

## **Anti-Acanthamoeba activity of a semi-synthetic mangostin derivative and its ability in removal of Acanthamoeba triangularis WU19001 on contact lens**

### **ABSTRACT**

*Garcinia mangostana* L., also known as the mangosteen tree, is a native medicinal plant in Southeast Asia having a wide variety of pharmacologically active compounds, including xanthonoid mangostin. In this study, we examined the pharmacological activities of the selected semi-synthetic mangostin derivative, namely, amoebicidal activity, encystation inhibition, excystation activity, and removal capacity of adhesive *Acanthamoeba* from the surface of contact lens (CL). Among the three derivatives, C1 exhibited promising anti-*Acanthamoeba* activity against *Acanthamoeba triangularis* WU19001 trophozoites and cysts. SEM images displayed morphological changes in *Acanthamoeba* trophozoites, including the loss of acanthopodia, pore formation in the cell membrane, and membrane damage. In addition, the treated cyst was shrunken and adopted an irregular flat cyst shape. Under a fluorescence microscope, acridine orange and propidium iodide (AO/PI) staining revealed C1 induced condensation of cytoplasm and chromatin with the loss of cell volume in the treated trophozoites, while calcofluor white staining demonstrated the leakage of cell wall in treated cysts, leading to cell death. Interestingly, at the concentration ranges in which C1 showed the anti-*Acanthamoeba* effects (IC<sub>50</sub> values ranging from 0.035–0.056 mg/mL), they were not toxic to Vero cells. C1 displayed the highest inhibitory effect on *A. triangularis* encystation at 1/16×MIC value (0.004 mg/mL). While C1 demonstrated the excystation activity at 1/128×MIC value with a high rate of 89.47%. Furthermore, C1 exhibited the removal capacity of adhesive *Acanthamoeba* from the surface of CL comparable with commercial multipurpose solutions (MPSs). Based on the results obtained, C1 may be a promising lead agent to develop a therapeutic for the treatment of *Acanthamoeba* infections and disinfectant solutions for CL.