

Oil from Asian Bullfrog (*Rana tigerina*) Skin: Antimicrobial Activity and Its Application in Emulsion Gelatin-based Film

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ABSTRACT

Asian bullfrog (*Rana tigerina*) has been commonly consumed as meat protein source by Asian people. The certain amount of frog skin was obtained from cutting process line, which could be used as natural source of bioactivity compounds, particularly antimicrobial oil. In the present study, antimicrobial activities of oil extracted from skin of *R. tigerina* against various bacteria were determined using agar-well diffusion assay. The application of the frog oil in emulsion gelatin-based film as antimicrobial packaging was also investigated. Oil from bullfrog skin was extracted and examined for its antibacterial activities on *Staphylococcus aureus*, *Bacillus cereus*, *Escherichia coli*, *Vibrio cholera*, *Aeromonas hydrophil* and *Salmonella typhimurium*. Frog skin oil (FSO) (250-500 mg/mL) showed inhibitory activities on both Gram +ve (*B. cereus*) and Gram -ve (*E. coli*) bacteria with inhibition zone diameters of 8.97-11.50 and 8.77-11.50 mm, respectively. A gelatin-based film incorporated with frog skin oil emulsion (FSOF) was characterized and its antibacterial activities were also investigated using agar spot test in comparison with palm oil emulsified film (POF) and fish gelatin (GF) film. Physical characteristics of the three films varied. FSOF was significantly ($P < 0.05$) thicker than GF, but thinner than POF. FSOF had higher tensile strength than PO and showed higher elongation at break than GF ($P < 0.05$). Based on water vapor permeability, FSOF could be a good barrier with higher potential than GF ($P < 0.05$), which was comparable to PO ($P > 0.05$). FSOF showed higher transparency value with higher intense of yellow color, compared with those of POF and GF ($P < 0.05$). Antimicrobial activity of FSOF was not be detected, which could be accounted for the oil might have been trapped in the film matrix which limited the release of the oil into agar. The extracted oil could be a natural alternative antimicrobial agent. However, further study is required to enhance the release/availability of the oil in emulsion film as antimicrobial agent.

Keywords: Asian bullfrog, Extracted oil, Antimicrobial activity, Emulsion, Gelatin-based film