

ACTIVITY OF VIRGIN COCONUT OIL, LAURIC ACID OR MONOLAURIN IN COMBINATION WITH LACTIC ACID AGAINST *STAPHYLOCOCCUS AUREUS*

Pussadee Tangwatcharin¹ and Prapaporn Khopaibool²

¹Faculty of Technology and Community Development, Thaksin University Phatthalung Campus, Phatthalung; ²Department of Food Science and Technology, King Mongkut's Institute of Technology, Lat Krabang, Bangkok, Thailand

Abstract. The objective of this study was to investigate the *in vitro* activities of virgin coconut oil, lauric acid and monolaurin in combination with lactic acid against two strains of *Staphylococcus aureus*, ATCC 25923 and an isolate from a pig carcass, by determination of Fractional Bactericidal Concentration Index (FBCI), time-kill method, as well as scanning and transmission electron microscopy. Minimum bactericidal concentrations (MBC) of lauric acid, monolaurin and lactic acid were 3.2 mg/ml, 0.1 mg/ml and 0.4% (v/v), respectively. The effects of lauric acid + lactic acid and monolaurin + lactic acid combinations were synergistic against both strains, exhibiting FBCIs of 0.25 and 0.63, respectively. In time-kill studies, lauric acid and monolaurin + lactic acid combinations added at their minimum inhibitory concentrations produced a bactericidal effect. The induction of stress in non-stressed cells was dependent on the type and concentration of antimicrobial. This resulted in a loss and change of the cytoplasm and membrane in cells of the bacterium. In contrast, virgin coconut oil (10%) was not active against *S. aureus*. The bacterial counts found in pork loin treated with lauric acid and monolaurin alone were significantly higher ($p < 0.05$) than those treated with both lipids in combination with lactic acid at sub-inhibitory concentrations. The color, odor and overall acceptability of the pork loins were adversely affected by treatment with the three lipids and lactic acid alone but when combinations of the agents were used the sensory quality was acceptable.

Keywords: *Staphylococcus aureus*, virgin coconut oil, lauric acid, monolaurin, lactic acid, lipid, antimicrobial agent

Correspondence: Pussadee Tangwatcharin,
Faculty of Technology and Community Development,
Thaksin University Phatthalung Campus,
Phatthalung 93110, Thailand.

Tel: 1100 66 (0) 74 693996; Fax: 1100 66 (0) 74 693996

E-mail: putang3009@hotmail.com