

Supathon Srinaovaratkul 2009: Efficacy of Antimicrobial and Antioxidant Films Containing Natural Plant Extracts for Food Packaging. Master of Science (Packaging Technology), Major Field: Packaging Technology, Department of Packaging Technology. Thesis Advisor: Assistant Professor Panuwat Suppakul, Ph.D. 234 pages.

Essential oils of ylang ylang, fingerroot, oregano and their principal constituents including linalool, geraniol and carvacrol, respectively have been studied for antimicrobial activity using an agar well diffusion method and for their antioxidant activity using a  $\beta$ -carotene diffusion method, a  $\beta$ -carotene bleaching method and a radical scavenging of 2,2-diphenyl-1-picrylhydrazyl (DPPH) method. The minimum inhibitory concentration (MICs) and minimum oxidative bleaching inhibitory concentration (MOBICs) of these oils and their principal constituents were determined using an agar dilution method and a broth dilution method, respectively. At the concentration of  $50 \mu\text{l mL}^{-1}$ , essential oils and their principal constituents showed a zone of inhibition, ranging from 7.04 to 18.10 mm. in diameter. The MICs ( $12.5$ -  $>200 \mu\text{l mL}^{-1}$ ) and MOBICs ( $0.195 \mu\text{l mL}^{-1}$ ), oregano and carvacrol possessed the strongest antimicrobial activity, whereas ylang ylang, fingerroot, oregano and carvacrol possessed the strongest antioxidant activity. Cellulose ether films containing oregano or carvacrol as antimicrobial additive were quantitatively investigated their *in vitro* antimicrobial activity against target microorganisms using a headspace diffusion and a total plate count method. All of these incorporated films showed positive antimicrobial activity against all test strains. Cellulose ether films containing ylang ylang, fingerroot, oregano or carvacrol as antioxidant additive showed positive antioxidant activity against both oxidative bleaching of  $\beta$ -carotene and DPPH radical. Carvacrol incorporated cellulose ether-coated LDPE film was applied to wrap samples of minced pork as antimicrobial and antioxidant film. The results showed an inhibitory effect of this antimicrobial film against microbial growth in naturally contaminated minced pork. In addition, sensory panelists did not perceive a difference between minced pork wrapped in carvacrol incorporated cellulose ether-coated LDPE and in control film. Cellulose ether-coated LDPE film containing carvacrol 1%w/w could reveal ability to keep redness and significantly showed a lower pH, peroxide value (POV) and thiobarbituric acid (TBA) value ( $P \leq 0.05$ ) during storage period. These studies highlight the encouraging potential use of cellulose ether film containing carvacrol as antimicrobial and antioxidant packaging film for enhancing quality and safety of packaged foods.

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Thesis Advisor's signature

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