



REFERENCES

- Allan, G.G. and Peyron, M. (1997). Depolymerization of chitosan by means of nitrous acid. In R.A.A. muxxarelli and M.G.Peter (Eds.), Chitin Handbook. European Chitin Society.
- Chandy, T. and Sharma, C.P. (1992). Chitosan beads and granules for oral sustained delivery of nifedipine: in vitro studies. Biomaterials, 13(13), 949-952.
- Goosen, M.F.A. (Eds.). (1997). Application of chitin and chitosan (pp. 3-29, 89-102). Pennsylvania, U.S.A.: Technomic Publishing Co., Inc.
- Hun, D.N.S. (1992). Emerging Technologies for Materials and Chemicals from Biomass: New developments in cellulose derivatives and copolymers. In R.M. Rowell, T.P. Schultz, and R. Narayan (Eds.), American Chemical Society (pp. 476). ACS Symposium Series.
- Jha, N., Leela, I., and Prabhakar Rao, A.V.S. (1988). Removal of cadmium using chitosan. Journal of Environmental Engineering, 114, 962.
- Katsuaki, K., Norio, N., Takashi, K., Seichi, T., and Oyin, S. (1981). Studies on chitin. Part VIII: Some properties of water soluble chitin derivatives. Polymer Journal, 13(3), 241-245.
- Kurita, K. (1997). Soluble precursors for efficient chemical modifications of chitin and chitosan. In M.F.A. Goosen (Eds.), Applications of chitin and chitosan (pp. 103-112). Lancaster: Technomic Publishing Co., Inc.
- Kurita, K., Ameniya, J., and Ohya, Y. (1999). Comb-shaped chitosan derivatives having oligo(ethylene glycol) side chains. Polymer Bulletin, 42, 387-393.
- Kurita, K. (2001). Controlled functionalization of the polysaccharide chitin. Progress in Polymer Science, 26, 1924-1971.
- Mark, H.F., Bikales, N.M., Overberger, C. G., and Menges, G. (1985). Chitin. Encyclopedia of Polymer Science and Engineering (vol.3, pp.430-440). New York: John Wiley&Sons.
- Maruca, R., Suder, B.J., and Wightmen, J.P. (1982). Interaction of heavy metals with chitin and chitosan-3.chromium. Journal of Applied Polymer Science, 27, 4827-4837.

- Mckay, G., Blair, H.S., and Gardener, J.R. (1989). Adsorption of dyes on chitin I. Equilibrium Studies. Journal of Applied Polymer Science, 27, 3043.
- Mekkriengkrai, D. (2000). An approach for oligochitosan via chitinase system and the chemical modification. M.S. Thesis in Polymer Science, The Petroleum and Petrochemical College, Chulalongkorn University.
- Moo-Yeal, L., Figen, V., Yoshitsune, S., Toshio, K., and Ji-Won, Y. (1999). Optimum conditions for the precipitation of chitosan oligomers with DP 5-7 in concentrate hydrochloric acid at low temperature. Process Biochemistry, 34, 493-500.
- Muzzarelli, R.A.A., Tanfani, F., Emanuelli, M., and Bolognini, L. (1985). Aspartate glucan, glycine glucan and serine glucan for the removal of cobalt and copper from solutions and braines. Biotechnology and Bioengineering, 27, 1115-1121.
- Nair, K.G.R. and Madhavan, P. (1984). Chitosan for removal of mercury from water. Fishery Technology, 21, 109.
- Ouchi, T., Nishizawa, H., and Ohya, Y. (1998). Aggregation phenomenon of PEG-grafted-chitosan in aqueous solution. Polymer, 39(21), 5171-5175.
- Peng, C., Wang, Y., and Tang, Y. (1998). Synthesis of crosslinked chitosan-crown ethers and evaluation of these products as adsorbents for metal ions. Journal of Applied Polymer Science, 70, 501-506.
- Peniche-Covas, C., Alvarez, L.W., and Arguelles-Monal, W. (1987). The Adsorption of mercury ions by chitosan. Journal of Applied Polymer Science, 46, 1147.
- Samakrat, K. (2002). Vinyl-chitosan macromonomer: An approach for controlled strucure chitosan. M.S. Thesis in Polymer Science, The Petroleum and Petrochemical College, Chulalongkorn University.
- Singh, D.K. and Ray, A.R. (1994). Graft copolymerization of 2-hydroxyethyl methacrylate onto chitosan films and their blood compatibility. Journal of Applied Polymer Science, 53, 1115-1121.
- Tan, S., Wang, Y., Peng, C., and Tang, Y. (1999). Synthesis and adsorption properties for metal ions of crosslinked chitosan acetate crown ethers. Journal of Applied Polymer Science, 71, 2069-2074.

- Tanida, F., Tojima, T., Han, S.M., Nishi, N., Tokura, S., Sakairi, N., Seino, H., and Hamada, K. (1998). Novel synthesis of a water-soluble cyclodextrin-polymer having a chitosan skeleton. Polymer, 39(12), 5261-5263.
- Tojima, T., Katsuru, H., Han, S.M., Tanida, F., Nishi, N., Tokura, S., and Sakairi, N. (1998). Preparation of an α -cyclodextrin-linked chitosan derivatives via reductive amination strategy. Journal of Polymer Science: Part A: Polymer Chemistry, 36, 1965-1968.
- Volesky, B. and Holan, Z.R. (1995). Biosorption of heavy metals. Biotechnology Progress, 11, 235-250.
- Wan, L., Wang, Y., and Qian, S. (2002). Study on the adsorption properties of novel crown ether crosslinked chitosan for metal ions. Journal of Applied Polymer Science, 84, 29-34.
- Yamagishi, T.A., Tani, K., Shirano K., Ishida, S.I., and Nakamoto, Y. (1996). Metal cation extraction properties of linear all-*ortho* phenolic oligomers. Journal of Polymer Science: Part A: Polymer Chemistry, 34, 687-693.
- Yang, Z., Wang, Y., and Tang, Y. (1999). Preparation and adsorption properties of metal ions of crosslinked chitosan azacrown ethers. Journal of Applied Polymer Science, 74, 3053-3058.
- Yang, Z., Wang, Y., and Tang, Y. (2000). Synthesis and adsorption properties for metal ions of mesocyclic diamine-grafted chitosan- crown ether. Journal of Applied Polymer Science, 75, 1255-1260.
- Yang, Z., Yuan, Y., and Wang, Y. (2000). Synthesis and evaluation of of chitosan aryl azacrown ethers as adsorbents for metal ions. Journal of Applied Polymer Science, 77, 3093-3098.
- Yang, Z. and Yuan, Y. (2001). Studies on the synthesis and properties of hydroxyl azacrown ether-grafted chitosan. Journal of Applied Polymer Science, 82, 1838-1843.
- Yoksan, R., Mitsuru, A., Siriratana, B., and Chirachanchai, S. (2001). Hydrophobic chain conjugation at hydroxyl group onto γ -ray irradiated chitosan. Biomacromolecules, 2(3), 1038-1044.

CURRICULUM VITAE

Name: Ms. Sasiprapha Phongying

Date of Birth: August 10, 1975

Nationality: Thai

University Education:

1994-1998 Bachelor degree of Science in Petrochemicals and Polymeric Materials, Faculty of Industrial Technology, Silpakorn University, Nakhon Pathom, Thailand.

Working Experience:

1999-2000 **Position:** Researcher
Company name: Dynamic Chemicals Company Limited,
Nakhon Pathom, Thailand.

