either combination essential oils of holy basil (*Ocimum sanctum* L.) and fingerroot (*Boesenbergia pandurata* Schltr) [H/F] or combination phytochemicals of geranial and 1,8-cineol [G/C]. Their antimicrobial activities against pathogenic bacteria including *Listeria monocytogenes*, *Staphylococcus aureus*, *Escherichia coli* and *Salmonella typhimurium* were determined using a vapor diffusion technique by measuring colony diameter and counting number of colony. Application of antimicrobial film on a meat model system, bologna slices, was also investigated by monitoring growth over time. **Results and Discussion:** In the vapor diffusion technique, addition of essential oils and phytochemicals in the zein film significantly reduced colony diameter and number of surviving cells of gram positive bacteria but had no effect on gram negative bacteria. Higher concentration of essential oils and phytochemicals resulted in stronger antimicrobial effect. The best ratios of the combinations were H/F at 0.08/0.08% (v/v/w) and G/C at 0.04/0.4% (v/v/w) that showed bactericidal effect against pathogenic bacteria. In the meat model system, bologna slices were prepared by surface inoculation of *L. monocytogenes* Scoot A to yield 2 log CFU/g. The inoculated bologna was placed in a petridish and covered with zein film containing either H/F at 0.08/0.08% (v/v/w) or G/C at 0.04/0.4% (v/v/w). Samples were stored at 4 and 13°C for 11 days. After storage bologna at 4°C for 11 day, zein film containing either H/F or G/C reduced *L. monocytogenes* by 0.65 and 0.59 log CFU/g, respectively. When stored at 13°C, *L. monocytogenes* was reduced by 0.43 and 0.30 log CFU/g, respectively. Moreover, the antimicrobial films retarded spoilage at least two day. It was concluded that zein films containing herb extracts have potential for inhibiting foodborne pathogens and retarding spoilage in processed meats.