APPENDICES

Appendix A The Percentage of Ratio between Mangosteen Weight and Sodium Alginate Weight

Table A1 The percentage of ratio between mangosteen weight and sodium alginate weight

Sample	AG(g)	MT(ml)	MT(g)	MT:AG(%)
0.5 % AG	0.5	0	0	0
	0.5	0.5	0.005	0.01
	0.5	1	0.01	0.02
	0.5	3	0.03	0.06
	0.5	5	0.05	0.1

Appendix B The Calibration Curve of Dissolved Mangosteen Extracts by UV-Vis Spectroscopy

Due to *in vitro* drug release, the coated gauze with mangosteen extracts will be investigated in PBS and acetate buffer *in vitro* for a human blood's and skin's pH at 7.4 and 5.5, respectively. To estimate the concentration of the released extracts, the calibration curve is created by using the UV-Vis spectroscopy at wave number = 370 nm. The fig. A1 and A2 shows the calibration curve in acetate buffer (pH 5.5) and PBS (pH 5.5), respectively.

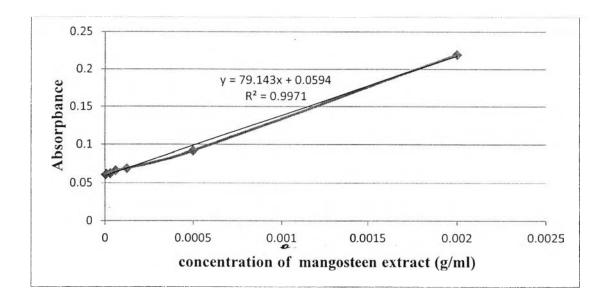


Figure B1 The calibration curve of mangosteen extracts in acetate buffer (pH 5.5).

0

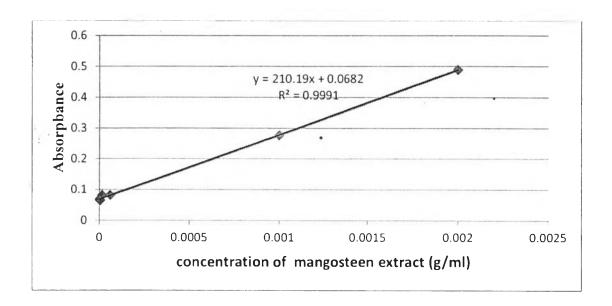


Figure B2 The calibration curve of mangosteen extracts in PBS (pH 7.4).

Appendix C The Clear Zone from Disc Diffusion Method of Coated Gauze Contented Mangosteen Extracts to Against the Bacteria

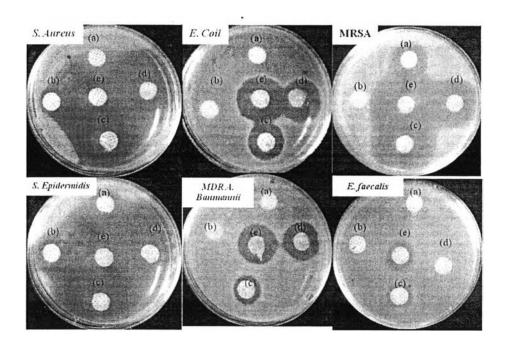


Figure C1 The Clear Zone of initial gauze (a) and Coated Gauze Contented Mangosteen Extracts 0% (b), 0.01% (c), 0.02% (d) and 0.06% w/v (e) to Against Bacteria.

REFERENCES

- Arunrattiyakorn, P., Suksamrarn, S., Suwannasai, N., and Kanzaki, H. (2011)

 Microbial metabolism of α-mangostin isolated from Garcinia mangostana L.

 Phytochemistry, 72(8), 730-734.
- Aslani, P. and Kennedy, R.A. (1996) Studies on diffusion in alginate gels. I. Effect of cross-linking with calcium or zinc ions on diffusion of acetaminophen.

 <u>Journal of Controlled Release</u>, 42(1), 75-82.
- Attwood, A.I. (1989) Calcium alginate dressing accelerates split skin graft donor site healing. <u>British Journal of Plastic Surgery</u>, 42(4), 373-379.
- Benavides, S., Villalobos-Carvajal, R., and Reyes, J.E. (2012) Physical, mechanical and antibacterial properties of alginate film: Effect of the crosslinking degree and oregano essential oil concentration. <u>Journal of Food Engineering</u>, 110(2), 232-239.
- Bierhalz, A.C.K., da Silva, M.A., Braga, M.E.M., Sousa, H.J.C., and Kieckbusch, T.G. (2014) Effect of calcium and/or barium crosslinking on the physical and antimicrobial properties of natamycin-loaded alginate films. <u>LWT</u> Food Science and Technology, 57(2), 494-501.
- Birnbaum, S., Pendleton, R., Larsson, P.-O., and Mosbach, K. (1981) Covalent stabilization of alginate gel for the entrapment of living whole cells.

 <u>Biotechnology Letters</u>, 3(8), 393-400.
- Blair, S.D., Jarvis, P., Salmon, M., and McCollum, C. (1990) Clinical trial of calcium alginate haemostatic swabs. <u>British Journal of Surgery</u>, 77(5), 568-570.
- Chomnawang, M.T., Surassmo, S., Wongsariya, K., and Bunyapraphatsara, N. (2009) Antibacterial Activity of Thai Medicinal Plants against Methicillin-resistant Staphylococcus aureus. <u>Fitoterapia</u>, 80(2), 102-104.
- Chou, A.I., Akintoye, S.O., and Nicoll, S.B. (2009) Photo-crosslinked alginate hydrogels support enhanced matrix accumulation by nucleus pulposus cells in vivo. Osteoarthritis and Cartilage, 17(10), 1377-1384.

- Dias, A.M.A., Rey-Rico, A., Oliveira, R.A., Marceneiro, S., Alvarez-Lorenzo, C., Concheiro, A., Júnior, R.N.C., Braga, M.E.M., and de Sousa, H.C. (2013) Wound dressings loaded with an anti-inflammatory jucá (Libidibia ferrea) extract using supercritical carbon dioxide technology. The Journal of Supercritical Fluids, 74(0), 34-45.
- Ding, X., Shi, L., Liu, C., and Sun, B. (2013) A randomized comparison study of Aquacel Ag and Alginate Silver as skin graft donor site dressings. <u>Burns</u>, 39(8), 1547-1550.
- Goh, C.H., Heng, P.W.S., and Chan, L.W. (2012) Cross-linker and non-gelling Na+ effects on multi-functional alginate dressings. <u>Carbohydrate Polymers</u>, 87(2), 1796-1802.
- Jeon, O., Bouhadir, K.H., Mansour, J.M., and Alsberg. E. (2009) Photocrosslinked alginate hydrogels with tunable biodegradation rates and mechanical properties. <u>Biomaterials</u>, 30(14), 2724-2734.
- Kaomongkolgit, R., Jamdee, K., and Chaisomboon, N. (2009) Antifungal activity of alpha-mangostin against Candida albicans. <u>Journal of Oral Science</u>, 51(3), 401-406.
- Ketsa, S. and Paull, R.E., 1 Mangosteen (Garcinia mangostana L.), in Postharvest Biology and Technology of Tropical and Subtropical Fruits, E.M. Yahia, Editor. 2011, Woodhead Publishing. p. 1-32e.
- Kim, J.O., Park, J.K., Kim, J.H., Jin, S.G., Yong, C.S., Li, D.X., Choi, J.Y., Woo, J.S., Yoo, B.K., Lyoo, W.S., Kim, J.-A., and Choi, H.-G. (2008) Development of polyvinyl alcohol–sodium alginate gel-matrix-based wound dressing system containing nitrofurazone. <u>International Journal of Pharmaceutics</u>, 359(1–2), 79-86.
- Mary Grace, M.S., Navin Chand, Ph.D., Sunil Kumar Bajpai, Ph.D. (2009) Copper Alginate-Cotton Cellulose (CACC) Fibers with excellent antibact prop.

 Journal of Engineered Fibers and Fabrics, 4(3), 24-35.
- Mørch, Ý.A., Donati, I., and Strand, B.L. (2006) Effect of Ca2+, Ba2+, and Sr2+ on Alginate Microbeads. <u>Biomacromolecules</u>, 7(5), 1471-1480.
- Nelsestuen, G.L. (1983) Calcium involvement in the protein-membrane systems of blood coagulation. <u>Inorganica Chimica Acta</u>, 79(0), 41.

- Ong, S.-Y., Wu, J., Moochhala, S.M., Tan, M.-H., and Lu, J. (2008) Development of a chitosan-based wound dressing with improved hemostatic and antimicrobial properties. <u>Biomaterials</u>, 29(32), 4323-4332.
- Pawar, S.N. and Edgar, K.J. (2012) Alginate derivatization: A review of chemistry, properties and applications. <u>Biomaterials</u>, 33(11), 3279-3305.
- Pedro, M., Cerqueira, F., Sousa, M.E.I., Nascimento, M.S.J., and Pinto, M. (2002) Xanthones as inhibitors of growth of human cancer cell lines and Their effects on the proliferation of human lymphocytes In Vitro. <u>Bioorganic & Medicinal Chemistry</u>, 10(12), 3725-3730.
- Pothitirat, W., Chomnawang, M.T., Supabphol, R., and Gritsanapan, W. (2009) Comparison of bioactive compounds content, free radical scavenging and anti-acne inducing bacteria activities of extracts from the mangosteen fruit rind at two stages of maturity. <u>Fitoterapia</u>, 80(7), 442-447.
- Qin, Y. (2005) Silver-containing alginate fibres and dressings. <u>International Wound</u> <u>Journal</u>, 2(2), 172-176.
- Rhim, J.-W. (2004) Physical and mechanical properties of water resistant sodium alginate films. LWT Food Science and Technology, 37(3), 323-330.
- Roger, S., Talbot, D., and Bee, A. (2006) Preparation and effect of Ca²⁺ on water solubility, particle release and swelling properties of magnetic alginate films.

 Journal of Magnetism and Magnetic Materials, 305(1), 221-227.
- Shapiro, L. and Cohen, S. (1997) Novel alginate sponges for cell culture and transplantation. <u>Biomaterials</u>, 18(8), 583-590.
- Shih, M.-F., Shau, M.-D., Chang, M.-Y., Chiou, S.-K., Chang, J.-K., and Cherng, J.-Y. (2006) Platelet adsorption and hemolytic properties of liquid crystal/composite polymers. <u>International Journal of Pharmaceutics</u>, 327(1–2), 117-125.
- Sikorski, P., Mo, F., Skjåk-Bræk, G., and Stokke, B.T. (2007) Evidence for Egg-Box-Compatible Interactions in Calcium-Alginate Gels from Fiber X-ray Diffraction. <u>Biomacromolecules</u>, 8(7), 2098-2103.

- Singh, B. and Pal, L. (2012) Sterculia crosslinked PVA and PVA-poly(AAm) hydrogel wound dressings for slow drug delivery: Mechanical, mucoadhesive, biocompatible and permeability properties. <u>Journal of the Mechanical Behavior of Biomedical Materials</u>, 9(0), 9-21.
- Singh, B., Sharma, S., and Dhiman, A. (2013) Design of antibiotic containing hydrogel wound dressings: Biomedical properties and histological study of wound healing. <u>International Journal of Pharmaceutics</u>, 457(1), 82-91.
- Straccia, M.C., Romano, I., Oliva, A., Santagata, G., and Laurienzo, P. (2014) Crosslinker effects on functional properties of alginate/N-succinylchitosan based hydrogels. <u>Carbohydrate Polymers</u>, 108(0), 321-330.
- Urbana/Champaign and Carle Cancer Center. "The Clotting Process (Hemostasis)" 19 April 2015. http://www.med.illinois.edu/hematology>

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