

## REFERENCES

- Aiba, S.I., Minoura, N., and Fujiwara, Y. (1985). Graft copolymerization of amino acids onto partially deacetylated chitin. Int. J. Biol. Macromol., 7, 120-121.
- Aiba, S.I., Izume, M. (1988). Studies on the effect of gamma-ray irradiation on chitin and chitosan. Bulletin of Industrial Products Research Institute, No. 111.
- Aiba, S-I. (1993). Studies on chitosan: 6. Relationship between N-acetyl group distribution pattern and chitinase digestibility of partially N-acetylated chitosans. Int. J. Biol. Macromol., 15, 241-245.
- Aiba, S-I. (1994). Preparation of N-acetylchitooligosaccharides by hydrolysis of chitosan with chitinase followed by N-acetylation. Carbohydrate Research, 265, 323-328.
- Allan, G.G., and Peyron, M. (1997). Depolymerization of chitosan by means of nitrous acid. In R.A.A. muzzarelli and M.G. Peter (Eds.). Chitin Handbook, European Chitin Society.
- Andrady, A.L., Torikai, A., Kobatake, T. (1996). Spectral Sensitivity of Chitosan Photodegradation. J. Appl. Polym. Sci., 62(9), 1465-1471.
- Bodmeier, R., Oh, K-H., and Pramart, Y. (1989). Preparation and evaluation of drug-containing chitosan beads. Drug Development and Industrial Pharmacy, 15(9), 1475-1494.
- Brine, C.J., Sanndford, P.A., and Zikakis, J.P. (Eds.). (1991). Advances in chitin and chitosan. England : Elsevier Science Publishers LTD.

- Chen, R.H., Chang, J.R., and Shyur, J.S. (1997). Effects of ultrasonic conditions and storage in acidic solutions on changes in molecular weight and polydispersity of treated chitosan. Carbohydrate research, 299, 287-294.
- Chunharotrit, S. (1998). Chitin derivative for controlled release system. M. Sc., Thesis, Chulalongkorn University.
- Domand, A., Roberts, G.A.F., and Varum, K.M. (Eds.). (1997). Advances in Chitin Science : Volume II. France : JACQUES ANDRE' PUBLISHER.
- Fujii, S., Kumagai, H., Noda, M. (1980). Carbohydrate Research, 83, 389.
- Hirano, S., Ohe, Y., and Ono, H. (1976). Selective N-acylation of chitosan. Carbohydrate Research, 47, 315-320.
- Hirano, S. (1978). A facile method for the preparation of novel membranes from N-acetyl- and N-acrylidend-chitosan gels. Agricultural and Biological Chemistry, 42(10), 1939-1940.
- Hirano, S., and Takeuji, M. (1983). Structural analysis of the reaction products of chitosan with *o*-, *m*-, and *p*-phthalaldehydes. Int. J. Biol. Macromol., 5, 373-376.
- Horowitz, S.T., Roseman, S., Blumenthal, H.J. (1957). Preparation of glucosamine oligosaccharides. 1. Separation. J. am. Chem. Soc., 79, 5041-5049.
- Horton, D., Just, E.K. (1973). Preparation from chitin of (1-4)-2-amino-2-deoxy- $\beta$ -D-glucopyranuronan and its 2-sulfoamino analog having blood-anticoagulant properties. Carbohydrate Research, 29, 173-179.
- Kurita, K., Chikaoka, S., Kamiya, M. (1988). Bull. Chem. Soc. Jpn., 61, 927.
- Kurita, K., Yoshino, H., Yokota, K., Ando, M., Inone, S., Ishii, S., and Nishimura, S.I. (1992). Preparation of tosylchitins as precursors for facile chemical modification of chitin. Macromolecules, 25, 3786-3790.

- Lertworasirikul, A. (1999). Structure controlled chitin derivatives by chemical modification approach: an application for insecticide controlled release. M.Sc., Thesis, Chulalongkorn University.
- Lim, L.Y., Khor, E. and Koo, O. (1998).  $\gamma$  Irradiation of chitosan. J Biomed Mater Res (Appl Biomater), 43, 282-290.
- Matsushima, Y., Fujii, N. (1957). Studies on aminohexoses. 4. N-deacetylation with hydrazine and deamination with nitrous acid, a clue to the structure of aminopolysaccharides. Bull. Chem. Soc. Japan, 30, 48-50.
- Nishimura, S.I., Kohgo, O., Kurita, K., and Kuzuhara, H. (1991). Chemospecific manipulation of a rigid polysaccharide: syntheses of novel chitosan derivatives with excellent solubility in common organic solvents by regioselective chemical modifications. Macromolecules, 24, 4745-4748.
- Moore, G.K., and Roberts, G.A.F. (1981). Reactions of chitosan: 2. Preparation and reactivity of N-acyl derivatives of chitosan. Int. J. Biol. Macromol., 3, 292-296.
- Qurashi, M.T., Blair, H.S., and Allen, S.J. (1992). Studies on modified chitosan membranes. I. Preparation and characterization. Journal of Applied Polymer Science, 46, 255-261.
- Sashiwa, H., Saimoto, H., Shigemasa, Y., and Tokura, S. (1993). Carbohydr. Res., 242, 167-172.
- Sawayanagi, Y., Numbu, N., and Nagai, T. (1982). Use of chitosan for sustained-release preparations of water-soluble drug. Chem. Pharm. Bull., 30(11), 4213-4215.
- Simionescu, Cr., I., Popa, M., I., and Dumitriu, S. (1985). Bioactive polymers XXI. Coupling of chloramphenicol on Biozan R. Colloid & Polymer Science, 263, 620-623.

- Thacharodi, D., Rao, K.P. (1995). Collagen-chitosan composite membranes for controlled release of propranolol hydrochloride. International Journal of Pharmaceutics, 120, 115-118.
- Tokura, S., Nishimura, N., Noguchi, J. (1979). Study on chitin. III. \* Preparation of chitin fibers. Polymer Journal, 11(10), 781-786.
- Ulanski, P., and Rosiak, J.M. (1992). Preliminary studies on radiation-induced changes in chitosan. Radiat. Phys. Chem., 39(1), 53-57.
- Uragami, T., yoshida, F., and Sugihara, M. (1983). Study of synthesis and permeabilities of special polymer membranes. LI. Active transport of halogen ions through chitosan membranes. Journal of Applied Polymer Science, 28, 1361-1370
- Wang, X.P., Shen, Z.Q., Zhang, F.Y. (1998). Pervaporation separation of water/alcohol mixtures through hydroxypropylated chitosan membranes. Journal of Applied Polymer Science, 69, 2035-2041.
- Wenwei, Z., Xiaoguang, Z., Li, Y., Yuefang, Z., and Jiazhen, S. (1993). Some chemical changes in chitosn induced by  $\gamma$ -ray irradiation. Polymer Degradation and stability, 41, 83-84.
- Xu, J., McCarthy, S.P., and Gross, R.A. (1996). Chitosan film acylation and effects on biodegradability. Macromolecules, 29, 3436-3440.

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