

Research Title: The Development of biopolymer blends between polylactic acid and rubber mixed *Alpinia galanga* (L.) Willd essential oil for extension of frozen seafood shelf life

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ABSTRACT

The aims of this study were the study on antibacterial activity of *Alpinia galangal* essential oil on food-borne bacteria from seafood and application the oil into the composite biopolymer of polylactic acid and Natural rubber (PLA/NR/Galangal oil) to produce the antibacterial film for rewapping of frozen seafood. The major compositions in the obtained *galangal* oil were 1,8-cineole (53.48%), 5-t-butyl-3-hexa-3,5-dien-2-one (13.49%) and dl-limonene (4.849%). The antibacterial activity of *galangal* oil against to *E. coli* TISTR 887, *S. aureus* TISTR 517 and *S. typhimurium* TISTR 292 was tested by disc diffusion method with concentrations of 0, 15, 30, and 45 $\mu\text{L}/\text{mL}$. The *galangal* oil presented the antibacterial activity against to these bacteria. The minimum inhibitory concentrations of this oil against to *E. coli* TISTR 887, *S. aureus* TISTR 517 and *S. typhimurium* TISTR 292 were 0.78, 1.56, and 0.78 $\mu\text{L}/\text{mL}$, respectively. The preparation of bioplastic films from polylactic acid/natural rubber blends (10 wt%) via extrusion and film-blowing processes were studied. The bioplastic PLA/NR films can be prepared under both processes at specific processing conditions. The die temperature of 147°C, screw speed of 3 rpm and draw ratio of 1 were the optimum conditions for extrusion process. The extruded PLA/NR film was brittle. The processing temperature of 150°C and screw speed of 320 rpm were the optimum conditions for film-blowing process. The blown PLA/NR film in machine direction showed the highest modulus and elongation at break. Rice straw papers coated with galangal oil at 2% could resist growth of all bacteria and decrease physical properties of paper. The frozen prawn was thawed, wrapped again with the coated paper and kept in freezer for several cycles. The results showed that the shelf life of thawed prawn could be extended up to 6 days.

Keywords : *Alpinia galangal*, antibacterial activity, essential oil, polylactic acid, natural rubber latex