REFERENCES

- Agren, M.S. (1996) Four alginate dressings in the treatment of partial thickness wounds: a comparative experimental study. <u>British Journal of Plastic Surgery</u>, 49(2), 129-134.
- Ain, Q.U., Sharma, S., Khuller, G.K., and Garg, S.K. (2003) Alginate-based oral drug delivery system for tuberculosis: pharmacokinetics and therapeutic effects. Journal of Antimicrobial Chemotherapy, 51, 931-938.
- Attwood, A.I. (1989) Calcium alginate dressing accelerates split skin graft donor healing. <u>British Journal of Plastic Surgery</u>, 42(4), 373-379.
- Biagini, G., Bertani, A., Muzzarelli, R., Damadei, A., DiBenedetto, G., Belligolli, A., Riccotti, G., Zucchini, C., and Rizzoli, C. (1991) Wound management with *N*-carboxybutyl chitosan. <u>Biomaterials</u>, 12(3), 281-286.
- Blair, S.D., Backhouse, C.M., Harper, R., Matthews, J., and McCollum, C.N. (1988)

 Comparison of absorbable materials for surgical haemostasis. <u>British</u>

 <u>Journal of Surgery</u>, 75(10), 969-971.
- Bolton, L., and Van Rijswijk, L. (1991) Wound dressings meeting clinical and biological needs. <u>Dermatology Nursing</u>, 3(3), 146-160.
- Chan, M.W., Schwaitzberg, S.D., Demcheva, M., Vournakis, J., Finkielsztein, S., and Connolly, R.J. (2000) Comparison of poly-*N*-acetyl glucosamine (P-GlcNAc) with absorbable collagen (Actifoam), and fibrin sealant (Bolheal) for achieving hemostasis in a swine model of splenic hemorrhage. <u>Journal of Trauma-Injury Infection and Critical Care</u>, 48, 454-457.
- Chandy, T., and Sharma, C.P. (1990) Chitosan as biomaterials. <u>Biomaterials</u>
 Artificial Cells and Artificial Organs, 18, 1-24.
- Chickering, D.E., Jacob, J.S., Desia, T.A., Harrison, M., Harris, W.P., and Morell, C.N. *et al.* (1997) Bioadhesive polymers III. An *in vivo* transit and bioavailability study of drug loaded alginate and poly (fumaric-co-sebacic anhydride) microspheres. <u>Journal of Controlled Release</u>, 48, 35-46.
- Cole, S.M., and Nelson, D.L. (1993) Alginate wound dressing of good integrity. US patent No. 5197945.
- Collins, P.M. (Ed.), (1998) <u>Dictionary of carbohydrates</u>. London: Chapman and Hall.

- Debra, J.B., and Cheri, O. (1998) Wound healing: Technological innovations and market overview. 2, 1-185.
- Doyle, J.W., Roth, T.P., Smith, R.M., Li, Y.Q., and Dunn, R.M. (1996) Effect of calcium alginate on cellular wound healing processes modeled *in vitro*.

 Journal of Biomedical Materials Research Part A, 32(4), 561-568.
- Fan, L.H., Du, Y.M., Huang, R.H., Wang, Q., Wang, X.H., and Zhang, L.N. (2005)

 Preparation and characterization of alginate-gelatin blend fibers. <u>Journal of Applied Polymer Science</u>, 96, 1625-1629.
- Fischer, T.H., Thatte, H.S., Nichols, T.C., Bender-Neal, D.E., Bellinger, D.A., and Vournakis, J.N. (2005) Synergistic platelet integrin signaling and factor XII activation in poly-*N*-acetyl glucosamine fiber-mediated hemostasis. Biomaterials, 26, 5433-5443.
- Furr, J.R., Russell, A.D., Turner, T.D., and Andrews. A. (1994) Antibacterial activity of Actisorb plus, Actisorb and silver nitrate. <u>Journal of Hospital Infection</u>, 27, 201-208.
- Goth, T., Matsushima, K., and Kikuchi, K.I. (2004) Preparation of alginate-chitosan hybrid gel beads and adsorption of divalent metal ions. <u>Chemosphere</u>, 55, 135-140.
- Griffiths, J.A. (1991) Wound care: can the nursing process help? <u>Professional Nurse</u>, January, 208-212.
- Han, Y.P., Zhao, L.H., Yu, Z.J., Feng, J., and Yu, Q.Q. (2005) Role of mannose receptor in oligochitosan mediated stimulation of macrophage function. <u>International Immunopharmacology</u>, 5, 1533-1542.
- Hiromitsu, S., Tsuyoshi, K., Taizo, H., and Naoya, O. (1981) Stability of drugs in aqueous solutions II. Application of Weibull probability paper to prediction of coloration of paranteral solution. <u>Chemical and Pharmaceutical Bulletin</u>, 29, 3680-3687.
- Horncastle, J. (1995) Wound dressings: Past, present, and future. <u>Medical Device</u> <u>Technology</u>, Jan/Feb, 30-36.
- Hou, W.M., Miyazaki, S., Takada, M., and Komai, T. (1985) Sustained release of indomethacin from chitosan granules. <u>Chemical and Pharmaceutical</u> <u>Bulletin</u>, 33, 3986-3992.

- Jarvis, P.M., Galvin, D.A.J., Blair, S.D., and McCollum, C.N. (1987) How does calcium alginate achieve hemostasis in surgery. <u>Thrombosis and Haemostasis</u>, 58(1), 80.
- Kennedy, J.F., Paterson, M., Knill, C.J., and Lloyd, L.L. (1996) The diversity of properties of polysaccharides as wound management aids, and characterization of their structures. In: G.W. Cherry, F. Gottrup, J.C. Lawrence, C. J. Moffatt, and T.D. Turner (Eds.), <u>Proceedings of the Fifth European Conference on Advances in Wound Management</u> (pp. 122-126). London: Macmillan Magazines Ltd.
- Khan, K.A. and Rhodes, C.T. (1972) Effectiveness of some tablet disintegrants in an insoluble direct compression base, <u>Pharmaceutica Acta Helvetlae</u>, 47 (2–3), pp. 153–159.
- Kifune, K., Yamaguchi, Y., Kishimoto, S. (1988) Wound healing effect of chitin surgical dressing. <u>Trans Soc Biomater</u>, 11, 216.
- King, A.H. (1983) Brown seaweed extracts (alginates), In: <u>Food Hydrocolloids</u>, ed. by Glicksman, M. CRC Press, Boca Raton, FL.
- Klasen, H.J. (2000) Historical review of the use of silver in the treatment of burns. Burns, 26, 117-130.
- Klasen, H.J. (2000) Historical review of the use of silver in the treatment of burns. Burns, 26, 131-138.
- Knill, C.J., Kennedy, J.F., Mistry, J., Miraftab, M., Smart, G., Groocock, M.R., and Williams, H.J. (2004) Alginate fibres modified with unhydrolysed and hydrolysed chitosans for wound dressings. <u>Carbohydrate Polymer</u>, 55, 65-76.
- Kobayashi, Y., Matsuo, R., Ohya, T., and Yokoi, N. (1987) Enzyme-entrapping behaviours in alginate fibers and their papers. <u>Biotechnology</u> <u>Bioengineering</u>, 30, 451-457.
- Kroschwitz, J.I. (1986) Encyclopedia of Polymer Science and Engineering. Second Edition, Vol. 6, John Wiley & Sons. New York, pp. 812-815.

- Kulling, D., Vournakis, J.N., Woo, S., Demcheva, M.V., Tagge, D.U., Rios, G., Finkielsztein, S., and Hawes, R.H. (1999) Endoscopic injection of bleeding esophageal varices with a poly-N-acetyl glucosamine gel formulation in the canine portal hypertension model. <u>Gastrointestinal Endoscopy</u>, 49, 764-771.
- Lansdown, A.B.G., Jensen, K., and Jensen, M.Q. (2003) Contreet foam and contreet hydrocolloid: an insight into two new silver-containing dressings. <u>Journal of Wound Care</u>, 12, 205-210.
- Lansdown, A.B.G. (2002) Silver2: Toxicity in mammals and how its products aid wound repair. <u>Journal of Wound Care</u>, 11, 173-177.
- Le, Y., Anand, S.C., and Horrocks, A.R. (1997) Recent developments in fibres and materials for wound management. <u>Indian Journal of Fibre and Textile</u> Research, 22, 337-347.
- Le, Y., Anand, S.C., and Horrocks, A.R. (1997) Using alginate fiber as drug carrier for wound dressing, In: <u>Medical Textiles 96</u>. Woodhead Publishing, Cambridge, 21-6.
- Lloyd, L.L., Kennedy, J.F., Methacanon, P., Paterson, M., and Knill, C.J. (1998)

 Carbohydrate polymers as wound management aids. <u>Carbohydrate</u>

 Polymers, 37, 315-322.
- Lu, Y., Weng, L., and Zhang, L. (2004) Morphology and properties of soy protein isolate thermoplastics reinforced with chitin whiskers. <u>Biomacromolecules</u>, 5, 1046-1051.
- Madhavan, P. (1992) In: Popular Science Lecture Series (Kochi:CIFT).
- Malette, W.G., Quigley, H.J., and Adickes, E.D. (1986) Chitosan effects in vascular surgery, tissue culture and tissue regeneration. In R.A.A. Muzzarelli, C. Jeuniaux and G.W. Gooday eds., Chitin in Nature and Technology, p. 435-442. Plenum Press, New York.
- Mandel, K.G., Daggy, B.P., Brodie, D.A., and Jacoby, H.I. (2000) Review article: alginate-raft formulations in the treatment of heartburn and acid reflux.

 <u>Alimentary Pharmacology and Therapeutic</u>, 14(6), 669-690.
- McDowell, R.H. (1960) Applications of alginates. Reviews of Pure and Applied Chemistry, 10, 1-19.

- McDowell, R.H. (1977) <u>Properties of Alginates</u>. Alginate Industries Ltd., London, 67p., 4th ed.
- Miyazaki, S., Ishii, K., and Nadai, T. (1981) The use of chitin and chitosan as drug carriers. Chemical and Pharmaceutical Bulletin, 29, 3067-3069.
- Miyazaki, S. (1998) Chitin and chitosan as vehicle for drug delivery. Zairyo Gijutsu, 16, 276-281.
- Morganti, P., Muzzarelli, R.A.A., and Muzzarelli, C. (2006) Multifunctional use of innovative chitin nanofibrils for skin care. <u>Journal of Applied</u>
 Cosmetological, 24, 105-114.
- Morin, A., and Dufresne, A. (2002) Nanocomposites of chitin whiskers from Riftia tubes and poly(caprolactone). Macromolecules, 35, 2190-2199.
- Muzzarelli, R.A.A., Mattioli-Belmonte, M., Pugnaloni, A. and Biagini, G. (1999)

 Biochemistry, histology and clinical uses of chitins and chitosans in wound healing. In: P. Jolles and R.A.A. Muzzarelli, Editors, Chitin and Chitinases, Birkhauser, Basel.
- Muzzarelli, R.A.A., and Muzzarelli, C. (2005) Chitin nanofibrils, In <u>Chitin and Chitosan</u>: Research Opportunities and Challenges. P.K. Dutta, ed., New Age Intl., New Delhi, India.
- Muzzarelli, R.A.A. (1973) In <u>Naturally Chelating Polymers</u> (New York: Pergamon), p. 83.
- Muzzarelli, R.A.A. (1995) Methyl pyrrolidinone chitosan, production process and uses thereof. US <u>Patent</u> 5378472.
- Nair, K.G., and Dufresne, A. (2003a) Crab shell chitin whisker reinforced natural rubber nanocomposites. 1. Processing and swelling behavior. Biomacromolecules, 4, 657-665.
- Nair, K.G., and Dufresne, A. (2003b) Crab shell chitin whiskers reinforced natural rubber nanocomposites. 2. Mechanical behavior. <u>Biomacromolecules</u>, 4, 666-674.
- Nair, K.G., and Dufresne, A. (2003c) Crab shell chitin whiskers reinforced natural rubber nanocomposites. 3. Effect of chemical modification of chitin whiskers. <u>Biomacromolecules</u>, 4, 1835-1842.
- Nara, K., Yamaguchi, Y. and Tane, H. (1987) Wound dressing. US Patent 4651725.

- Ngan, V. "Synyhetic Wound Dressings." DermNet NZ 24 Dec 2007. 29 Jan 2009 http://www.dermnetnz.org/procedures/dressings.html
- Nge, T.T., Hori, N., Takemura, A., Ono, H., and Kimura, T. (2003a) Synthesis and FTIR spectroscopic studies on shear induced oriented liquid crystalline chitin/poly(acrylic acid) composite. <u>Journal of Applied Polymer Science</u>, 90, 1932-1940.
- Nge, T.T., Hori, N., Takemura, A., Ono, H., and Kimura, T. (2003b) Synthesis and orientation study of a magnetically aligned liquid-crystalline chitin/poly (acrylic acid) composite. <u>Journal of Polymer Science</u>, B: Polymer Physics, 41, 711-714.
- Nge, T.T., Hori, N., Takemura, A., and Ono, H. (2003c) Phase Behavior of liquid crystalline chitin/acrylic acid liquid mixture. <u>Langmuir</u>, 19, 1390-1395.
- Pariser, E.T., and Lombadi, D.P. (1980) In: <u>Chitin Source Book</u>: A guide to research literature (New York: Wiley).
- Paul, W., and Sharma, C.P. (2004) Chitosan and alginate wound dressings: a short review. <u>Trends in Biomaterials and Artificial Organs</u>, 18(1), 18-23.
- Qin, Y., Agboh, C., Wang, X., and Gilding, D.K. (1996) Alginate fibers. Chem. Fibers Intern., 46, 272-273.
- Qin, Y., and Gilding, D.K. (1996) Alginate fibres and wound dressings. <u>Medical</u>

 <u>Device Technology</u>, Nov, 32-40.
- Qin, Y., and Groocock, M.R. (2002) Polysaccharide fibers. PCT WO/02/36866A1.
- Raabe, D., Romano, P., Sachs, C., Fabritius, H., Al-Sawalmih, A., Yi, S., Servos, G., and Hartwig, H.G. (2006) Microstructure and crystallographic texture of the chitin-protein network in the biological composite material of the exoskeleton of the lobster Homarus americanus. <u>Material Science and Engineering</u>, A-421, 143-153.
- Rathke, T.D., and Hudson, S.M. (1994) Review of chitin and chitosan as fiber and film formers. <u>J.M.S.-Rev.-Macromolecular Chemistry and Physics-Makromolekulare Chemie.</u>, C34(3), 375-437.
- Ravi Kumar, M.N.V., Rajakala Sridhari, T., Durga Bhavani, K., and Dutta, P.K. (1998) Trends in color removal from textile mill effluents. <u>Colourage</u>, Aug, 25.

- Ravi Kumar, M.N.V. (1999) Chitin and chitosan fibres: a review. <u>Bull. Mater. Sci.</u>, 22(5), 905-915.
- Salmon, S., and Hudson, S.M. (1997) Crystal morphology, biosynthesis, and physical assembly of cellulose, chitin, and chitosan. <u>J.M.S.-Rev.-Macromolecular Chemistry and Physics-Makromolekulare Chemie</u>, C37(2), pp.199–276.
- Sawayanagi, Y., Nambu, N., and Nagai, T. (1982) Compressed tablets containing chitin and chitosan in addition to lactose or potato starch. Chemical and Pharmaceutical Bulletin, 30(8), 2935-2940.
- Sayag, J., Meaume, S., and Bohbot, S. (1996) Healing properties of calcium alginate dressings. Journal of Wound Care, 5(8), 357-362.
- Schmidt, G.R., and Means, W.J. (1986) Process for preparing algin/calcium gel structured meat products. U.S. patent no. 4,603,054.
- Shibata, Y., Foster, L.A., Metzger, W.J., and Myrvik, Q.N. (1997) Alveolar macrophage priming by intravenous administration of chitin particles, polymers of *N*-acetyl-D-glucosamine, in mice. <u>Infection and Immunity</u>, 65, 1734-1741.
- Sparkes, B., and Murray, D.G. (1986) Chitosan based wound dressing materials. US Patent 4572906.
- Sriupayo, J., Supaphol, P., Blackwell, J., and Rujiravanit, R. (2005a) Preparation and characterization of alpha-chitin whisker-reinforced poly(vinyl alcohol) nanocomposite films with or without heat treatment. <u>Polymer</u>, 46, 5637-5644.
- Sriupayo, J., Supaphol, P., Blackwell, J., and Rujiravanit, R. (2005b) Preparation and characterization of alpha-chitin whisker-reinforced chitosan nanocomposite films with or without heat treatment. <u>Carbohydrate Polymers</u>, 62, 130-136.
- Szosland, B., and East, G.C. (1995) The dry spinning of dibutyrylchitin fibres.

 <u>Journal of Applied Polymer Science</u>, 58, 2459-2466.
- Tamura, H., Tsuruta, Y., and Tokura, S. (2002) Preparation of Chitosan-coated Alginate Filament. <u>Material Science and Engineering</u>, C20, 143-147.
- Thomas, A., Gilson, C.D., and Ahmed, T. (1995) Gelling of alginate fibres. <u>Journal</u> of Chemical Technology and Biotechnology, 64, 73-79.

- Thomas, S., and McCubbin, P. (2003) A comparison of the antimicrobial effects of four silver-containing dressings on three organisms. <u>Journal of Wound Care</u>, 12, 101-107.
- Thomas, S., and McCubbin, P. (2003) An *in vitro* analysis of the antimicrobial properties of 10 silver-containing dressings. <u>Journal of Wound Care</u>, 12, 305-308.
- Thomas, S. (1990) <u>Wound Management and Dressings</u>. London: Pharmaceutical Press.
- Thomas, S. (2000) Alginate dressings in surgery and wound management. <u>Journal of Wound Care</u>, 9, 56-60, 115-119, 163-166.
- Wang, Q., Du, Y.M., Hu, X.W., Yang, J.H., Fan, L.H., and Feng, T. (2006)

 Preparation of alginate/soy protein isolate blend fibers through a novel coagulating bath. <u>Journal of Applied Polymer Science</u>, 101(1), 425-431.
- Winter, G.D. (1962) Formation of the scab and the rate of epithelialization of superficial wounds in the skin of the young domestic pig. <u>Nature</u>, 193, 293-294.
- Yalpani, M., Johnson, F., and Robinson, L.E. (1992) <u>Chitin, Chitosan: Sources, Chemistry, Biochemistry, Physical Properties and Applications, Elsevier, Amsterdam.</u>
- Yao, K.D., Peng, T., Yin, Y.J., and Xu, M.X. (1995) Microcapsules/microspheres related to chitosan. <u>J.M.S.-Rev.-Macromolecular Chemistry and Physics-Makromolekulare Chemie</u>, C35, pp.155-180.
- Zikakis, J.P. (ed.) (1984) In <u>Chitin, Chitosan and Related Enzymes</u> (Orlando: Academic Press), pp. XVII-XXIV.

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- Watthanaphanit, A., Supaphol, P., Tamura, H., Tokura, S., and Rujiravanit, R. (2008) Fabrication, Structure, and Properties of Chitin Whisker-Reinforced Alginate Nanocomposite Fibers. <u>Journal of Applied Polymer Science</u>, 110, 890-899.



Proceedings:

- Watthanaphanit, A., Supaphol, P., Furuike, T., Tamura, H., Tokura, S., and Rujiravanit, R. (2008, August 5-6) Antibacterial Activity of Alginate Nanocomposite Fibers Containing Chitosan Whiskers and Release Characteristic of the Presence Chitosan Whiskers. <u>Proceedings of the 22th Symposium on Chitin and Chitosan</u>, Niigata, Japan.
- Watthanaphanit, A., Supaphol, P., Tamura, H., Tokura, S., and Rujiravanit, R. (2006, April 23-26) Preparation and Characterization of Alginate Containing Chitin Whiskers. <u>Proceedings of the 7th Asia-Pacific Chitin and Chitosan Symposium (The 7th APCCS)</u>, Bexco, Busan, Korea.

Presentations:

- Watthanaphanit, A., Supaphol, P., Furuike, T., Tamura, H., Tokura, S., and Rujiravanit, R. (2008, September 24-26) Enhancement of chitosan content in alginate wet spun fiber using chitosan emulsion and dye absorb ability of the hybridized fibers. Paper presented at <u>The 57th</u> (2) <u>SPSJ Symposium on</u> Macromolecules, Osaka, Japan.
- 2. Watthanaphanit, A., Supaphol, P., Furuike, T., Tamura, H., Tokura, S., and Rujiravanit, R. (2008, August 7) Preparation and characterizations of wet spun alginate fiber containing chitosan whiskers. Paper presented at <u>Japanese Society</u> for Biomaterials, Osaka, Japan.
- 3. Watthanaphanit, A., Supaphol, P., Furuike, T., Tamura, H., Tokura, S., and Rujiravanit, R. (2008, August 5-6) Antibacterial activity of alginate nanocomposite fibers containing chitosan whiskers and release characteristic of the presence chitosan whiskers. Paper presented at <a href="https://doi.org/10.1007/jheart-10
- 4. Watthanaphanit, A., Supaphol, P., Furuike, T., Tamura, H., Tokura, S., and Rujiravanit, R. (2008, May 28-30) Preparation of alginate nanocomposite fibers containing chitosan whiskers: antibacterial activity and release characteristic of the presence chitosan whiskers. Paper presented at <a href="https://doi.org/10.2003/jhth.com/nactorial-activity-nactoria-activity-nactorial-activity-nact

- 5. Watthanaphanit, A., Tamura, H., Tokura, S, Supaphol, P., and Rujiravanit, R. (2007, December 4-7) Development of alginate fibers with antibacterial property by silver coating. Paper presented at <u>The 10th Pacific Polymer Conference</u> (PPC10), Kobe, Japan.
- 6. Watthanaphanit, A., Supaphol, P., Tamura, H., Tokura, S., and Rujiravanit, R. (2007, July 31-August 1) Mechanical property and biodegradability of wet-spun chitin whisker/alginate nanocomposite wound dressing fiber. Paper presented at International Symposium in Science and Technology-Collaboration between ASEAN Countries in Environment and Life Science, Osaka, Japan.
- 7. Watthanaphanit, A., Supaphol, P., Tamura, H., Tokura, S., and Rujiravanit, R. (2007, June 25-28) Preparation and properties of chitin whisker/alginate nanocomposite fibers as wound dressing. Paper presented at The 2nd International Conference on Advances in Petrochemicals and Polymers (The 2nd ICAPP), Bangkok, Thailand.
- 8. Watthanaphanit, A., Supaphol, P., Tamura, H., Tokura, S., and Rujiravanit, R. (2006, April 23-26) Preparation and characterization of alginate containing chitin whiskers. Paper presented at <u>The 7th Asia-Pacific Chitin and Chitosan Symposium</u> (The 7th APCCS), Busan, Korea.
- Watthanaphanit, A., Rujiravanit, R., Supaphol, P., and Tokura, S. (2005, December 12-15) Fibers with antimicrobial properties. Paper presented at <u>U.S.-Thai Symposium on Biomedical Engineering in Thailand: Moving toward International Standards</u>, Bangkok, Thailand.